

A Comparative Study on the Pedagogical Integration Of AI-Driven Resources to Enhance
Foreign Language Learning in Seventh Graders of a Private and a Public Institution in the
Colombian Caribbean Coast

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Abstract

This study explores the pedagogical integration of Artificial Intelligence (AI)-driven resources in English language learning among seventh-grade students from two contrasting educational contexts on the Colombian Caribbean coast: a private school in Sincelejo and a public school in Barranquilla. Using a mixed-methods and action research approach, the study implemented classroom interventions supported by two AI tools; ChatGPT and Duolingo, across four lesson plans targeting listening, speaking, reading, and writing. Data were collected through questionnaires, semi-structured interviews, and focus groups. Findings revealed that AI positively influenced students' motivation, engagement, and confidence in using English as a foreign language. Both institutions demonstrated progress in receptive skills, vocabulary retention, and communicative participation, though outcomes varied according to contextual factors such as technological access, digital literacy, and teacher mediation. Private school students benefited from stable connectivity and individualized practice, while public school students showed strong affective gains and greater collaboration. The study concludes that AI can enhance bilingual learning environments when aligned with reflective pedagogy and equitable access. It emphasizes AI's complementary role in supporting, rather than replacing, teacher-led instruction. Recommendations include continuous teacher training, infrastructure

improvement, and context-sensitive adaptation of AI-based strategies to foster inclusive and sustainable innovation in foreign language education.

Keywords: artificial intelligence, English language learning, motivation, Duolingo, ChatGPT, bilingual education

Resumen

Este estudio explora la integración pedagógica de recursos impulsados por Inteligencia Artificial (IA) en el aprendizaje del inglés entre estudiantes de séptimo grado de dos contextos educativos contrastantes en la costa Caribe colombiana: un colegio privado en Sincelejo y una institución pública en Barranquilla. A través de un enfoque mixto y de investigación-acción, se implementaron intervenciones en el aula apoyadas por dos herramientas de IA; ChatGPT y Duolingo, en cuatro planes de clase centrados en las habilidades de escucha, habla, lectura y escritura. Los datos se recopilaban mediante cuestionarios, entrevistas semiestructuradas y grupos focales. Los hallazgos revelaron que la IA influyó positivamente en la motivación, el compromiso y la confianza de los estudiantes al usar el inglés como lengua extranjera. Ambas instituciones evidenciaron avances en las habilidades receptivas, la retención de vocabulario y la participación comunicativa, aunque los resultados variaron según factores contextuales como el acceso tecnológico, la alfabetización digital y la mediación docente. Los estudiantes del colegio privado se beneficiaron de una conectividad estable y práctica individualizada, mientras que los de la institución pública mostraron mayores logros afectivos y colaboración entre pares. El estudio concluye que la IA puede fortalecer los entornos de aprendizaje bilingüe cuando se alinea con una pedagogía reflexiva y un acceso equitativo. Se enfatiza el papel complementario de la IA como apoyo, y no sustituto, de la enseñanza docente. Se recomienda la formación continua del profesorado, la mejora de la infraestructura y la adaptación contextual de estrategias basadas en IA para promover una innovación educativa inclusiva y sostenible.

Table of Contents

Author Note	2
Abstract	3
Resumen.....	5
Introduction.....	9
Objectives	12
General Objective.....	12
Specific Objectives.....	12
Literature Review.....	13
Methodological Design.....	19
Research Approach and Design Type	19
Research Context and Implementation Process	21
Research Settings: Public and Private Institutions.....	21
Equity and Contingency Strategies	23
Institutional Collaboration and Teacher Involvement.....	23
Data Collection Instruments.....	24

Participants	27
Data Analysis	30
Pedagogical Intervention.....	31
Data Analysis	34
Coding System for Data References	35
Category 1: Perception and Acceptance of AI in English Language Learning	37
Subcategory 1: AI as a supportive environment for autonomy and confidence.....	38
Subcategory 2: AI as a source of motivation and accessible learning.....	41
Category 2: Impact of AI on the Development of Linguistic Skills	44
Subcategory 1: AI-Mediated listening and reading comprehension: strengthening receptive skills through adaptivity and repetition.	46
Subcategory 2: AI and oral interaction: enhancing pronunciation, fluency, and communicative confidence	48
Subcategory 3: Writing development through immediate feedback and error noticing.....	50
Category 3: Challenges in implementing AI in English learning	52

Subcategory 1: Clear identification of gaps (diagnosis).....	53
Subcategory 2: Awareness of the need for teacher training	56
Subcategory 3: Recognition of the complementary role of AI.....	58
Conclusions.....	62
Contributions To Bilingual Learning Environments	66
References.....	72
Appendices.....	77
List Of Tables and Figures.....	79

Introduction

This study examines the pedagogical integration of Artificial Intelligence (AI)–driven resources in English language learning among seventh-grade students in two contrasting educational contexts: a public and a private school located on the Colombian Caribbean coast. The research explores differences in access to technological resources, institutional support, and pedagogical practices between the two schools, aiming to understand how these variables influence the implementation of AI tools in language education.

Private schools in the region often have better infrastructure, including internet access and digital devices, along with smaller class sizes and more frequent teacher training. These conditions allow for smoother and more consistent integration of AI-based tools, such as language learning applications, chatbots, and real-time feedback platforms. Students in these institutions also tend to receive additional support at home, which further contributes to their engagement with AI-enhanced learning.

In contrast, public schools face significant limitations, such as insufficient technological resources, larger student populations, and limited opportunities for teachers to receive digital training. These factors can hinder the effective use of AI in language instruction. Nevertheless, when schools select and adapt AI tools according to their specific needs and constraints, these resources can still contribute meaningfully to student learning and help reduce educational gaps.

The central question guiding this research is: How does the pedagogical integration of AI-driven resources contribute to foreign language learning in seventh-grade students from a public and a private institution on the Colombian Caribbean coast?

Understanding the influence of AI in these contrasting settings is particularly relevant given the growing digital divide in Colombian education. AI has become an increasingly significant element in educational innovation, reshaping how languages are taught and learned worldwide. Its capacity to provide real-time feedback, personalize instruction, and enhance motivation offers new opportunities for both teachers and students. However, meaningful integration depends on equitable access, pedagogical reflection, and teacher mediation.

This study adopts an action research methodology that allows teachers to examine and transform their own classroom practices through innovation and reflection. By implementing AI-driven tools in both a public and a private EFL classroom, the research seeks to explore how these resources enhance students' motivation, engagement, and academic performance. The focus is not on comparing institutions, but on identifying the pedagogical value that AI can offer in diverse learning environments.

The project includes the pedagogical use of two AI tools; ChatGPT and Duolingo, as part of a task-based intervention aimed at improving students' English language skills. Each lesson plan focuses on one of the core language areas: writing, speaking, listening, or reading. The

intervention promotes active learning, collaboration, and autonomy while encouraging students to reflect on their cognitive and emotional progress.

Ultimately, this study views AI as a potential pedagogical equalizer capable of supporting more inclusive and dynamic bilingual learning environments. It aims to contribute to the growing understanding of how digital innovation can create meaningful educational opportunities for all students, regardless of their socioeconomic background.

Objectives

General Objective

Analyze the contribution of AI-driven resources on foreign language learning in seventh-grade students by measuring the impact of their pedagogical integration in a private and a public institution in the Colombian Caribbean coast.

Specific Objectives

1-Implement two AI-driven resources, including ChatGPT and Duolingo, as part of a pedagogical approach for two groups of young learners in a private and a public institution in the Colombian Caribbean coast, making use of institutional resources such as TV, computers or tablets or with personal mobile devices with prior authorization.

2- Compare young learners' engagement, motivation, and language proficiency outcomes following the use of AI-driven resources in two different educational settings on the Colombian Caribbean coast.

3-Determine the contribution of AI-driven resources in supporting foreign language acquisition, comparing outcomes of young learners from private and public institutions.

Literature Review

The increasing integration of Artificial Intelligence (AI) in educational contexts has prompted global discourse regarding its pedagogical implications and transformative potential. Various researchers and institutions have examined the intersection between AI and education, particularly in the teaching and learning of English as a foreign language (EFL), highlighting both the benefits and limitations of its application.

One of the most prominent voices in this discussion is Luckin (2016), who introduced the concept of *augmented intelligence* to describe AI not as a replacement for teachers but as a complementary tool that enhances human cognition. In her report *Intelligence Unleashed: An Argument for AI in Education*, Luckin emphasized AI's capacity to adapt to individual student needs, offering personalized learning experiences through dynamic feedback and content adjustment. The author argued that while AI is useful in supporting learning, it must be implemented critically, ensuring students remain actively aware of their knowledge development and that teachers remain involved in supervising AI use.

During the COVID-19 outbreak, the use of AI and other digital tools in education rapidly accelerated. Chua's (2020) study on the role of artificial intelligence in education amidst the pandemic, explored how AI contributed to the continuity of education in the Philippines during widespread school closures. Chua's meta-analysis revealed that AI-supported tools provided adaptive learning, automated feedback, and performance tracking. These tools enabled greater student autonomy and assisted institutions with logistical challenges such as attendance, grading,

and content delivery. Chua concluded that AI was instrumental in maintaining educational quality in contexts where infrastructure was limited.

Similarly, Shiohira and Keevy (2020) addressed AI's role in education from a social and inclusive perspective in a report presented at a UNESCO global forum. Their findings emphasized the importance of integrating AI systems that respect linguistic and cultural diversity, particularly in multilingual and indigenous contexts. They highlighted that AI could support language learning through grammar correction, translation, and real-time feedback, particularly for learners of English as a foreign language. However, it was also noted that in many contexts, AI was introduced hastily and without adequate preparation, underscoring the need for human-centered, equitable implementation that prioritizes ethical considerations.

In the Latin American context, Cobo (2021), through his UNESCO IESALC report, identified the pandemic as a catalyst for digital innovation in education. He argued that Latin American education systems, particularly in Colombia, require strategic investment in technological infrastructure, teacher training, and AI-based tools. Cobo highlighted the Universidad Nacional Abierta y a Distancia (UNAD) as an example of innovation, citing its AI ecosystem that supports emotional well-being, assessment feedback, plagiarism detection, and participation tracking. From his ethical and responsible perspective, Cobo advocated for the use of AI as a means to bridge social gaps and improve the quality of education in under-resourced regions.

