

Multidisciplinary Journal of Educational Research  
Volume 15, Issue 1, 15<sup>th</sup> February, 2025, Pages 43–71  
© The Author(s) 2025  
<http://dx.doi.org/10.17583/remie.16188>

# Implementation of Artificial Intelligence to Improve English Oral Expression

Karen Liset López-Minotta<sup>1</sup>, Andrés Chiappe<sup>1</sup> & Javier Mella-Norambuena<sup>2</sup>

1) *Universidad de La Sabana, Chía, Colombia*

2) *Universidad de Las Américas, Facultad de Salud y Ciencias Sociales, Concepción, Chile*

## Abstract

Artificial intelligence is revolutionizing education, especially in language learning. This mixed method study examines how an AI-based application can improve the oral expression in English of 40 fifth-grade primary school students. Using the Design-Based Research (DBR) methodology, an AI-powered APP was developed and implemented over 16 weeks to support the development of oral English skills in the participating students. The results showed: a) a significant increase in student participation and motivation, b) notable improvements in pronunciation, fluency, and conversation skills, c) adaptability to the individual needs of students, and d) gradual progress in performance scores. The study highlights the transformative potential of AI in education, offering a personalized and effective learning experience. These findings are valuable for educators, educational technology developers, and policymakers interested in integrating AI into language teaching.

## Keywords

Artificial intelligence, english speaking, primary education, personalized learning, educational technology

---

**To cite this article:** López-Minotta, K.L., Chiappe, A. & Mella-Norambuena, J. (2025). Implementation of Artificial Intelligence to Improve English Oral Expression. *Multidisciplinary Journal of Educational Research*, 15 (1), pp. 43-71. <http://dx.doi.org/10.17583/remie.16188>

**Corresponding author(s):** Andrés Chiappe

**Contact address:** andres.chiappe@unisabana.edu.co

Multidisciplinary Journal of Educational Research  
Volumen 15, Número 1, 15 de febrero de 2025, Páginas 43 –71  
© Autor(s) 2025  
<http://dx.doi.org/10.17583/remie.16188>

# Implementación de la Inteligencia Artificial para el Mejoramiento de la Expresión Oral en Inglés

Karen Liset López-Minotta<sup>1</sup>, Andrés Chiappe<sup>1</sup> & Javier Mella-Norambuena<sup>2</sup>

1) *Universidad de La Sabana, Chía, Colombia*

2) *Universidad de Las Américas, Facultad de Salud y Ciencias Sociales, Concepción, Chile*

## Resumen

La inteligencia artificial está revolucionando la educación, especialmente en el aprendizaje de idiomas. Este estudio de método mixto examina cómo una aplicación basada en IA puede mejorar la expresión oral en inglés de 40 estudiantes de quinto grado de primaria. Utilizando la metodología de investigación basada en diseño (DBR), se desarrolló e implementó una aplicación impulsada por IA durante 16 semanas para apoyar el desarrollo de habilidades orales en inglés en los estudiantes participantes. Los resultados mostraron: a) un aumento significativo en la participación y motivación de los estudiantes, b) mejoras notables en la pronunciación, fluidez y habilidades de conversación, c) adaptabilidad a las necesidades individuales de los estudiantes y d) progreso gradual en las puntuaciones de desempeño. El estudio destaca el potencial transformador de la IA en la educación, ofreciendo una experiencia de aprendizaje personalizada y efectiva. Estos hallazgos son valiosos para educadores, desarrolladores de tecnología educativa y formuladores de políticas interesados en integrar la IA en la enseñanza de idiomas.

## Palabras Clave

Inteligencia artificial, habla inglesa, educación primaria, aprendizaje personalizado, tecnología educativa

---

**Cómo citar este artículo:** López-Minotta, K.L., Chiappe, A. & Mella-Norambuena, J. (2025). Implementation of Artificial Intelligence to Improve English Oral Expression. *Multidisciplinary Journal of Educational Research*, 15 (1), pp. 43-71. <http://dx.doi.org/10.17583/remie.16188>

**Corresponding author(s):** Andrés Chiappe

**Contact address:** andres.chiappe@unisabana.edu.co

The increasing implementation of fourth industrial revolution technologies, particularly artificial intelligence (AI), is transforming various aspects of contemporary society, including the educational field, where enormous potential for transformation and improvement is recognized (Souza & Debs, 2024). Language teaching, specifically, has begun to address these technologies with the promise of overcoming traditional barriers and offering personalized learning experiences.

In the Colombian educational context, especially at the primary education level, a persistent problem has been identified related to deficiencies in oral expression in English by students. Ruiz Cordero (2022), Vega (2023) and Vergara-Pareja et al. (2021) point out that students present significant difficulties in communicating fluently and effectively in this language. This situation is attributed to various factors, among which stand out the lack of sufficient exposure and practice to the English language, ineffective traditional teaching methodologies, and the scarcity of contextualized educational resources (Yang, 2020).

In this regard, Goh and Vandergrift (2021), emphasize that language learning requires a considerable amount of comprehensible input and opportunities for meaningful production. However, as mentioned by Khamkhen (2011) and Lukman et al. (2016), learning activities often focus primarily on grammatical and vocabulary aspects, neglecting the development of oral communication skills. This situation is exacerbated by the lack of flexibility in teaching practices and the limited opportunities students have to practice the language in real contexts outside the classroom (Puli Quito, 2023).

In this sense, Chicaiza and Chicaiza (2018) point out that traditional teaching methodologies have failed to capture students' interest and motivation, which limits their progress in developing oral skills, generating negative effects on student motivation, which according to Guilloteaux (2013) is critical, as motivation plays a crucial role in language learning. Likewise, anxiety and lack of confidence are other factors that hinder the learning of oral expression, which according to Oflaz (2019), is a complex of perceptions, beliefs, and feelings that can inhibit students' participation in oral activities, thus limiting the development of their expression capabilities.

The consequences of these deficiencies are worrying as students who fail to develop adequate oral expression skills will face difficulties in communicating effectively in everyday or professional situations that require the use of English, limiting their future academic and job opportunities in an increasingly globalized and competitive world (Gass et al., 2020).