At a local level, a qualitative study titled “Academy and Virtuality” by Herrera Pérez and Ochoa Londoño (2022) explored the application of AI and virtual learning in a public school in Barranquilla. The study revealed how the institution adapted remote and hybrid learning models despite severe infrastructure and connectivity limitations. Data gathered through interviews and textual analysis demonstrated that teachers experienced high stress due to limited digital literacy, while students faced challenges with access and participation. Nonetheless, the implementation of blended learning and family involvement was noted as positive outcomes, supporting student retention and promoting autonomy.

Despite the generally optimistic tone of much of the literature, critical perspectives also exist. Mühlhoff (2024) expressed concerns about the overreliance on tools such as ChatGPT in his analysis of AI-based correction systems. Conducted in German school settings, his research found that AI systems often produced incoherent or misleading feedback, with students increasingly trusting information without verifying its validity. Mühlhoff cautioned that such practices may inhibit the development of critical thinking, reflection, and independent learning, and he emphasized the need for rigorous oversight and ethical awareness in educational AI use.

In contrast, Khan (2024) offered a more favorable view in his book *New Words: How AI Will Revolutionize Education*. His study involved the implementation of Khanmigo, an AI-based tutor used in a U.S. school to support students from primary to higher education levels. Khanmigo did not simply give answers; it fostered student interaction and critical engagement with content. Over two years, pilot studies demonstrated improved academic performance,

enhanced teacher support, and more interactive learning environments. Teachers reported reductions in workload and increases in student engagement, while students benefited from real-time feedback and individualized guidance.

The findings of Mühlhoff (2024) and Khan (2024) clearly illustrate the tension between innovation and critical caution that defines the current discourse on AI in education. While Khan's evidence demonstrates how AI can effectively enhance learner participation, personalize instruction, and assist teachers, Mühlhoff's critique serves as an important counterbalance, reminding educators that technological progress must not come at the expense of human agency or reflective thought. This dialogue underscores a key challenge for AI integration: designing systems that amplify human intelligence, as Luckin (2016) suggested, rather than diminishing it through automation or dependency.

Furthermore, these contrasting perspectives reveal that AI's impact is not universal but context dependent. In well-resourced environments such as the U.S. schools described by Khan (2024), AI can supplement teaching and learning through adaptive, data-driven support. In contrast, Mühlhoff's findings, situated in European classrooms, reveal that when ethical guidelines, teacher training, or algorithmic transparency are lacking, AI may unintentionally reinforce passive learning habits or misinformation. This divergence suggests that effective AI integration requires not only technological infrastructure but also pedagogical frameworks that nurture digital literacy and critical thinking.

For contexts like the Colombian Caribbean Coast, where digital access and teacher preparedness remain uneven (Cobo, 2021; Herrera Pérez & Ochoa Londoño, 2022), these insights are especially significant. Khan's success story with Khanmigo points to the transformative possibilities of AI when implementation is strategic, equitable, and supported by educators. Yet, as Mühlhoff (2024) warns, without ethical reflection and active teacher mediation, AI could risk widening existing educational inequities or promoting uncritical reliance on machine-generated knowledge.

Consequently, the literature points to two essential priorities: harnessing AI's potential to promote personalized and engaging learning experiences, while ensuring its implementation remains rooted in human-centered and pedagogically sound practices. Future research in Latin American and EFL contexts should therefore focus not only on AI's technical capabilities but also on how teachers and learners negotiate its presence, how they question, reinterpret, and adapt AI-generated input within their own sociocultural realities. This balance between innovation and ethics will be central to any sustainable model of AI integration in language education.

These studies collectively reflect the evolving landscape of AI in education. While AI presents significant opportunities to support personalized, accessible, and innovative learning, particularly in EFL contexts; its integration must be intentional, ethical, and adapted to local realities. As we explore the implementation of AI in two educational institutions on the

Colombian Caribbean Coast, it becomes essential to draw upon these diverse perspectives to inform a context-sensitive and inclusive approach to digital transformation in language education

Methodological Design

This study adopts a mixed-methods research design, integrating quantitative and qualitative approaches to comprehensively analyze how AI-driven resources influence English language learning in two contrasting educational contexts. As Creswell and Plano Clark (2018) explain, mixed-methods research combines the complementary strengths of both paradigms, allowing for a deeper and more nuanced understanding of complex educational phenomena. Likewise, Fetters (2020) highlights the value of methodological pluralism in addressing multifaceted pedagogical questions, particularly in contemporary language education.

In this study, quantitative data were obtained through questionnaires, while qualitative data were gathered from interviews and focus groups. This integration of methods enables triangulation of findings and promotes a holistic understanding of the pedagogical impact of AI tools.

The following subsections describe the research approach, design type, participants and contexts, data collection instruments, and procedures applied throughout the study, concluding an overview of ethical considerations.

Research Approach and Design Type

Quantitative and qualitative methods will be integrated through the implementation of the four developed instruments and the resulting results. To comprehensively explore the impact of

AI tools in English language learning across two different educational contexts, this study uses four key instruments.

The process begins with a student questionnaire, which gathers information about learners' socioeconomic backgrounds, access to technology, and attitudes toward learning English and using AI tools. This helps contextualize each student's starting point. A semi-structured interview with English teachers is also conducted to understand their perspectives on using AI in the classroom, including perceived benefits, challenges, and strategies. A first focus group with students follows, offering a space for participants to express their expectations and initial experiences with AI in language learning. After the intervention, a second focus group provides qualitative insights into how students perceived their progress and engagement. These discussions help capture motivational and emotional aspects that complement numerical data.

After four pedagogical sessions using ChatGPT and Duolingo, all collected data will be examined using Microsoft Excel as a statistical tool, to ensure a clear, well-rounded understanding of how AI integration affects English learning in both public and private school settings. In such a research way, the researchers can critically assess the affordances and limitations of AI tools in real classroom settings, while also promoting equity and inclusion in foreign language instruction. As Creswell (2012) notes, such approaches are particularly valuable in contexts marked by diversity and educational inequality, where interventions must be both responsive and adaptable.

Action research is widely applied in educational settings due to its practical, participatory, and reflective nature. As Bradbury-Huang (2010) explains, action research is a collaborative process aimed at improving practice through cycles of planning, action, observation, and reflection.

Research Context and Implementation Process

This process will be carried out in two distinct contexts; a public and a private secondary institution, where the same pedagogical intervention, involving the integration of AI tools, will be implemented and analyzed. Observations and collected experiences, particularly those reflecting participants' emotions and attitudes, will help assess how these tools facilitate or enhance students' performance in learning English as a foreign language. Additionally, by recording the activities, exercises, and learning outcomes, the study will provide feedback on how these AI-based strategies support foreign language acquisition.

Research Settings: Public and Private Institutions

Although the two schools are different in their social and economic situations, both have the basic technology needed to carry out research and use AI tools in class. In both public and private schools, classrooms have TVs and speakers, which help show videos and other materials. Also, most students have their own mobile phones, so they can use AI apps like Duolingo and ChatGPT during the lessons. These tools help make sure that all the planned activities like the students' questionnaires, group talks, and AI-based language tasks can be done well in both

schools. The technology they have is enough to support the research and make sure the results are fair and useful.

Exploring both shared and divergent experiences of students across two socio-educational environments includes various factors. First, the public institution and its seventh-grade group are comprised of students ranging in age from 12 to 14, belonging to social classes 1 and 2. Furthermore, the English proficiency level is low due to limited family support and a lack of resources, evident in the student group of 40 to 42 students, who have classrooms with fans and a TV as support material. The English class intensity is four hours per week. In contrast, private-sector educational institutions have groups of 27 to 30 students. Classrooms have Wi-Fi and air conditioning, and English intensity is 10 hours per week. The English proficiency level is high due to the support of parents, as students participate in extracurricular activities that reinforce the language. Furthermore, the school is in a well-known area of the Sucre department.

The study aims to generate transferable insights that inform inclusive and equitable technology integration strategies in language education through the use of technological tools such as computers and tablets available at the private school in Sucre, and the availability of cell phones for students, with prior authorization from parents, coordinators, and the principal, the school has been instrumental in administering the proposed tests and artificial intelligence exercises. Similarly, although the public school in Barranquilla does not have tablets, it has a computer lab, internet access, and computers where interactive activities can be carried out. Likewise, if required, cell phones will be available to students with the authorization of parents

and administrators. The school also has a streaming room where video projections are made through a video beam, and speakers and television are used, depending on the type of activity.

Equity and Contingency Strategies

To ensure that both institutions involved in the project offer equitable opportunities for students to complete the proposed activities, contingency strategies will be implemented in the event of unforeseen challenges. First, it is essential to make use of the available resources within the institutions, such as TVs, projectors, computers, speakers, and Wi-Fi connections. However, in the case of connectivity issues, power outages, or limited access to technological resources during class sessions, teachers will adapt their plans accordingly. For example, if internet access is unavailable, televisions may be used to project exercises and images so all students can follow along. If only a limited number of devices are available for individual tasks, students will be grouped to work collaboratively. Additionally, teachers may share internet access from personal devices when necessary. In situations where there is a power outage, poor ventilation, or an unavailable technology room, outdoor spaces within the institution will be used to carry out the planned activities.

Institutional Collaboration and Teacher Involvement

In a cross-disciplinary manner, with teachers from other areas, the master's students from both institutions will share the project proposal, the benefits and incidence of artificial intelligence in education, and how, specifically, this program will allow students to strengthen

their language skills in English. The objective is for the master's students, thanks to the knowledge acquired in the master's program, to train other teachers and show them how artificial intelligence tools can be used to teach classes. Also, one of the project's goals is to share the results of tests and activities, with the aim of demonstrating the project's progress.

Data Collection Instruments

As part of our research project, four data collection instruments were designed by the researchers: a student questionnaire, a semi-structured interview for teachers, and two focus group guides for students.

The development of these instruments was informed by the objectives and methodological framework of the study, which adopted a qualitative and comparative approach. Each instrument was aligned with the research goal of exploring the integration of artificial intelligence (AI) tools, such as ChatGPT & Duolingo into the English language learning process of seventh-grade students in both private and public educational contexts.

The creation process began with a comprehensive review of the literature on the use of AI in education, bilingual learning environments, and student-centered methodologies such as Task-Based Language Teaching (TBLT). Based on this foundation, our team collaboratively designed each instrument to collect rich, relevant, and contextualized information from participants.

The student questionnaire was designed to collect students' perceptions, motivation, engagement, and experiences using AI tools in English language classes. The student questionnaire was structured into several domains addressing technology access, motivation, and perceptions of AI-assisted learning. The semi-structured interview aimed to gather insights from English teachers regarding their views on the pedagogical effectiveness of AI tools in developing language skills and fostering classroom interaction, and the focus group guide was developed to encourage open discussion among students about their learning experiences with AI, their preferences, and their perceived benefits and challenges. The focus group protocol centered on emotional reactions, perceived progress, and learning preferences.

Table 1 - Summary of data collection instruments

Type of Instrument	Purpose of the Instrument
Students Questionnaire	Collected data to characterize participants and explore their familiarity, perceptions, and overall satisfaction with the use of AI tools in the English learning process.
Semi-structured Interview for Teachers	Explored teachers' perceptions regarding the effectiveness, benefits, challenges, and pedagogical strategies associated with the implementation of AI-driven tools in their classrooms.
Focus Group	Gathered insights into students' emotions, learning experiences, and difficulties, as well as their comparisons between traditional and technology-enhanced classes and their willingness to continue using AI resources in the future.

Source: Own creation

As a feedback mechanism with the two students from different institutions, the students will share a moment of reflection, through which they will learn about their experiences

implementing these tools, how they felt about participating in the project, which methodology and application they liked most, and which exercises they disliked and why. A comparison of events will also be made between the different groups of students.

All instruments were drafted with attention to the age and language proficiency of participants, ensuring that the questions were accessible, clear, and relevant to their context. To ensure the reliability and academic rigor of the instruments, they were submitted to an external validation process by an expert with a master's degree in English Language Teaching. The validation focused on three key aspects: alignment with the study objectives, clarity of language and structure, and adequacy for data collection in the target educational settings. Each of the four instruments; the questionnaire, interview, and the two focus group guides, was evaluated coherent with the research objectives, appropriately written, and sufficient for collecting the intended qualitative data. The expert confirmed that the instruments supported the study's purpose of exploring how AI tools impact language learning in diverse school contexts. This validation reinforced the credibility of our tools and confirmed that they were suitable for implementation in both public and private school settings on the Colombian Caribbean coast. As a result, the instruments were finalized and prepared for field application under ethical and methodological standards approved by the institutional ethics committee.

The analysis of the instruments will be carried out quantitatively and qualitatively, depending on their nature. The matrices and responses provided in the semi-structured interviews conducted with both teachers and students will be coded, identifying emotions, experiences, or

categories related to the use of the artificial intelligence applications ChatGPT or Duolingo in teaching or learning English as a second language. Similarly, the collected data will be interpreted based on the results of open-ended and closed-ended questions, as well as repetitive phrases or patterns. The responses will be closely observed in relation to the research object and context. Likewise, in the focus groups, the findings will be analyzed, considering the comments, agreements, and predominant ideas. The perspective on the effectiveness of the technological tools ChatGPT or Duolingo in carrying out exercises in English as a second language will also be analyzed. Questioning will be conducted in these groups in turn, focusing on each experience. The interview transcripts were analyzed using a thematic coding scheme grounded in emergent categories

Participants

The participants in this study comprised a diverse group of 40 students from the Colombian Caribbean coast, specifically the cities of Sincelejo and Barranquilla. This diversity was reflected in the participants' educational contexts, as the sample included one group of seventh graders from a private institution in Sincelejo and another group from a public institution in Barranquilla. Such variability in educational levels and contexts provided a rich foundation for examining the pedagogical integration of artificial intelligence (AI) resources across different learner demographics. Furthermore, the three members of the research team, serving as both teachers and researchers, actively contributed to the design, implementation, and analysis of the study, ensuring a comprehensive and reflective exploration of the research objectives. It is

important to add that the 15 students from each school that are part of the study are those who expressed their willingness to be part of it, and those whose parents were able to sign the consent form on time.

The first group included seventh-grade students from Liceo Panamericano Campestre, a private institution in Sincelejo, Sucre, founded in 1966. The target population comprised students aged 12 to 14, distributed across four groups (7°A to 7°D), each with 27 to 30 students. The school, known for its developmental approach, emphasizes English language instruction with an intensive curriculum of 10 hours per week divided into specialized courses:

- Reading Club (reading comprehension),
- English Center (listening and speaking skills)
- Language in Use (grammar and writing).

Liceo Panamericano Campestre, serving approximately 2,000 students, is the top-performing institution in the Sucre department based on Pruebas Saber ICFES results. Its advanced infrastructure includes air-conditioned classrooms with projectors, Wi-Fi, and teacher-use computers, along with a modern computer lab and library. These resources provide an ideal environment for integrating AI-driven educational tools.

The second group consists of seventh-grade students (7th A to 7th F) from the Institución Educativa Germán Vargas Cantillo located in the Las Cayenas neighborhood of Barranquilla, Atlántico. Each group consists of approximately 40 to 42 adolescents, ranging from 12 to 13

years old. The institution is public and is operated by (Fe y Alegría, Colombia), which, according to its Jesuit philosophy, is based on popular education and social transformation. Therefore, this educational center is in a neighborhood marked by gang violence, which fights for territories and invisible lines and in one way or another affects the student population, which is often immersed in these conflicts. For this reason, the school has implemented English language instruction as a motivational strategy so that students find learning this second language a way to overcome their difficulties. For this reason, the classrooms have a television and a speaker that facilitate the projection of videos and songs in English.

The classrooms are spacious, with fans, not air conditioning. The school has a computer lab, where computers are also used for online listening exercises. Wi-Fi is available throughout the school. English instruction is limited to four hours per week per grade. Students do not use textbooks in class; instead, teachers design activities in their notebooks. The school's English level is basic, as the families' social class is between 1 and 2. The school faces a major challenge: first, implementing bilingualism and then raising its ICFES scores, which is currently in category B. Therefore, teachers, to achieve the proposed goals and given the needs of this technological age, have planned the use of artificial intelligence as a teaching tool, creating an ideal environment that strengthens their communication skills.

Table 2 - Summary of participants

Number of participants	Age	Place of origin	Level/School grade	Additional features relevant to the project
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15 students	11 - 14 years old	Sincelejo Sucre	Secondary school	English class duration: 10 hours per week.
15 students	12 - 13 years old	Barranquilla Atlántico	Secondary school	English class duration: 4 hours per week.

Source: Own creation

Data Analysis

To study the data collected with different instruments in this research project, we will use several steps to analyze both numbers and opinions. First, the results from the questionnaires will be analyzed and organized in Excel. There, we will calculate basic statistics like averages, most common answers, and differences between contexts. During the data analysis process, the researcher will look for patterns in students' answers about their access to technology, motivation, satisfaction, and how they feel about the AI tools they use. This will help to understand if their background and attitude affect their learning.

For the interviews with teachers and the focus group with students, the collected responses will be transcribed and analyzed to identify recurring themes and ideas, such as the benefits and challenges of using AI tools and students' perceptions during the activities. Excel will be employed to organize and categorize the data according to emerging themes, supported by graphical representations that illustrate measurements across different variables.

The quantitative and qualitative results will then be compared to obtain a comprehensive understanding of the findings. Graphs, comparison tables, and charts generated in Excel will be

used to clearly present the outcomes. This analytical approach aims to elucidate how AI tools supported students' English language learning in both institutions and how contextual factors, such as technological availability, influenced the learning experience.

Pedagogical Intervention

The pedagogical approach behind integrating AI into language learning is grounded in constructivist and socio-cognitive theories. Obidovna (2023) emphasizes the value of AI-based modules in personalizing instruction, allowing students to progress at their own pace and within their level of proficiency. This supports a learner-centered model where tools like Grammarly and adaptive platforms break language tasks into manageable parts, offering instant feedback that fosters autonomy and scaffolding. Alharbi (2023) adds that Automated Writing Evaluation tools improve writing accuracy but must be combined with teacher guidance to promote deeper cognitive engagement. To build on this, the teacher-researchers will incorporate four specific tasks into their lesson plans; each focused on one language skill: writing, speaking, listening, or reading. These tasks, paired with appropriate AI tools, are designed to facilitate reflection and analysis of how these resources impact language development in young learners from different educational contexts.

AI is also used to promote critical thinking and metacognitive awareness. Wang and Dang (2024) explain that generative tools like ChatGPT encourage students to analyze and evaluate content, helping them build “GenAI literacy” and reflect on ethical considerations.

Likewise, Polakova and Klimova (2024) note that chatbots simulate real conversations, boosting fluency and lowering learner anxiety. The study applies a task-based approach already familiar to participating teachers, enabling flexible integration of tools such as writing assistants, speech recognition platforms, and adaptive reading materials. By sharing classroom themes across institutions, researchers can design adaptable tasks that prioritize linguistic goals over fixed topics. This approach creates a dynamic, personalized learning environment that fosters engagement and supports diverse learner needs, contributing valuable insight into the role of AI in foreign language education.

Interventions took place in both institutions with selected samples during the months of June and August 2025. The process was structured into different phases and the set of activities were simultaneously developed, considering an schedule that includes 8 activities from data collection instruments to pedagogical sessions (see table 3) that started in June 3 with the application of the students' questionnaire and closes with the implementation of the focus group and the data analysis of each step of the process from start to finish.