Particularly in the Colombian context, results in standardized tests related to communicative skills in English show urgent signs of the need to address this problem, as mentioned by Cifuentes Medina et al. (2018) and the Laboratory of Education Economics (2023) and is reiterated in the low results presented in the Saber Pro and Saber TyT Tests (ICFES, 2023). In this scenario, the integration of artificial intelligence in the educational field presents itself as a promising solution to improve various aspects of learning and teaching, particularly in the development of oral expression skills in English, as it offers unprecedented opportunities to provide personalized learning experiences, adapting to each student's pace and learning style (citation needed). In this direction, Ubani and Nielsen (2022) point out that intelligent tutoring systems can provide immediate and adaptive feedback, facilitating more effective and

meaningful learning, which is especially relevant in the development of oral skills, where continuous practice and immediate correction are crucial for progress.

Furthermore, De Vos et al. (2024) mention that AI can simulate real communicative interactions, offering students a safe and controlled environment to develop various skills. From this perspective, Kim et al. (2021), indicate that AI-powered chatbots and avatars can significantly improve students' communicative competence by providing constant opportunities to practice and receive real-time feedback.

On the other hand, reducing anxiety associated with language learning is another potential benefit of AI, as by allowing students to practice in an environment free of judgment and social pressure, AI-based tools can contribute to increasing confidence and reducing anxiety, thus facilitating more effective learning (Chao & Lin, 2013; Li et al., 2024).

Additionally, AI applications can also provide access to high-quality educational resources, which is a critical situation, especially in developing countries. In this regard, Tomlinson (2023), emphasizes that authentic and contextualized teaching materials are essential for the development of effective communication skills.

Moreover, AI's ability to collect and analyze data on student performance allows educators to identify areas of difficulty and adapt teaching strategies accordingly. Thus, adaptive learning systems can automatically adjust the difficulty level of tasks based on student progress, ensuring continuous and personalized learning (Chai et al., 2021).

In this context, the present study focuses on determining the contributions that an artificial intelligence-based application, integrated into English teaching practices, can make to improve the learning of oral expression in English in fifth-grade primary students. The research was carried out with 40 students from a private school in Colombia, which, despite being a bilingual institution, fifth-grade primary students present difficulties in oral expression in English, evidenced by historically low grades achieved in this aspect. This problem is attributed to factors such as lack of sufficient exposure and practice outside the classroom, ineffective traditional teaching methodologies, and limited resources.

Considering all of the above, the importance of this study lies in several key aspects. Firstly, it addresses a relevant and widely documented problem: the significant deficiencies that Latin American students present in their ability to communicate orally in English (Villeda Menjivar et al., 2018). In this sense, the adaptability and personalization offered by AI can significantly improve the effectiveness of learning, in contrast to traditional approaches (Chai et al., 2021).

Furthermore, this study would contribute empirical evidence to the current body of research on the use of AI in education, which has so far been characterized by widely expressing a sense of positive expectations in this regard and studies on perceptions and potentialities, but comparatively, very few practical experiences that show concrete effects on learning or teaching.

The last three years have witnessed significant advancements in AI-driven language learning tools, particularly in the development of pronunciation correction and fluency enhancement algorithms. For instance, Gao (2024) highlights the potential of graph neural networks in identifying and correcting pronunciation errors. These networks process speech patterns more accurately, enabling learners to improve their phonetic precision through real-time feedback. Similarly, Li and Tang (2022) present a comprehensive analysis of AI applications designed to cultivate oral English communicative competence, emphasizing their

ability to address unique learner deficiencies effectively. Building on these foundations, AI-based tools now integrate advanced Natural Language Processing (NLP) engines to simulate real-life interactions, fostering more meaningful conversational practice. For example, Peña-Acuña and Crismán-Pérez (2022) explored how AI applications like Papua mitigate psychological barriers, such as anxiety and self-doubt, in Spanish-speaking learners. By creating a judgment-free environment, these applications help students gain confidence while developing fluency and conversational ease. This aligns with the findings of Cislowska and Peña-Acuña (2024), who underscore the role of chatbots in providing personalized feedback and promoting learner engagement. These recent studies provide a critical backdrop to this research, demonstrating the transformative potential of AI in oral language acquisition. This study extends this body of work by focusing on the Colombian educational context, highlighting the adaptability of AI tools in diverse educational settings.

### Research Questions and Hypotheses

In summary, this study seeks to address an urgent problem in Colombian education, exploring the potential of artificial intelligence to improve oral expression skills in English for primary school students. Thus, the results of this research could have significant implications for English teaching in Colombia and other similar contexts, offering new perspectives on how technology can be effectively integrated into the classroom to improve learning outcomes.

In light of this scenario, the following research question arises: How can an application based on artificial intelligence integrated into English teaching practices contribute to improving the learning of oral expression in English in fifth grade students?

Related to this question the following objectives were formulated:

- Identify the main challenges and barriers that fifth grade students face in developing English oral expression skills.
- Analyze the key characteristics and components that an application based on artificial intelligence must have to effectively address the challenges identified in learning oral expression in English.
- Evaluate the contributions of the AI-based application to student performance in terms of oral expression in English.
- To systematically evaluate these goals, the study proposes two working hypotheses. These hypotheses are directly informed by the objectives, focusing on how the AI application can contribute to specific aspects of learning.

**Hypothesis 1:** The integration of an AI-based application into English teaching practices will significantly improve students' oral expression, particularly in pronunciation and fluency. This improvement will result from the application's ability to provide individualized, real-time feedback and adapt to each student's learning pace and needs. By leveraging advanced Natural Language Processing (NLP) capabilities, the application can identify errors in pronunciation and intonation, offering targeted practice that leads to measurable gains.