Table 3-Intervention Plan (Schedule)

Phase	Activity	Time Frame
Phase 1: Initial Instruments	Students Questionnaire	June 3 - 6
	Semi-Structured Interview	June 12
	Focus group 1	June 13

Phase 2: First Pedagogical intervention	Lesson 1 – Writing Skill Focused	July 2
Phase 3: Second Pedagogical intervention	Lesson 2 – Speaking Skill Focused	July 4
Phase 4: Third Pedagogical intervention	Lesson 3 – Listening Skill Focused	July 7
Phase 5: Fourth Pedagogical intervention	Lesson 4 – Reading Skill Focused	July 9
Phase 6: Last Instruments	Focus group 2	July 11
Phase 7: Data Analysis	Both qualitative and quantitative data will be analyzed using Excel	July 21 - 25

Source: Own creation

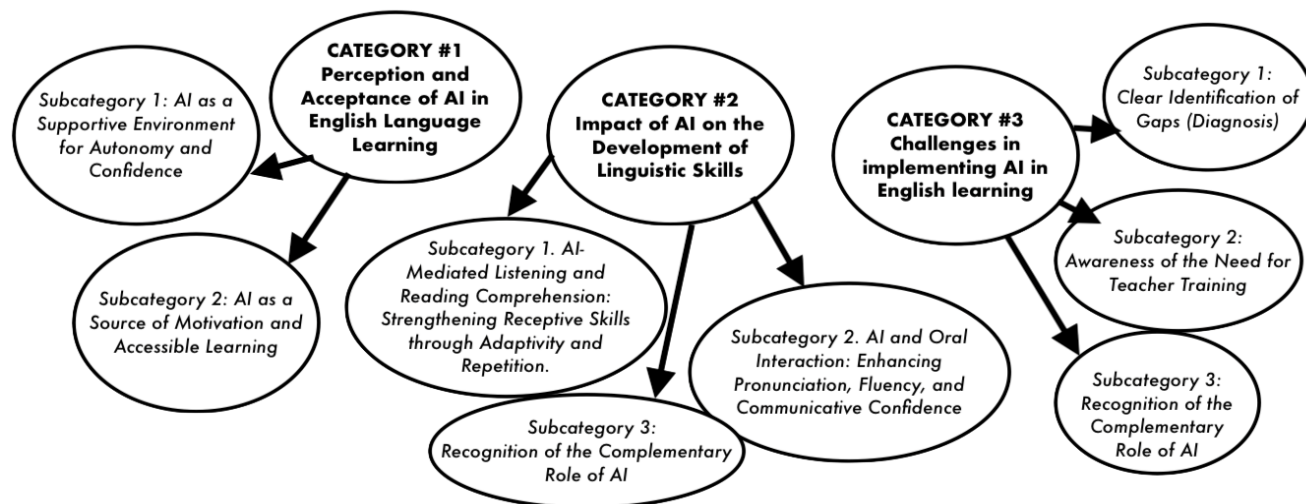
Data Analysis

This chapter analyzes the pedagogical integration of AI-driven resources in two educational contexts: a private and a public school located on the Colombian Caribbean Coast. Data obtained from questionnaires, focus groups, and teacher interviews were coded and triangulated. The analysis adopted a mixed qualitative-quantitative approach, through which recurring patterns were identified, interpreted, and organized into subcategories that were later consolidated into three overarching categories reflecting the main dimensions of the study.

The first category, Perception and Acceptance of AI in English Language Learning, encompasses the assessments and attitudes of teachers and students toward the integration of these tools, highlighting levels of motivation, openness to change, and confidence in the use of emerging technologies. The second category, Impact of AI on the Development of Linguistic Skills, groups findings related to progress in comprehension, production, and practice of the four communicative skills, providing insights about how the use of these digital resources influence the language learning process. Finally, the third category, Challenges and Recommendations for the Implementation of AI in the Classroom, addresses the tensions, limitations, and proposals derived from the participants' experiences, with the aim of guiding future pedagogical strategies that promote a more effective and equitable use of these technologies in diverse educational contexts. The set of categories and subcategories are summarized in the following map. (Figure

1)

Figure 1- Categories and subcategories



Source: Own creation

Coding System for Data References

A systematic coding system was applied throughout the analysis. Each code combined four key elements: the institutional context; PU for the public school and PRI for the private school; the data collection instrument; FOC for Focus Group, SEMI for Semi-Structured Interview, and Q for Questionnaire; the participant identifier, which distinguished between students and teachers; and the date of data collection, indicating when each response was obtained.

In this study, codes beginning with the letters D and E corresponded to students: D represented public-school students, and E represented private-school students, both codes for the focus group. The letters X and Y were used for teachers, with X (1–3) identifying the three teachers interviewed from the public school, and Y (1–3) identifying the three teachers from the private school. The final element, the date, situates each citation in its temporal context.

Table 4- Coding system

Code Element	Example
Institution Prefix	PU / PRI
Instrument Type	FOC / SEMI / Q
Participant	E (Private school students), D (Public school students); X (1, 2, 3)
Identifier	(public-school teacher); Y (1,2,3) (private-school teacher)
Date of Data Collection	August 2025 / July 2025
Full Example	PRI-FOC, E6, August 2025

Source: Own creation

To ensure transparency and accuracy in data handling, all materials originally collected in Spanish were translated into English by the research team. This decision responded to the need for consistency in the analysis and presentation of findings in an academic context. The translation process was conducted with close attention to linguistic precision and conceptual equivalence, aiming to preserve the authenticity and meaning of participants' responses. Special

care was taken to maintain the tone, cultural nuances, and contextual details embedded in the original expressions. To enhance reliability, the translations were collaboratively reviewed and refined to minimize potential bias or misinterpretation throughout the analytical process.

Category 1: Perception and Acceptance of AI in English Language Learning

This category explores the attitudes, evaluations, and dispositions of students and teachers toward the incorporation of artificial intelligence tools in the process of learning English. Its purpose is to show how motivation, comfort, and confidence influence the way these technologies are received in the classroom, while also highlighting the challenges associated with their implementation.

The subcategories that compose this category provide a more detailed understanding of these perceptions. AI as a Supportive Environment for Autonomy and Confidence illustrates how AI fosters independence in practice and pace, contributing to the reduction of anxiety and increase in confidence which reflects the potential of these applications to create a less intimidating environment for foreign language learning. Likewise, AI as a Source of Motivation and Accessible Learning emphasizes how the engaging and interactive nature of AI promotes motivation and enjoyment, while its adaptive design facilitates clearer understanding and easier access to language content. Taken together, these subcategories portray a comprehensive framework that not only evidences a generally positive disposition toward AI but also identifies the pedagogical conditions required for such acceptance to lead to meaningful and sustainable learning outcomes.

Subcategory 1: AI as a supportive environment for autonomy and confidence

The findings reveal that AI tools foster both autonomy and emotional support in the language classroom. Quantitative and qualitative data confirm that students and teachers from both institutions perceive AI positively. According to the students' questionnaires, over 80% of learners expressed enjoyment, confidence, and motivation when using AI to learn English. Similarly, findings from the teachers' interviews show that nearly 90% of teachers observed increased student participation and engagement during AI-mediated activities. Although these benefits appeared in both settings, their nature and intensity varied slightly. In the public institution, AI promoted a stronger emotional and motivational impact, reducing fear and anxiety while encouraging participation. Conversely, in the private institution, AI supported self-directed learning and continuity, as students benefited from stable connectivity, personal devices, and prior digital experience.

Students highlighted that platforms such as ChatGPT and Duolingo allowed them to control their learning pace and revisit content independently: *"I liked it because I could repeat as many times as I wanted without feeling bad"* (PU-FOC, S2, July 2025, own translation). This reflects a shift toward greater learner agency, as students began to view AI not just as a source of information but as a tool for managing their own progress. Such experiences illustrate how AI fosters self-directed learning while lowering the affective filter, enabling learners to participate more confidently. As one private-school learner explained: *"It gave me confidence to speak because nobody laughed if I made a mistake"* (PRI-FOC, S5, July 2025, own translation).

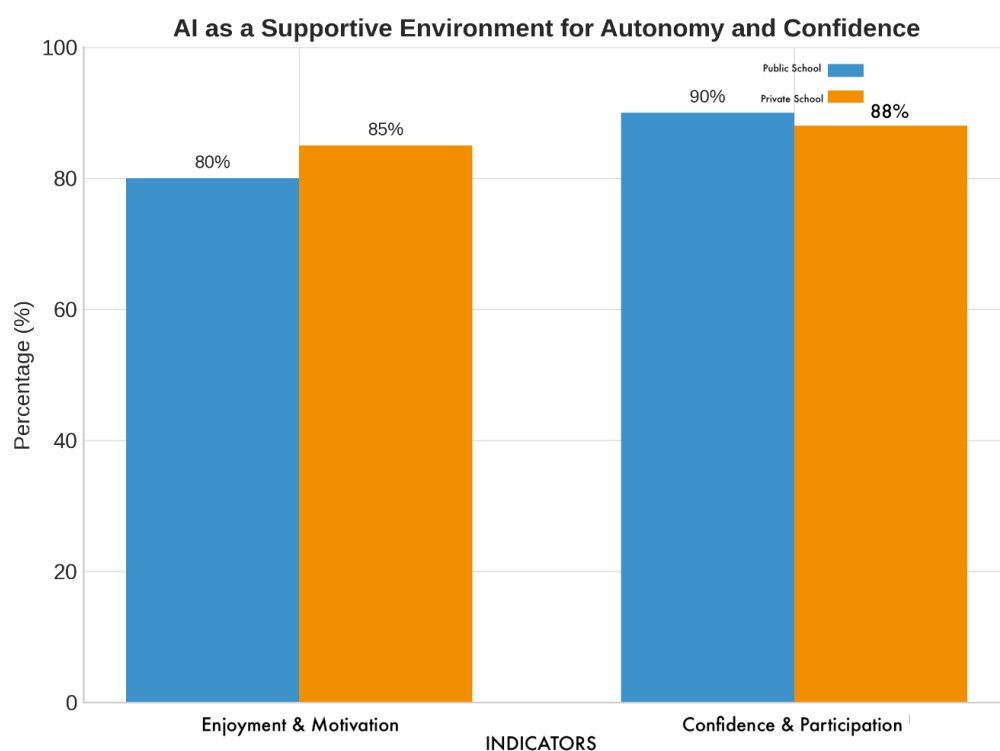
The non-judgmental and playful nature of AI environments encouraged participation and diminished fear of making mistakes. Teachers echoed this perception: *“Many shy students started participating more because they did not feel the pressure of making mistakes”* (PU-SEMI, X2, July 2025, own translation). *“I have identified progress... they raised their hands, participated on the board, shared their experiences, and interacted in the group, thanks to the use of this tool”* (PU-SEMI, X3, July 2025, own translation). These testimonies demonstrate that AI not only benefits individual learners but also reshapes classroom dynamics, promoting more inclusive and interactive participation. The transition from passive reception to active contribution signals a change in learner identity from hesitant and dependent to more autonomous and engaged participants.

These findings align with Moybeka’s (2023) research, which emphasizes that gamified and interactive AI environments reduce language anxiety by lowering the affective filter, creating a supportive atmosphere for communicative participation. The convergence of student voices and teacher observations confirms that the benefits of AI are both cognitive and affective: it enables learners to regulate their own process while transforming their attitudes toward participation. In this sense, AI operates as a pedagogical mediator, bridging individual autonomy and collective classroom confidence.