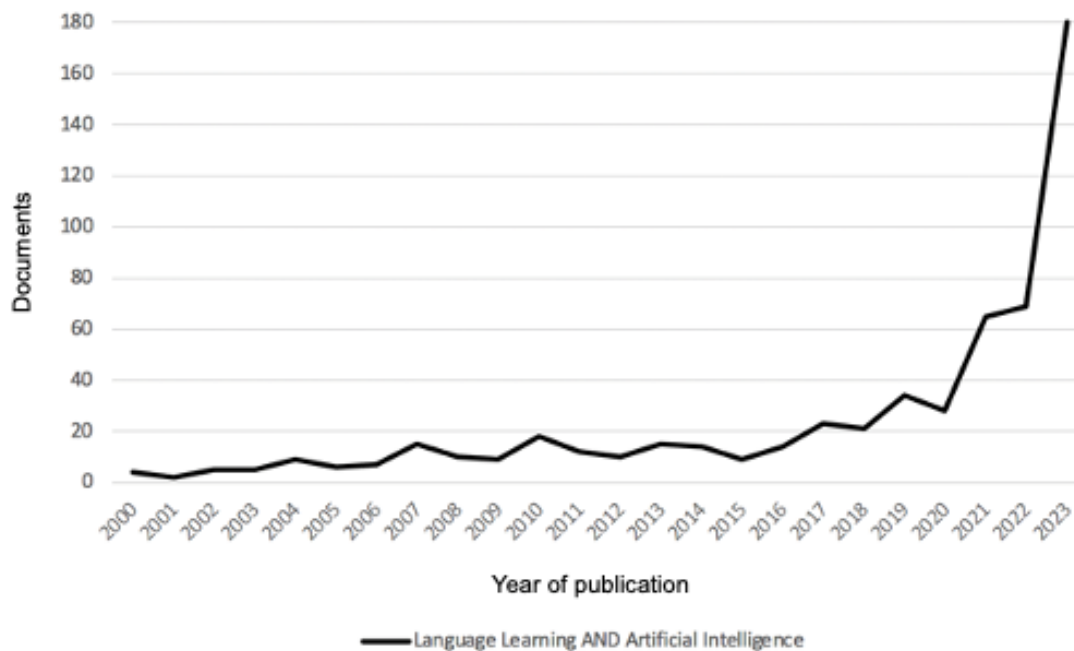
**Hypothesis 2:** The AI-based application will enhance students' motivation and confidence in speaking English by creating a supportive and interactive learning environment. Features such as gamified tasks, conversational simulations, and judgment-free feedback mechanisms will reduce anxiety and foster a positive attitude toward oral practice. These elements are expected to result in increased student engagement and willingness to participate in speaking activities.

## Literature Review

The integration of artificial intelligence in language learning, particularly English, has been a growing topic of interest in educational research since the last two decades, as shown in Figure 1.

**Figure 1**

*Published Research on Artificial Intelligence and Language Learning*



As part of this research, the main theories and empirical findings supporting the use of AI applications in English learning were examined.

In this regard, Adaptive learning theory, supported by researchers like Zawacki-Richter et al. (2019), argues that adjusting the teaching-learning process to individual needs can significantly improve learning outcomes. AI applications, through big data processing and machine learning algorithms, can analyze learning patterns and adapt content accordingly (Mora, 2020). Also, Slomp et al. (2024) found that AI-based adaptive learning systems improved performance and motivation of English as a second language students compared to traditional approaches.

Another theory that has gained relevance in the context of AI applications is Situated learning (Vargas et al., 2024). This theory suggests that learning is more effective when

contextualized and linked to students' previous experiences. In such regard, AI applications can provide virtual learning environments and interactive simulations that recreate real-world situations, fostering more meaningful learning (Montiel-Ruiz & López Ruiz, 2023).

Natural language processing (NLP) is another key aspect in AI and language learning research, in the way this technology allows AI applications to understand and generate human language more accurately (Marchante, 2022). In this direction, Voicu et al. (2023) found that students using an NLP-based English learning system achieved better results in reading comprehension and writing tasks compared to those receiving traditional instruction.

Additionally, Task-Based Language Teaching (TBLT) is another relevant pedagogical approach in the context of AI applications for language learning. This approach, supported by researchers like Hismanoglu and Hismanoglu (2011) and Palaninamy and Rajasekaran (2024), focuses on meaningful, contextualized tasks that reflect real-life situations. Studies have explored how AI applications can provide an interactive, personalized environment for students to practice these tasks, receiving real-time feedback and support (Habib, 2019; Liu et al., 2023).

Collaborative learning is also important in research on AI applications for language learning. Studies like those by Salazar and Maldonado (2020) have highlighted the benefits of collaborative learning in developing social skills, critical thinking, and joint knowledge construction.

While research has demonstrated the potential of AI applications to improve language learning, challenges and limitations have also been identified. Studies by Razmeh (2024) and Gong et al. (2021) have emphasized the importance of effectively integrating AI aligned with learning objectives, considering factors such as interface design, meaningful feedback, and cultural adaptation.

In a general way, the literature review reveals a solid theoretical basis and growing empirical evidence supporting the use of AI applications in English learning. However, it also highlights the need for further research to explore effective approaches for integrating AI meaningfully and in alignment with established pedagogical principles.

## Method

This study adopted the Design-Based Research (DBR) methodology to address the use of Artificial Intelligence in improving oral communication skills in English. DBR is characterized by its iterative nature and its ability to address complex educational problems in real contexts, allowing for the continuous development and refinement of educational interventions based on theoretically grounded principles (Rossi, 2021; Zheng, 2016).

The study employed a Design-Based Research (DBR) methodology, a framework chosen for its adaptability and practical relevance to educational interventions. DBR is particularly advantageous because it integrates theoretical insights with real-world applications, ensuring that interventions are both evidence-based and contextually appropriate. This approach is grounded in iterative cycles of design, implementation, evaluation, and refinement, which allow for continuous improvement of the intervention in response to empirical data and observed challenges. Another critical strength of DBR is its emphasis on contextual relevance.

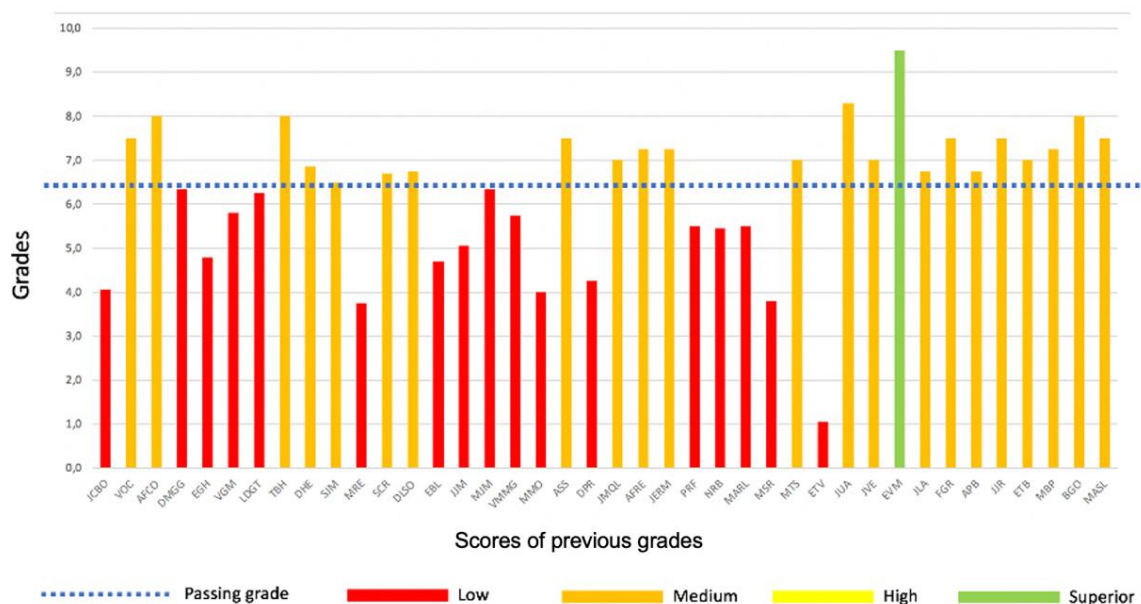
By situating the research within the specific cultural and educational context of Colombian fifth-grade classrooms, the study ensured that the intervention was directly applicable to the learners' needs. This contextual grounding was particularly important given the diverse proficiency levels and unique barriers faced by the target population, such as limited exposure to English and low confidence in speaking.

## Participants

The study was conducted in a private school in Colombia, with a sample of 40 fifth-grade students. Participants were selected to represent a variety of English proficiency levels, although in general, the grades obtained by these students the previous year in relation to oral skills in English show a low level, as shown in Figure 2.

**Figure 2**

*Previous Grades of the Participant Students on Oral Skills*



## Instruments

Three main instruments were used for data collection:

- 1) **Field diary:** Used throughout the study to systematically record students' interactions with the AI application, focusing on aspects such as frequency of use, time spent on each session, types of exercises performed, students' reactions and attitudes, observed difficulties, notable improvements in pronunciation and fluency, impact on confidence and motivation, and researcher reflections on the effectiveness of the implementation.
- 2) **Instrument 1:** An initial survey applied through Google Forms to collect information about students' use of AI, their perceptions, and general interest in educational technologies. The information collected from this instrument was of high value since it

was used as input for the design of the AI-powered App that was implemented in this study.

- 3) **Instrument 2:** Consisted of questions and conversations generated by the AI-powered App designed for this research, applied as a pretest at the beginning of the project, during implementation for monitoring, and as a posttest at the end of the intervention.

### ***Instrument Validation***

A two-expert validation process was conducted for Instrument 1, covering content validity, construct validity, face validity, objectivity, relevance, and comprehensiveness. The validation results are summarized in Table 1.

**Table 1**

*Validation Results for Instrument 1*

Validation Criteria	Expert 1 (Educational Psychology)	Expert 2 (Survey Design)
Content Validity	Excellent - The instrument covers all the key aspects of understanding and perceptions related to AI and its use in education.	Good - The content is relevant, but some items could be more specific or better aligned with the overall objectives.
Construct Validity	Good - The items seem to measure the intended constructs (knowledge, attitudes, and preferences), but some overlap between certain questions is observed.	Excellent - The constructs are well-defined, and the items clearly align with the targeted concepts.
Face Validity	Excellent - The instrument appears highly relevant and appropriate for assessing the target audience's knowledge and opinions on AI in education.	Good - The layout and wording are clear, but some items could be phrased more intuitively for the intended respondents.
Objectivity	Good - The closed-ended questions are objective, but the open-ended items may introduce some subjectivity in the analysis.	Excellent - The instrument is well-structured to minimize bias and ensure objective data collection.
Relevance	Excellent - The topics covered are highly relevant to understanding the target audience's perspectives on AI and its potential educational applications.	Excellent - The instrument addresses a crucial and timely issue in the field of educational technology.
Comprehensiveness	Good - The instrument provides a good overall coverage of the key aspects, but some additional items related to the perceived benefits and challenges of AI-based tools could strengthen the assessment.	Good - The instrument is comprehensive in its coverage, but some minor refinements could enhance the depth of insights collected.

## Procedure

The study was developed in seven iterations over 16 weeks; each week included:

- 3 sessions of 30 minutes of individual practice with the app
- 1 session of 45 minutes of group practice guided by the teacher, using the data provided by AI to focus on common areas of improvement.

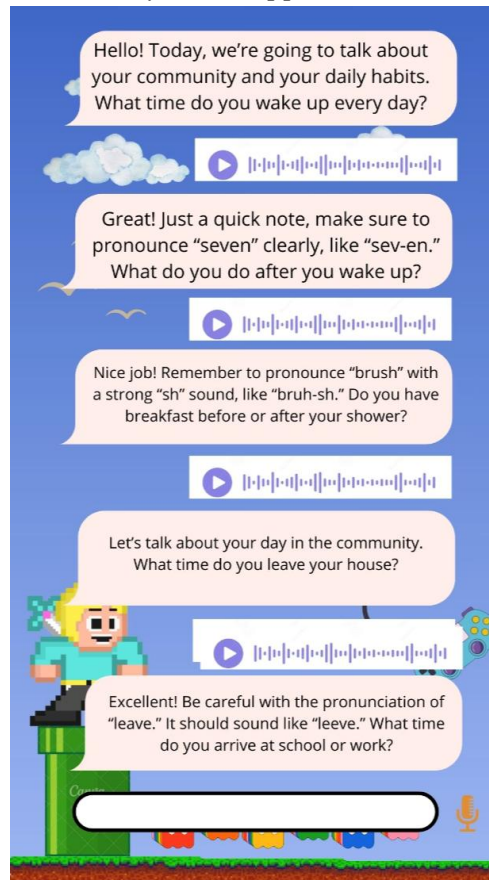
Each iteration had its own objectives, activities, and adjustments, which allowed for a continuous evolution of the prototype, ensuring its effectiveness and adaptation to students' needs.