Finally, results show that students and teachers from both institutions share a consistently positive perception of AI as a tool that enhances confidence, autonomy, and engagement in language learning. The small variations mentioned before are mainly associated with access,

digital competence, and resources. These differences are subtle rather than substantial. No significant differences were observed between institutions, as both groups benefited similarly from AI's capacity to lower affective barriers and sustain engagement. However, the findings also suggest that without proper pedagogical mediation, students may gravitate toward passive uses (*see figure 2*) (e.g., translation, reading) rather than active, communicative production. Therefore, while AI effectively supports the development of autonomy and confidence, it should serve as a pedagogical complement; enhancing, not replacing, teacher guidance and structured instruction.

Figure 2 - AI as a Supportive Environment for Autonomy and Confidence



Source: Own creation

Subcategory 2: AI as a source of motivation and accessible learning

This subcategory explores how Artificial Intelligence functions as a source of motivation and accessible learning in English language education. The evidence collected from both students and teachers indicates that AI-driven tools not only make learning more engaging and enjoyable but also facilitate access to individualized practice and flexible learning opportunities. However, while these technologies inspire enthusiasm and participation, they also demand careful pedagogical management to prevent dependency and distraction.

AI emerged as a powerful motivational force within the classroom. Students consistently described AI-supported activities as dynamic, innovative, and different from conventional lessons. They emphasized that interacting with applications such as ChatGPT and Duolingo transformed learning into an experience that felt playful and rewarding. As one learner said, *“I liked using AI because it was different from regular classes. I felt like it was playing or talking to the English teacher”* (PU-FOC, D3, question 1, August 2025, own translation). Another participant valued both engagement and responsiveness: *“What I liked the most was that ChatGPT answered me quickly, and Duolingo was fun with the scores”* (PU-FOC1, E6, question 2, August 2025, own translation). Such reflections reveal that AI serves as a motivational catalyst, fostering positive emotions, curiosity, and active participation. These findings are consistent with Moybeka (2023) and Polakova and Klimova (2024), who found that gamification and AI chatbots enhance motivation and reduce learning anxiety.

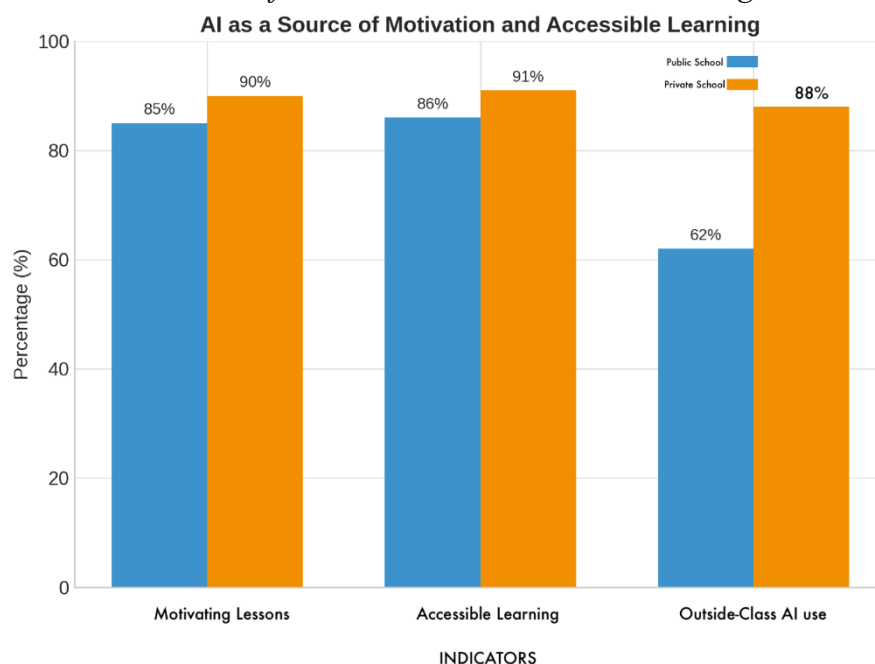
Teachers' observations reinforce this motivational dimension of AI. One teacher noted, *“students are more motivated to participate, since they feel that the information provided by AI is very reliable”* (PU-SEMI, X1, question 4, July 2025, own translation). Yet, educators also highlighted potential drawbacks of this motivation when not guided properly. The same teacher warned that *“students often depend on these applications without carrying out the processes”* (PU-SEMI, X1, question 4, July 2025, own translation), while another advised gradual and supervised integration to minimize distraction (PRI-SEMI, X2, question 5, July 2025, own translation). These perspectives suggest that although AI successfully motivates learners, this motivation must remain pedagogically channeled to ensure sustained and meaningful engagement rather than superficial enthusiasm.

Beyond its motivational impact, AI was also identified as a key driver of accessible learning. Students valued the possibility of learning at their own pace and repeating exercises as needed, which allowed them to feel more comfortable and confident. One student expressed, *“I could practice as many times as I wanted without anyone rushing me”* (PRI-FOC, E1, question 2, August 2025, own translation). This sense of accessibility, both in terms of time and personalized support, reflects Luckin's (2016) concept of adaptive learning, where AI systems adjust to learners' needs and provide cognitive scaffolding to promote autonomy. Through this adaptability, AI enables students from diverse backgrounds and proficiency levels to engage in self-paced, self-directed language practice.

Source: Own creation

Quantitative findings from the students' questionnaires and focus group confirm the qualitative trends observed in both contexts. Over 85% of students across the two institutions reported that AI-based lessons were more motivating than traditional ones, while nearly 90% of teachers acknowledged increased participation and engagement during AI-mediated activities. Similarly, 86% of public-school students and 91% of private-school students agreed that AI made English learning easier and more accessible. However, continuity of use differed slightly: while 62% of public-school learners used AI tools outside class, 88% of private-school learners did so regularly, largely due to greater access to personal devices and stable internet connections. These data (*see figure 3*) highlight that, although infrastructure shapes the extent of AI use, the perceived motivational and accessibility benefits are remarkably similar in both institutions.

Figure 3- AI as a Source of Motivation and Accessible Learning



In the public institution, motivation was linked mainly to emotional engagement, novelty, and the supportive classroom environment, whereas in the private institution, it was associated with autonomy, feedback, and the ability to continue learning beyond school hours. Despite these contextual variations, no substantial differences emerged in the general perception of AI; both groups recognized its role in making English learning more dynamic, inclusive, and learner centered.

In conclusion, AI functions as both a motivational catalyst and an accessibility equalizer in English language education. It promotes enthusiasm, participation, and individualized learning experiences that traditional methods often lack. However, its effectiveness depends on pedagogical mediation, ensuring that motivation translates into meaningful learning rather than passive or entertainment-based engagement. When properly guided, AI becomes a pedagogical complement that democratizes access, nurtures autonomy and confidence, and bridges motivational and technological gaps between students from different socioeconomic contexts.

Category 2: Impact of AI on the Development of Linguistic Skills

Artificial Intelligence (AI) tools such as Duolingo and ChatGPT are increasingly recognized as powerful mediators in second language acquisition (SLA). According to Luckin (2016), AI provides adaptive scaffolding that aligns with Vygotsky's Zone of Proximal Development, allowing learners to practice within their level and gradually advance, moreover AI-based platforms enhance learners' listening discrimination, speaking fluency, and reading comprehension through personalized tasks and immediate corrective feedback. AI supports

vocabulary retention and error correction in writing by offering instant feedback loops. In this sense, the use of AI not only supports skill acquisition but also fosters autonomy and confidence, aspects already discussed in Category 1.

The analysis of data from the questionnaires, focus groups, and teacher interviews reveals that AI has had a measurable impact on the development of linguistic skills, though the effects are uneven across modalities. A student from the public institution explained: *“I could listen to the words many times until I understood them”* (PU-FOC, D4, question 2, August 2025, own translation) This reflects how the repetitive and adaptive features of Duolingo reinforce auditory discrimination, in line with Mayer’s (2014) Cognitive Theory of Multimedia Learning, where repetition and multimodal exposure strengthen comprehension.

This category examined how AI-driven tools influenced the acquisition and practice of the four core language skills: listening, speaking, reading, and writing. While both institutions reported significant benefits, the extent and consistency of progress varied according to access conditions, teacher mediation, and frequency of use. The analysis revealed that AI positively shaped comprehension and production processes, though a tendency toward more receptive than productive activities was observed in both schools, in other words, the results can be barely differentiated, however, there are many aspects that are prudent to have in mind, since the practice in both schools faced interesting challenges throughout the process.

Subcategory 1: AI-Mediated listening and reading comprehension: strengthening receptive skills through adaptivity and repetition.

Receptive skills, namely listening and reading, play a vital role in foreign language acquisition, as they constitute the foundation upon which productive communication is developed. Within the context of AI-assisted learning, these skills benefit from the principles of adaptive learning and multimodal input. According to Mayer's (2014) Cognitive Theory of Multimedia Learning, comprehension increases when learners interact with content presented through multiple channels; such as text, audio, and visuals, because this multimodality enhances attention and memory retention. Similarly, Luckin (2016) and Krashen (2009) argue that AI platforms can individualize exposure and provide repeated, contextualized input, which fosters both vocabulary acquisition and inferential comprehension. Duolingo and ChatGPT embody these principles by allowing learners to listen, read, and process language at their own pace while offering immediate feedback and support. In this sense, AI-mediated practice of receptive skills does not simply transmit information but actively constructs understanding through repetition, adaptivity, and engagement.

The integration of AI tools in both public and private schools demonstrated a positive and measurable influence on students' receptive skills. In the questionnaires, 88% of the students in both institutions indicated that they felt *"more confident understanding English after using AI-based applications."* This perception was supported by the focus group data, where a public-school student mentioned, *"I could listen to the words many times until I understood them"* (PU-

FOC1, D4, August 2025), reflecting the value of repetition for auditory comprehension. In the private school, a student noted, *“before, English was hard, but now I can understand stories better”* (PRI-FOC1, E6, August 2025), showing how AI increased reading motivation and understanding. Teachers also reinforced these impressions in the interviews. A private-school teacher observed, *“AI helps them get used to different accents and speeds, and they understand better with the images and subtitles”* (PRI-SEMI, Y2, July 2025), while a public-school teacher stated, *“it helps me explain complex topics in simpler ways”* (PU-SEMI, X1, July 2025). These examples illustrate that, regardless of context, AI acted as a bridge between input and comprehension, promoting self-regulated learning.