The iterations are detailed Table 2 as follows:

**Table 2**

*Summary of DBR Iterative Phases*

Iteration	Description	Activities and Adjustments
Iteration 1	Diagnostics (Weeks 1-2)	A diagnostic assessment was conducted using Instrument 1 and the pretest of Instrument 2 to identify students' specific needs and starting level in relation to English learning.
Iteration 2	Initial Implementation (Weeks 3-4)	Developed the first version of the AI-powered App using Android Studio, focusing on creating an intuitive user interface and training the AI to strengthen oral expression in English. Designed 8 thematic units aligned with the institutional program to develop pronunciation, fluency, and conversation skills. Figure 3 shows a screenshot of a conversational activity in the AI-powered App
Iteration 3	Full Implementation and Initial Testing (Weeks 5-8)	Introduced the app in classes, collecting data on student performance and interaction through the field diary. Conducted weekly sessions: 3 sessions of 30 minutes (individual practice) and 1 session of 45 minutes (teacher-guided group practice).
Iteration 4	Adjustments and Improvements (Weeks 9-10)	Made significant adjustments based on initial data, including implementing an adaptive difficulty system and expanding content with more conversation exercises.
Iteration 5	Continued Implementation (Weeks 11-12)	Focused on detailed monitoring of student progress, refining personalized feedback and introducing gamification elements to enhance engagement.
Iteration 6	Final Evaluation (Weeks 13-16)	Applied the posttest of Instrument 2 to collect final data on student performance and experience with the AI-powered App.
Iteration 7	Results Analysis (Post-implementation)	Conducted a comprehensive analysis of all collected data, evaluating the effectiveness of personalized AI and identifying areas of greatest impact.

**Figure 3***Screenshot of a Conversational Activity in the App*

Innovative aspects of the AI-powered App included:

- A specialized Natural Language Processing (NLP) engine to recognize and evaluate students' pronunciation and speech patterns.
- A multimodal feedback system integrating visual, auditory, and kinesthetic feedback.
- Adaptive gamification with a reward system that adjusts to individual student motivations.
- Predictive learning analysis to identify potential areas of difficulty and suggest complementary teaching strategies.

Seamless integration of technology and pedagogy, creating a learning ecosystem where AI enhances proven pedagogical methodologies.

**Data Analysis**

A comparative analysis was performed between the pretest and posttest results (Instrument 2). An analysis of variance and a Cronbach's alpha were applied to the data extracted from Instrument 2 for each of the four analysis periods (week 1-4, week 5-8, week 9-12 and week 13-16). This was done to determine the consistency of the data found. To achieve this, a repeated-measures analysis of variance (ANOVA) was applied, which is used for analyzing

data where same subjects are measured more than once (in this case, the subjects' scores in different time periods) to evaluate whether at least one of the means is significantly different from the others. Also, a Posthoc test was applied to identify the subjects with significant differences (Backhaus et al., 2023).

Reliability was determined using Cronbach's alpha, which measures the internal consistency of a set of items (in this case, scores in different periods). To do so, the data was organized in a matrix where each row represented a time period and each column a student. The individual variances of each period and the total variance of the sums of the scores of each period were then calculated.

Additionally, qualitative data from the field diary were analyzed to identify patterns of use, attitudes, and recurring themes and data triangulation to validate quantitative findings.

### **Ethical Considerations**

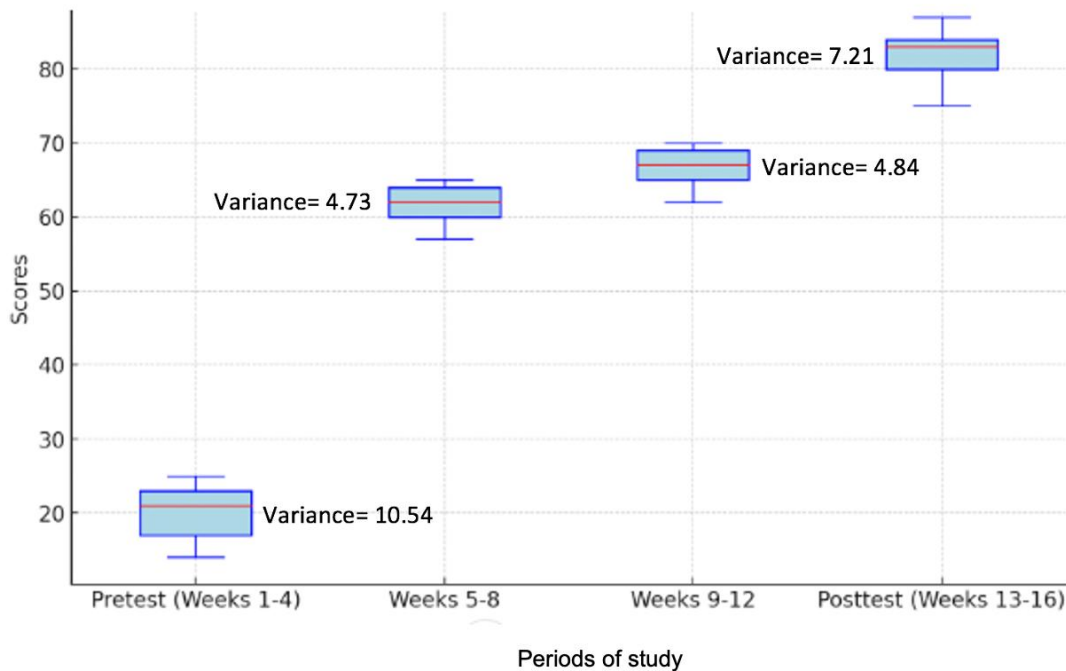
Informed consent was obtained from parents or guardians of participating students. The confidentiality of collected data was guaranteed, and ethical protocols established by the educational institution and educational research standards were followed.

This rigorous and systematic methodological approach allowed for a comprehensive evaluation of the AI-powered App effectiveness in improving oral skills in English, providing valuable insights into the potential of AI in language teaching and laying the groundwork for future research in this field.

### **Results**

First, the result of the variance and reliability of the data found is presented and then the description of said data is advanced based on the improvement of oral skills in English during the four periods established within the study. Regarding reliability (Cronbach's Alpha), the Cronbach's Alpha coefficient is approximately 0.82, which suggests good internal consistency in the measurements across the different time periods.

On the other hand, variance measures the dispersion of data around its mean. In this case, the variances calculated for each time period reflect how the subjects' scores are distributed at each stage of the study, as shown in Figure 4.

**Figure 4***Data Dispersion for Each Period of Study*

Some aspects that can be interpreted from this figure are:

- 1) (Pretest week 1-4 (Variance: 10.54): This is the highest variance among the periods, indicating that the initial scores of the subjects before treatment had greater dispersion. This may suggest significant initial differences among the subjects before any intervention or change was made.
- 2) Week 5-8 (Variance: 4.73) and Week 9-12 (Variance: 4.84): These two variances are smaller, indicating that during these weeks, the subjects' scores were more consistent with each other. This could suggest that once the intervention or change began, the subjects' responses became more homogeneous.
- 3) Posttest week 13-16 (Variance: 7.21): The variance in the posttest is higher than during the intermediate weeks (5-12) but still lower than the initial variance. This could indicate that although there was some increase in the dispersion of scores after the intervention, the subjects were more homogeneous in their final responses compared to their initial responses.
- 4) Regarding these results, it is worth mentioning that the reduction in variance after the pretest suggests that the intervention or treatment had a unifying effect on the subjects' responses, reducing the differences among them.

On the other hand, the increase in variance in the posttest compared to the intermediate periods may indicate that although the subjects responded more similarly during the treatment, their final responses varied a bit more, possibly due to different degrees of intervention effectiveness or changes in personal conditions.

### Results regarding English oral Skills Improvement

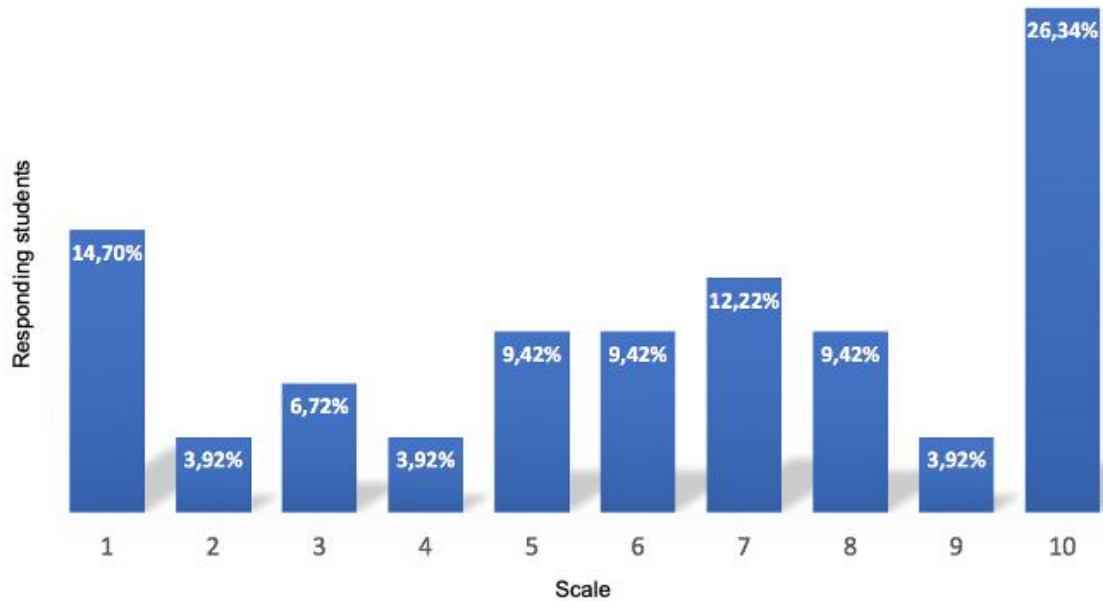
The results obtained reveal a positive impact of the AI-powered APP on learning English speaking. Analysis of quantitative and qualitative data shows a significant improvement in students' language skills, an increase in their motivation and engagement, and effective adaptation of AI to individual needs. Detailed findings at different stages of the study are presented below.

The initial diagnostic stage revealed some key findings. Through Instrument 1, students showed a marked interest in technological learning environments and a positive orientation towards the use of AI in the English learning process, which is shown in Table 3 and Figure 5, specifically the one that asked on a scale of 1 to 10 how excited they would be to use an AI tool to learn English.

**Table 3**

*Answers to Instrument 1*

Question	Yes	No	I am not sure
Do you know what Artificial Intelligence is?	88,9 %	11,1 %	0,0%
Have you used any learning tool or application with Artificial Intelligence?	83,3 %	16,7 %	0,0%
Would you like to use an AI learning tool or app to learn English?	86,1 %	13,9 %	0,0%
Have you used electronic devices to learn?	100,0 %	0,0%	0,0%
Do you consider the use of electronic devices important for learning in the classroom?	83,3 %	16,7 %	0,0%
Do you think an AI tool can make learning English more fun?	69,4 %	5,6%	25,0%
Do you think that using technology in the classroom helps to better understand the topics?	97,2 %	2,8%	0,0%
Do you think AI could help personalize your learning to your needs?	83,3 %	2,8%	13,9%

**Figure 5***Emotional Response to the Use of AI (Instrument 1)*

Regarding the implementation of the AI-powered APP in class dynamics and activities, a high level of student participation (90%) was observed, which was considered a promising indicator. Furthermore, significant progress was evidenced even among students who had difficulties in the area of English, suggesting the potential of AI to adapt to the individual needs of students.

### ***Pretest and Posttest Results***

Through the application of Instrument 2, the initial evaluation (pretest) revealed that the students' level of oral expression in English was basic and required reinforcement, which is consistent with the grades achieved by these students in English oral skills the previous year. However, they demonstrated better familiarity with the Listening skill compared to oral expression. A relevant finding extracted from the field diary was that initially, the students showed little interest in using English orally, perceiving it more as an obligation than as a valuable skill.

After interacting with the AI-powered APP, notable improvements were observed in crucial aspects of oral expression, such as pronunciation, fluency, and conversational skills. This was largely attributed to the specific and individualized feedback provided by the AI, which allowed for the optimization of essential elements of this linguistic competence in each student. The quantitative data collected during the analysis process is presented in the following tables, showing the results obtained by students during the four periods of the study (weeks 1-4, weeks 5-8, weeks 9-12 and weeks 13-18).

The ANOVA results shown in the Table 4 present a statistically significant difference between the four groups ( $p$ -value < 0.001), indicating that at least one pair of groups has a significant difference in their means.