The results revealed that both institutions achieved comparable progress in receptive skill development, although the degree of consistency differed due to contextual conditions. Students from the private school benefited from smoother implementation and continuous exposure, which led to more regular practice and stronger gains in reading comprehension. Meanwhile, students from the public school achieved similar comprehension outcomes, despite intermittent connectivity issues that occasionally interrupted listening tasks. The adaptability of Duolingo and ChatGPT mitigated these limitations by allowing students to review content independently, compensating for classroom interruptions. Importantly, the data showed that improvement was not restricted by socioeconomic differences but was instead determined by the quality of pedagogical mediation. Teachers in both schools used AI as a supplement to classroom instruction, ensuring that students interpreted feedback rather than memorized it. Overall, AI-

mediated repetition and adaptive input enhanced both listening and reading comprehension, confirming that the cognitive and affective benefits of AI were shared across educational contexts, with only minor variations in implementation quality.

Subcategory 2: AI and oral interaction: enhancing pronunciation, fluency, and communicative confidence

Speaking is a central component of communicative competence, as it represents the ability to express meaning fluently and accurately in real time. However, it is also the skill that generates the highest level of anxiety among second language learners (Horwitz, 2016). In traditional classrooms, limited exposure to authentic interaction and the fear of making mistakes often inhibit oral participation. ChatGPT contributes to overcoming these barriers by providing adaptive, immediate, and non-judgmental feedback that allows learners to practice without social pressure. According to Lin and Lin (2023), AI-based corrective feedback promotes self-monitoring and metalinguistic awareness, while Luckin (2018) explains that intelligent systems can simulate authentic communicative contexts, helping learners build fluency and confidence through personalized interaction. Thus, AI acts as both a linguistic coach and a motivational partner, transforming oral production from a high-anxiety activity into a self-directed, confident-building process.

The analysis of the questionnaires, focus groups, and semi-structured interviews revealed consistent patterns across both schools, indicating that AI uses improved students' pronunciation,

fluency, and overall communicative confidence. In the questionnaire results, approximately 75% of students from both institutions reported feeling *“more comfortable speaking English”* and *“less afraid of making mistakes”* after using ChatGPT and Duolingo’s oral features. A private-school student described, *“I practiced speaking with ChatGPT, and it corrected my sentences; I felt like I was talking to a real teacher”* (PRI-FOC1, E7, August 2025). A public-school teacher confirmed this by stating, *“they speak more freely now; they lose the fear of being wrong”* (PU-SEMI, X3, July 2025). Similarly, another public-school student shared, *“I could repeat as many times as I wanted without feeling bad”* (PU-FOC1, D2, July 2025), emphasizing how repetition in a private digital space helped reduce anxiety. Teachers in the private school also observed qualitative progress: *“their pronunciation and intonation improved; they try to imitate the AI voice models”* (PRI-SEMI, Y1, July 2025). These converging accounts showed that AI was equally effective in promoting oral confidence in both contexts, despite infrastructural contrasts.

AI-enhanced oral interaction fostered measurable progress in fluency and pronunciation across both schools, demonstrating that technological mediation can democratize speaking practice regardless of socioeconomic conditions. The most significant difference lay in the continuity of practice; private-school students had uninterrupted sessions and therefore achieved greater spontaneity and control of speech rhythm, while public-school students experienced sporadic interruptions but still displayed clear gains in accuracy and confidence. The non-judgmental nature of AI feedback proved to be a decisive factor in both contexts: students learned to self-correct without emotional distress, and shy learners found a safe environment to

experiment with language. Teachers also reported a transformation in classroom dynamics, with students initiating more verbal interactions and displaying pride in their progress. Despite contextual disparities, both institutions shared a nearly identical outcome: AI tools enhanced oral expression by increasing exposure, reducing anxiety, and cultivating communicative confidence. In summary, AI did not replace human conversation but expanded its opportunities, allowing learners to develop authentic oral competence through sustained, individualized, and effectively supportive practice.

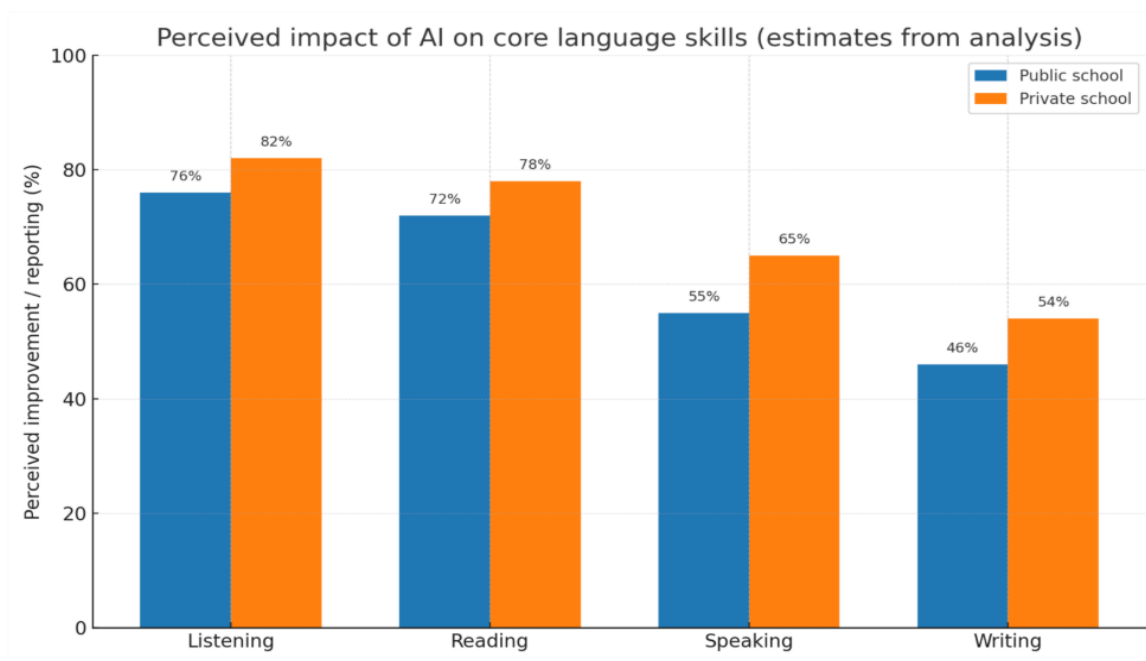
Subcategory 3: Writing development through immediate feedback and error noticing

Writing proficiency develops through feedback that promotes reflection on language form and content. Schmidt's (1990) Noticing Hypothesis suggests that learners internalize language patterns by consciously recognizing errors. AI tools like ChatGPT provide such metalinguistic feedback, enabling learners to correct grammar, syntax, and lexical choices in real time. Across instruments, 65% of students perceived improvement in writing, and teachers reported a 50% reduction in recurring spelling and syntax errors. A private-school student noted, *"when I wrote something, it showed me where I was wrong and how to improve it"* (PRI-FOC, E8, August 2025). However, a public-school teacher cautioned, *"Some students copy the corrections without thinking"* (PU-SEMI, X1, July 2025). AI feedback enhanced accuracy and awareness of grammatical structures but also introduced the risk of superficial learning when used uncritically. The private-school students tended to engage more reflectively with corrections, while some public-school learners relied on automated solutions due to limited

teacher supervision. This highlighted the necessity of pedagogical mediation to ensure that AI serves as a scaffold for learning rather than a shortcut. Despite this limitation, both institutions experienced clear progress in writing competence and confidence.

AI tools have changed the way students learn languages, but the results show that they do not use them equally for all skills (*see figure 4*). Students usually use AI more for reading and translation because it helps them understand quickly and makes learning easier. However, they use it less for speaking and writing, which is harder and need more personal effort. This shows that AI helps students improve their understanding and feel more confident, but it does not always help them speak or write better. The information suggests that teachers need to guide students to use AI not only to understand English, but also to practice it in real world.

Figure 4- Perceived impact of AI on core language skills (estimates from analysis)



Source: Own creation

Category 3: Challenges in implementing AI in English learning

This category delves into the challenges to achieving an effective and equitable integration of Artificial Intelligence (AI) tools in the educational environment, and is analyzed, in conjunction with the third objective of this research work, which seeks to determine the impact of the resources provided by AI on the acquisition of foreign languages on a comparative level of the two groups analyzed.

Thus, this category analyzes the instruments used for data collection, considering a total of 30 students from both schools and 6 teachers, respectively. The data collected from the instruments will be used, linking the results from the schools under study. Some distinctions will be made, since this category explores very similar responses without significant differences. These elements concentrate on criteria that will be directed toward the implementation of AI in the classroom, as well as the points of convergence or divergence that exist in their responses, through their respective subcategories. Subcategory one Clear Identification of Gaps addresses all the existing gaps that limit the incorporation of AI into teaching and learning exercises for English as a foreign language. Here, the difficulties in accessing a quality Wi-Fi network or having internet data that allows for stable and fast connectivity stand out. In addition, the availability of electronic resources such as computers, tablets, and cell phones supports the development of activities and strengthens bilingual environments. Likewise, these gaps in digital

resources and connectivity are considered to influence the school dynamics of English learning through AI.

Subcategory two Awareness of the Need for Teacher Training focuses on awareness of the need for teacher training as a fundamental element for adapting AI to English teaching in public and private school. This subcategory reflects that, although teachers consider AI useful as an educational support, there are still gaps in training for using these digital tools efficiently and dynamically. From this perspective, it is recognized that the lack of refresher programs for the use of these applications and the lack of follow-up on teachers' technological and pedagogical strategies constitute a gap that hinders educational innovation.

Subcategory three Recognition of the Complementary Role, focuses on the recognition of the complementary role of AI and how teachers and students at both institutions acknowledge the importance of these technological applications, highlighting their suitability for providing instant responses, individualized support, and homework assistance, which contributes to greater understanding and engagement in English language activities. However, although AI is seen as a digital tool that strengthens academic processes and language skills, the efficient use of these applications in the classroom poses a challenge, as they require adequate planning and design to consolidate them as an essential element in the teaching and learning of English.