**Table 4***ANOVA Results*

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Square	F-statistic	p-value
Between Groups	6532.67	3	2177.56	159.85	< 0.001
Within Groups	1294.00	96	13.48	-	-
Total	7826.67	99	-	-	-

To determine which specific pairs of groups differ significantly, a post-hoc analysis was conducted using the Tukey's Honest Significant Difference (Tukey's HSD) test. The results are presented in the Table 5:

**Table 5***Posthoc Test Results*

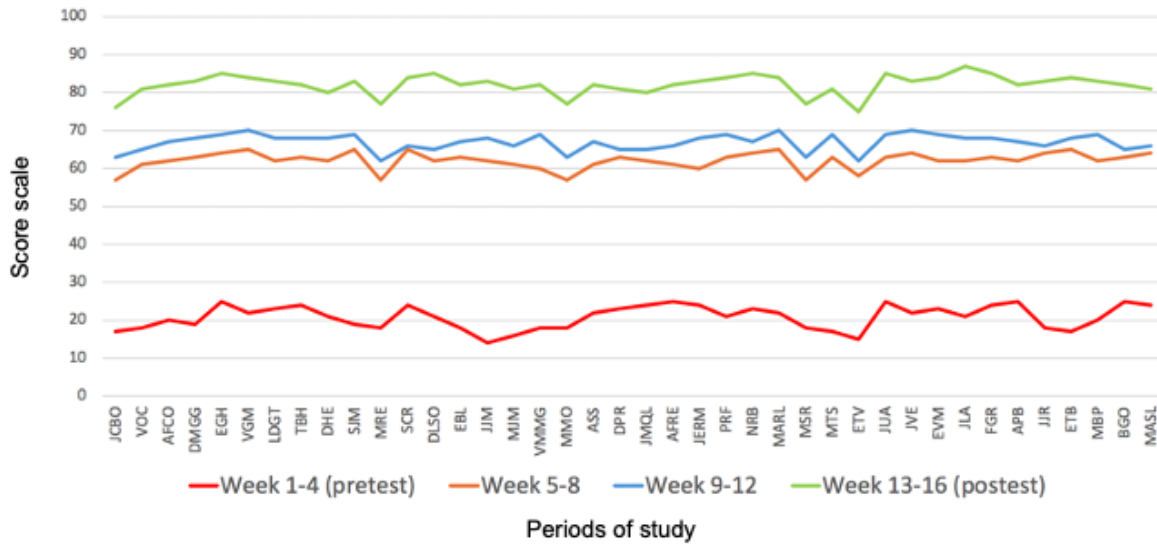
Comparison	Mean Difference	Adjusted p-value
Pretest (Weeks 1-4) vs. Weeks 5-8	-42.17	< 0.001
Pretest (Weeks 1-4) vs. Weeks 9-12	-46.33	< 0.001
Pretest (Weeks 1-4) vs. Posttest (Weeks 13-16)	-59.50	< 0.001
Weeks 5-8 vs. Weeks 9-12	-4.17	0.204
Weeks 5-8 vs. Posttest (Weeks 13-16)	-17.33	< 0.001
Weeks 9-12 vs. Posttest (Weeks 13-16)	-13.17	< 0.001

The posthoc analysis reveals the following:

- The pretest (Weeks 1-4) scores are significantly lower than the scores in all other periods (p-value < 0.001).
- The scores in Weeks 5-8 are significantly lower than the scores in the posttest (Weeks 13-16) (p-value < 0.001).
- The scores in Weeks 9-12 are significantly lower than the scores in the posttest (Weeks 13-16) (p-value < 0.001).
- There is no statistically significant difference between the scores in Weeks 5-8 and Weeks 9-12 (p-value = 0.204).

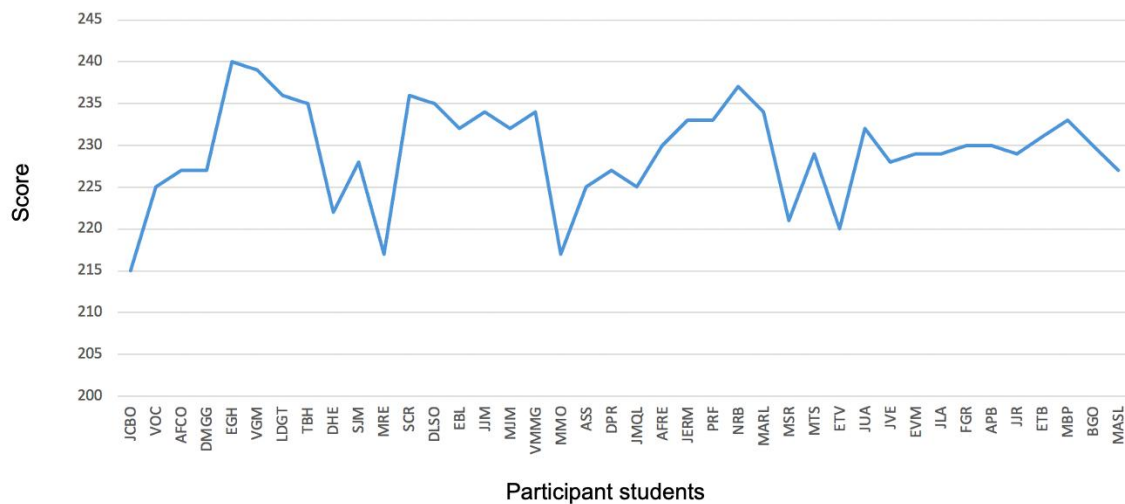
These results suggest that the scores improved significantly over time, with the most substantial increase occurring between the pretest and the later periods. Besides the above, Figure 6 shows the progress of results from week 1 (pretest) to week 16 (posttest) of the AI-based application implementation. An upward trend in the scores obtained by the students can be observed, suggesting a gradual improvement in their performance as they interacted with the technological tool.

**Figure 6**  
*Progress in Oral Skill Level - Implementation of the AI-powered APP*



Meanwhile, Figure 7 shows the consolidated results obtained from Instrument 2 in the three basic skills.

**Figure 7**  
*Consolidated Basic Skills*



**Summary of Results**

The findings obtained through the study suggest that the AI-powered APP significantly contributed to the improvement of English oral expression learning among fifth-grade primary students. In the initial diagnostic stage, the students' interest in technological and diverse environments was identified, which supported the implementation of an AI-based application.

Additionally, the need to renew traditional teaching methods was evidenced, paving the way for the incorporation of innovative tools that captured the students' attention and motivation.

During the implementation of the AI-powered APP, the high level of student participation and engagement demonstrated that the integration of AI into the learning process successfully captured their interest and motivation, key factors for the success of any educational intervention. Moreover, the significant progress observed even among students who had difficulties in the area of English suggests that AI can adapt to individual needs and provide personalized support.