Subcategory 1: Clear identification of gaps (diagnosis)

AI in educational and training institutions improves teaching and learning by providing individualized, engaging, flexible, and inclusive learning environments (Shiohira and Keevy,

2020). Based on this reference and the findings, technological and access barriers are identified in both private and public schools. Regarding the availability of equipment, a teacher from the private school mentioned that *"among the challenges is the availability of devices"* (PRI-SEMI, Y3, question 3, July 2025, own translation) and, regarding internet access, a teacher from the public school indicated that *"not all students have devices or an optimal network at school"* (PU-SEMI, X3, question 3, July 2025, own translation). Another teacher from the public institution states that they limit the use of AI in their classes, mentioning that *"the school does not have much internet coverage"* (PU-SEMI, X2, question 3, July 2025, own translation).

Furthermore, in the focus group, when asked, "Did you feel comfortable using these tools?" Was there anything that made you feel uncomfortable? A student from the private school stated, *"I felt uncomfortable because I had to wait for someone to lend me their cell phone"* (PRI-FOC, E4, question 8, July 2025, own translation). A girl from the public institution to the same question, responded, *"sometimes the internet would fail or the page would freeze"* (PU-FOC, D9, question 8, July 2025, own translation). Another boy from the public institution commented, *"sometimes the cell phone would get stuck or the internet would go out."* PU-FOC, D1, question 8, July 2025, own translation). (PU-FOC, D4, question 8, July 2025, own translation). A third classmate said, *"sometimes the internet was slow and that was a little frustrating."* (PU-FOC, D5, question 8, July 2025, own translation). Finally, one student agreed, *"my internet was down and I was getting a little impatient."* (PU-FOC, D4, question 8, July 2025, own translation).

Although it might be commonly thought that private schools have better electronic devices and optimal connectivity, the results of the instruments applied show that these technological resource limitations are also present in these contexts. The situation of the private school student who expressed discomfort waiting for his classmate to share his cell phone with him to complete the exercise, and the response of the teacher at the same institution, who sees the availability of devices as a challenge, shows that even in environments with greater financial capacity, such as this institution, technological barriers to the use of AI in English classes still exist. The coexistence in the thinking of both students and teachers reveals that these limitations are not unique to public schools but also arise in private settings, where the educational organization and the provision of technological tools influence and are related to real-life experiences with the use of AI in English learning.

In public institutions, limitations are primarily associated with internet connection and infrastructure factors in the school context. Teachers and students at public school express that the use of AI in English classes is limited because the educational Wi-Fi network does not cover all students, is slow, and has constant failures, which causes discouragement and interferes with students' disposition toward dynamics in this area. As mentioned by Selwyn (2021), who states that technological barriers in education are not limited solely to infrastructure but also include pedagogical, social, and trust aspects, suggesting that, in pedagogical environments, the impact of AI on education requires the incorporation of equity factors. In this sense, in private school, the limitations are related to each student's willingness to carry out activities with their own

device; in public school, the obstacle lies in unstable infrastructure and connectivity. In both public and private institutions, educators share a common concern: the challenge of implementing AI-based strategies that strengthen bilingual environments and ensure equitable learning.

Subcategory 2: Awareness of the need for teacher training

This subcategory refers to the awareness of teacher training in the use of artificial intelligence tools and the teaching of English as a second language, considering that its effectiveness requires ongoing teacher training and the need to update practices in the use of AI in teaching and learning. It also considers the need to address these strategies through training that strengthens linguistic and technological skills. In this sense, in the instruments applied, teachers from both schools expressed the importance of using AI in English learning, "as a resource that should not be limited to the technical or operational aspect but rather requires its integration into teaching from an ethical, inclusive, and cultural perspective, especially in multilingual environments. This would ensure the effectiveness of these practices" (Shiohira and Keevy, 2020).

Six teachers surveyed were from both institutions; three were from the private school and three from the public school. An English teacher from the private institution commented: "*one of the main suggestions has been to train ourselves in the correct use of the tools and in teaching English*" (PRI-SEMI, Y1, question 3, July 2025, own translation). Highlighting the importance of training teachers not only in the technical use of AI, but also in its pedagogical integration in

the classroom (Cobo 2021). A teacher of the same subject from the public institution stated, *"not all of us know how to use these technologies to teach in the best way"* (PU-SEMI, X1, question 2, July 2025, own translation). This highlights the need for specific training in the use of educational AI as academic support and requires the necessary training to effectively integrate AI into their bilingual methodologies.

At the same time, a public school teacher considered herself sufficiently familiar with this technology, stating that she uses it frequently in English classes and that it has been a significant experience: *"I am a very innovative teacher, with knowledge and passion for technology, and I have set myself the goal of using AI in at least one class a week"* (PU-SEMI, X2, question 1, July 2025, own translation). In this case, through training and updating in the use of digital tools, prior knowledge and the integration of AI into the teaching of this second language would be strengthened.

The results reveal a shared perception among teachers from both the public and private schools regarding the need for training in the use of artificial intelligence tools with an educational focus. At the private school, teachers believe their technical mastery of these AI applications is insufficient and express interest in training in the use of these digital tools to incorporate them into English language teaching. This self-reflection on the training gap reveals an attitude oriented toward teacher development and educational innovation. However, it also shows that despite the better socioeconomic situation in the private sector, teacher training remains a challenge that interferes with AI-mediated bilingual processes.

In the public context, there are different positions regarding teacher training. On the one hand, some teachers express that they lack sufficient information or mastery of these AI applications and that, therefore, their use and integration into English classes is limited, highlighting a gap in the school environment. In contrast, a teacher from the same institution expresses that she possesses skills in the technological field and that her experiences are associated with the use of AI, as she is an innovative person. This particular preparation can serve as a model for her fellow teachers, who have a desire to learn. These diverse situations, which occur within the same school, demonstrate that the implementation of AI does not rely solely on the institution's resources, but also on personal projects, ongoing studies, and the willingness to stay up-to-date on educational practices, with the goal of ensuring the successful teaching of English through AI.

Subcategory 3: Recognition of the complementary role of AI

This subcategory aims to present the implementation of AI in the English teaching process at the educational level as an opportunity to support learning in innovative and creative ways, as explained by a study that confirms an improvement in students' academic performance, greater teacher support, and more interactive learning environments (Khan 2024). Furthermore, the use of artificial AI in the classroom positively influences autonomous learning, constituting a relevant educational tool for teaching in the current digital age.

In the semi-structured interview conducted at both schools, in which six teachers participated (three from the private school and three from the public school), similar perceptions

were evident, especially in recognizing the use of artificial intelligence (AI) as a support in the classroom. In the private context, a teacher who used ChatGPT in one of his English classes mentioned: *“I recommend using these platforms as a complement to classwork, to reinforce learning”* (PU-SEMI, Y1, question 1, July 2025, own translation). Another teacher from the same institution, who used the same application, expressed: *“The immediate feedback has been very rewarding in my practice, as I feel it reinforces what we work on in class and increases their autonomy”* (PU-SEMI, Y2, question 1, July 2025, own translation). These perceptions emphasize the use of AI in classrooms as a tool that enriches pedagogical practices and facilitates second language acquisition.

At the public school, a teacher expressed his perception regarding the use of these applications, stating that *“these tools, when used appropriately, are a support for teachers and students”* (PU-SEMI, X2, question 2, July 2025, own translation). Similarly, another teacher from the same school, who used Duolingo in English class, stated: *“I have identified progress in students that is not limited to the use of these tools in class, but rather reinforces the topics at home”* (PU-SEMI, X3, question 4, July 2025, own translation). These responses demonstrate that the use of AI promotes autonomy and constitutes a pedagogical ally both inside and outside the classroom. In both cases, an equitable perception of AI is highlighted as a tool that provides educational support to teachers' work and enables more interactive and meaningful learning. Differences in availability and stability of technological resources between the institutions are summarized in Table 5.

Table 5- Comparative Access to Technological Resources (Public vs. Private)

Resource / Condition	Public School	Private School
Internet Connectivity	Intermittent / unstable	Stable and continuous
Device Access	Shared / limited	Individual devices available
Teacher Digital Training	Occasional and informal	Frequent and structured
Class Size	Larger	Smaller
Continuity of AI Use	Interrupted practice	Sustained practice

Source: Own creation

The findings show a shared acceptance by teachers at both the private and public schools regarding the complementary role that artificial intelligence plays in the English teaching-learning process. In the private context, the educational organization points out that AI enhances the teacher's work, reinforces topics developed in class, and provides opportunities for instant feedback, which strengthens student autonomy. Teachers at this school emphasize that these technological resources do not replace their teaching work; on the contrary, AI enhances learning scenarios. This perspective demonstrates an efficient unification of AI digital tools and meaningful learning, understanding this technological resource as an ally that offers continuous English practice and encourages participation and support beyond the school environment.

At the public institution, teachers also positively acknowledge the support AI provides to teaching processes, although its implementation is primarily associated with complementary plans to strengthen subject matter and encourage students' independent work. The experiences

reported, particularly those highlighting progress beyond the classroom, demonstrate how students integrate these resources as a support that personalizes the accompaniment and self-management of English learning. However, these advances also depend on teachers' adoption of AI in their classes, despite the digital limitations of the context. Thus, in both private and public institutions, it is recognized that these applications significantly impact the teaching of English as a foreign language, as they transform conventional pedagogy and foster motivation and self-directed learning.

Conclusions

This study was guided by the overarching objective of analyzing the pedagogical integration of AI-driven resources in the English language learning of seventh-grade students from two different educational contexts in the Colombian Caribbean coast: a private institution in Sincelejo, Sucre, and a public institution in Barranquilla, Atlántico. The findings demonstrated that the integration of tools such as Duolingo, and ChatGPT reshaped the learning experience, influenced performance across the four communicative skills, and revealed both the opportunities and challenges that arise when these resources are introduced in diverse institutional settings.

One of the clearest ways the findings addressed this objective was through the analysis of perceptions. Both students and teachers expressed highly positive views of AI integration, noting its novelty, interactivity, and motivational value. Learners described the activities as more enjoyable and less intimidating than traditional approaches, highlighting that these platforms gave them the freedom to practice without fear of judgment. Teachers confirmed this by observing an increase in classroom energy, participation, and autonomy. These outcomes directly showed that AI not only supports language practice but also reduces affective barriers, achieving one of the central intentions of the study: to explore whether technological innovation could transform attitudes and foster greater engagement in language learning.

The data also confirmed that the integration of AI-based tools contributed to the development of linguistic skills. Students' listening and reading comprehension improved

through repeated exposure to input, interactive exercises, and adaptive tasks that sustained their interest. Writing benefitted from the immediate feedback and corrections that allowed students to identify and reduce common errors, although some instances of superficial copying revealed the need for greater metacognitive guidance. Speaking showed more modest but important gains, with students reporting improvements in pronunciation and confidence, though this progress depended strongly on teacher mediation and opportunities for authentic practice. By documenting these results, the study fulfilled the aim of demonstrating how AI impacts the acquisition of core communicative skills, while also highlighting which areas require additional pedagogical reinforcement. The primary indicators of learning progress across skills are summarized in Table 5.

In addition, the challenges identified in the findings provided insight into the structural and pedagogical conditions necessary for successful AI integration. Connectivity issues, unequal access to devices, and large class sizes were significant limitations, especially in the public institution, where interruptions often hindered continuity. Teachers in both institutions expressed enthusiasm for the tools but admitted to feeling insufficiently prepared to incorporate them fully into their lessons. The reliance of some students on automatic corrections also exposed the risk of dependency and the danger of reducing learning to mechanical interaction with the software. These challenges addressed another key intention of the project: to identify the limitations that could undermine the impact of AI and to establish the importance of teacher mediation,

infrastructure, and reflective use. By uncovering these obstacles, the study provided a balanced understanding of both the potential and the risks of introducing AI into language classrooms.

The comparative nature of the project further developed the central objective by showing how institutional contexts shape the outcomes of technological integration. In the private school, where infrastructure was stronger and support more consistent, AI could be used more regularly and effectively, leading to smoother implementation and sustained gains in student performance. In the public school, where constraints were greater, the impact was uneven, yet still significant when teachers adapted activities creatively and mediated the use of AI carefully. This revealed that the technology itself does not determine success; rather, outcomes depend on the alignment between resources, teacher practices, and institutional realities. This comparative perspective deepened the study's conclusions, demonstrating that AI can contribute positively across contexts but only when implemented with equity-oriented strategies that recognize local limitations.

Taken together, the findings show that the integration of AI-driven tools fulfilled the study's main purpose by demonstrating that these resources motivate students, strengthen communicative skills, and reshape the English learning experience. At the same time, the results confirmed that technology alone does not guarantee meaningful learning; instead, its value lies in how it is mediated, contextualized, and adapted to learners' needs. In this sense, the study contributes to the field by offering empirical evidence that AI should complement rather than

replace teachers, by identifying strategies that enhance both receptive and productive skills, and by emphasizing the necessity of inclusion and equity in educational innovation.

In conclusion, the pedagogical integration of AI in seventh-grade English classrooms can be described as both promising and conditional. It is promising because it clearly improves motivation, reduces anxiety, and provides immediate and personalized support that enhances language learning. Yet it is conditional because without careful planning, equitable access, and continuous teacher mediation, AI risks becoming a source of distraction, dependency, or superficial practice. For Colombian education, particularly in the Caribbean region, the challenge is therefore not whether to adopt AI, but how to ensure that its integration is carried out responsibly, inclusively, and in ways that maximize its potential to reduce educational gaps.

Contributions To Bilingual Learning Environments

The results of this study contribute significantly to the perception and strengthening of bilingual learning environments in different settings along the Colombian Caribbean coast. The use of educational tools mediated by artificial intelligence, such as Duolingo and ChatGPT, demonstrates significant changes in English language acquisition and teaching. First, the research showed that artificial intelligence can be a fundamental channel for bilingual learning by encouraging students to practice and mitigating the socio-emotional barriers related to using English as a foreign language. The fact that students demonstrate a more confident attitude in participating in class shows that technological tools, when used correctly and integrated into pedagogy, can strengthen autonomy and linguistic skills.

Similarly, the findings reveal that AI strengthens the development of listening comprehension, speaking, reading comprehension, and writing skills when integrated with cultural contextualization and teacher intervention. This perspective allows the English teaching and learning process to not relegate cultural identities, but rather, to foster the communicative expansion of the environment. However, the research also shows that effectively implementing these AI-mediated technological and educational strategies requires ongoing and updated teacher training, equitable access to the internet or a stable connection, optimal infrastructure, and the availability of technological resources. In this way, technology can become a tool that promotes inclusion and reduces learning inequalities between public and private schools.

Finally, the project suggests the possibility of creating more active, critical, reflective, and participatory bilingual spaces that are tailored to Colombian specificities. This involves leveraging artificial intelligence tools in education to support teachers' work, not as a substitute. In this way, the evidence points to opportunities for developing innovative teaching proposals that strengthen meaningful English language learning and promote real-world scenarios relevant to each student's experiences.

Recommendations

This study highlights the growing importance of Artificial Intelligence (AI) as a pedagogical ally in foreign language education. However, for its potential to translate into sustainable improvement, AI integration must evolve from isolated experimentation toward real implementation. The following recommendations aim to guide teachers, institutions, and researchers in transforming the positive outcomes of this study into long-term educational practices aligned with contextual realities in Colombia.

Pedagogically, AI should be understood not as a substitute for traditional teaching but as a tool that enriches the learning process through personalization, feedback, and creativity. Teachers are encouraged to integrate AI tools gradually, ensuring that their use aligns with clear linguistic objectives rather than serving as mere entertainment. For instance, applications such as ChatGPT or Duolingo can support reflective writing, pronunciation, or grammar practice while sustaining motivation. These tools are most effective when teachers design guided activities that merge AI's adaptability with human mediation, fostering critical engagement rather than passive dependence. It is essential to strengthen students' metacognitive abilities, encourage them to analyze AI-generated corrections, identify patterns in their own errors, and apply this feedback meaningfully. Reflection-based tasks, such as learning journals or classroom discussions, can help ensure that learners develop autonomy and awareness instead of mechanical repetition.

Incorporating reflective and collaborative strategies is also vital. Collaborative projects in which students use AI collectively to create, edit, or evaluate language output can strengthen communication skills and reduce isolation. The teacher's presence as a facilitator and guide remains irreplaceable, particularly in helping students interpret AI feedback critically and connect it to authentic communicative contexts. Moreover, teachers should integrate AI tools within a multimodal framework that combines listening, speaking, reading, and writing to promote holistic language development. This approach helps prevent fragmentation of skills and reinforces meaningful learning experiences.

Inclusion must be a guiding principle in AI-based pedagogy. Digital resources should be adapted to meet the diverse needs of learners, including neurodivergent students and those requiring differentiated support. Tasks should allow flexible timing, multiple response formats, and individualized assistance, ensuring that all students can benefit from AI-enhanced instruction. Institutions should provide curricular and technological adaptations that promote equitable participation, guaranteeing that innovation does not deepen existing disparities but instead bridges learning gaps across student populations.

Institutionally, the differences observed between public and private schools in this study underline the need for stronger infrastructure and equitable access to technology. Schools should prioritize inclusive digital policies that guarantee students equal opportunities to benefit from AI-enhanced learning, regardless of socioeconomic background. Partnerships with local governments and private organizations can help expand connectivity and provide shared digital

resources. Simultaneously, educational institutions should offer sustained professional development in AI pedagogy, emphasizing not only technical skills but also ethical, methodological, and inclusive dimensions. Teachers must be supported to design classroom practices that make responsible, meaningful use of these tools while safeguarding data privacy and well-being. Training should include workshops on ethical AI use, strategies for fostering critical thinking, and approaches to prevent dependency or plagiarism.

Another institutional priority is the creation of ethical frameworks for AI use in schools. Clear policies on screen time, academic integrity, and data management can prevent misuse and help students engage critically with digital tools. Internal monitoring systems should also be implemented to evaluate the real impact of AI on students' communicative competence and learning motivation. Furthermore, inter-institutional collaboration can strengthen regional innovation. By sharing best practices and resources, schools with different socioeconomic conditions can jointly explore how AI adapts to their specific realities, building a collective vision of digital inclusion on the Colombian Caribbean coast.

Finally, this study opens several possibilities for future research. It would be valuable to examine whether the motivational and linguistic benefits identified here can be sustained over time or whether they decrease as the tools become routine in the classroom. Further research should also investigate how AI can better support productive skills, particularly speaking and writing, and what strategies help move students from passive correction to authentic communication. The role of teacher training deserves deeper exploration, as professional

development is key to turning AI into a reflective and ethical pedagogical practice. Comparative studies in rural and urban contexts, or across regions with varying levels of connectivity, would shed light on the impact of infrastructure on learning outcomes. In addition, extended longitudinal studies could explore how consistent exposure to AI influences language retention, critical thinking, and learner autonomy. Expanding the population to include students from different educational levels and backgrounds would also make it possible to identify broader trends in AI-supported language learning across the country.

In essence, these recommendations call for a more intentional and human-centered approach to AI in education. The technology's value lies not in automation but in its capacity to enhance inclusion, reflection, and learner agency. If guided by thoughtful pedagogy and supported by equitable institutional policies, AI can move from novelty to necessity, becoming a bridge between innovation and social justice in language education across Colombia and beyond.

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Appendices

Appendix A: Student Questionnaire

[Student's questionnaire](#)

Appendix B: Teacher Interview Guide

[Semistructured Interview](#)

Appendix C: Focus Group Discussion Guides

[Focus group](#)

Appendix D: Lesson Plans / AI-Based Pedagogical Interventions

[Lesson Plans](#)

Appendix E: AI Interaction Evidence

[Evidences \(Photos\)](#)

Appendix F: Coding Matrix for Qualitative Data

[Data Collection and Data Analysis](#)

[Questionnaire Analysis](#)

[Focus group Analysis](#)

Appendix G: Consent and Assent Forms

[Consent and Assent Forms](#)

List of Tables and Figures

Tables

Figure 1- Categories and subcategories	35
Figure 2 - AI as a Supportive Environment for Autonomy and Confidence	40
Figure 3- AI as a Source of Motivation and Accessible Learning	43
Figure 4- Perceived impact of AI on core language skills (estimates from analysis).....	51

Figures

Figure 1- Categories and subcategories	35
Figure 2 - AI as a Supportive Environment for Autonomy and Confidence	40
Figure 3- AI as a Source of Motivation and Accessible Learning	43
Figure 4- Perceived impact of AI on core language skills (estimates from analysis).....	51