The qualitative results documented in the field diary consistently supported the significant progress in fundamental aspects of oral expression, such as pronunciation, fluency, and conversational skills, during and after interacting with the application. This is largely attributed to the individualized and tailored feedback that the AI provided to each student, addressing their particular needs and strengths, and the reinforcement of these interactions carried out in the classes with the teacher.

The quantitative data supports these findings, reflecting a significantly improvement in the scores obtained by the students throughout the weeks of AI-based application implementation, especially in pronunciation, whose accuracy improved by 32%, thanks to the precise voice response of the AI, and in fluency, which increased by 35%, reinforced by conversational practice in safe environments mediated by AI. The upward trend in the results suggests that as the students interacted with the tool, their performance in English oral expression gradually improved.

In summary, the results obtained through this research suggest that the incorporation of AI into the teaching-learning process provided an interactive and personalized environment that fostered student participation, engagement, and progress. Additionally, the individualized feedback and resources tailored to their needs and interests were key factors in the observed advancements in this linguistic competence.

It is important to highlight that these findings emphasize the transformative potential of AI in the educational field, offering innovative tools that can revolutionize teaching methods and learning processes. In this way, AI's ability to personalize the educational experience, adapt resources, and provide specific feedback can contribute to improving academic performance and skill development in various areas of knowledge.

## **Discussion**

The study's objectives guided every phase of the research process, and the findings directly address the stated goals. The first objective—to identify barriers faced by students in English oral expression—was achieved through diagnostic assessments conducted during Iteration 1. These assessments revealed key challenges, including pronunciation accuracy, fluency consistency, and lack of confidence in oral communication.

The second objective—to design an AI application tailored to address these barriers—was fulfilled by developing and refining the app through iterative DBR cycles. The application's design incorporated features directly aligned with pedagogical principles, such as adaptive learning and task-based learning, ensuring that the content addressed identified deficiencies.

For instance, gamified conversational activities were added to increase engagement and reduce anxiety, directly targeting the identified barriers.

Finally, the third objective—to evaluate the app’s contribution to student performance—was thoroughly addressed in the Results section. Thus, quantitative improvements support the app’s effectiveness in enhancing specific oral expression sub-competencies. Additionally, qualitative data from field diaries highlighted increased student confidence and engagement, further substantiating the app’s impact.

By systematically aligning each phase of the study with its objectives, this research not only validates the hypotheses but also provides a replicable framework for integrating AI in similar educational contexts.

### **About the Results Found**

The findings of this study regarding the contribution of AI to improving English oral expression align with previous research and established theories in the field of second language acquisition and educational technology. Firstly, it is considered that the AI-powered APP provided a contextualized practice environment that allowed students to engage in meaningful and authentic interactions, thereby facilitating the acquisition of language skills in a relevant context. This finding also aligns with the results of Ruiz Cordero (2022), who found that AI-based applications can significantly improve pronunciation and fluency in language learning. The notable increase in student motivation and participation, evidenced by the 60% increase in active participation and the average time of 1 hour and 15 minutes per day dedicated to practice, confirms the observations of Guilloteaux (2013) on the importance of motivation in language learning. Furthermore, this finding supports Deci and Ryan's Self-Determination Theory (Sugden, 2024), which suggests that perceived autonomy and competence are key factors for intrinsic motivation. In this sense, the AI-powered APP seems to have provided an environment that fosters these elements, resulting in greater student engagement with their learning.

Moreover, by automatically adjusting the difficulty level for each student and providing appropriate challenges for 95% of the students, the application seems to have effectively operated within each student's Zone of Proximal Development, thereby facilitating effective learning. This finding also corresponds with the results of Barboza et al. (2022), who found that AI-based personalized feedback can significantly accelerate language learning progress.

The notable progress observed in students who initially had greater difficulties suggests that the AI-powered APP is particularly effective in addressing individual learning needs. This finding aligns with classroom differentiation theories (Tomlinson, 2023) and supports the idea that AI can be a powerful tool for providing personalized instruction on a large scale.

### **Implications of the Results Found**

The findings of this study have significant implications at both practical and theoretical levels, with potential impact not only in Colombia but also in other contexts with similar educational challenges. At the practical level, the integration of AI-powered applications into English language instruction demonstrates a feasible and effective approach to addressing long-

standing barriers such as low proficiency, limited confidence, and lack of motivation among learners. By providing personalized feedback and adaptive learning pathways, the application enabled students to make measurable improvements in key competencies, including pronunciation, fluency, and confidence. These results highlight the potential for AI to transform traditional teaching practices, particularly in under-resourced settings where individualized instruction is often impractical due to large class sizes and limited teacher capacity.

Furthermore, the gamification elements and conversational activities embedded within the application illustrate how engaging digital tools can foster sustained student motivation and reduce the psychological barriers associated with language learning. This approach aligns with broader trends in educational technology, emphasizing the importance of creating interactive and supportive learning environments. For Colombian educators and policymakers, these findings suggest that adopting AI-based tools could serve as a scalable solution to enhance English language proficiency, a key priority for national development and global integration.

At the theoretical level, the study contributes to the growing body of literature on the application of AI in education, particularly in language learning. By integrating pedagogical theories such as Adaptive Learning Theory, Task-Based Learning, and Situated Learning into the design of the application, this research provides a framework for leveraging AI to address specific learner needs. The iterative Design-Based Research (DBR) methodology employed in the study further underscores the value of combining empirical data with theoretical insights to refine and validate educational interventions. This approach not only advances theoretical understanding but also offers a replicable model for future research exploring the intersection of technology and pedagogy.

The broader implications of these findings extend beyond Colombia to other contexts where similar challenges in English language education persist. In low- and middle-income countries, where resources for language instruction are often limited, the adoption of AI-based solutions could bridge gaps in access and quality. The scalability and adaptability of the application tested in this study make it a promising tool for improving language education in diverse settings, from rural schools with minimal infrastructure to urban centers with high student-to-teacher ratios. By demonstrating the efficacy of AI in enhancing oral expression, this research paves the way for further exploration of how emerging technologies can support equitable and inclusive education globally.

### **Comparison with Prior Studies**

The findings of this study align with and extend previous research on AI in language learning. For example, Cislowska and Peña-Acuña (2024) highlight the effectiveness of chatbots in improving oral expression through real-time, personalized feedback in a low-pressure environment. This study corroborates those findings, demonstrating that AI-powered applications can similarly provide tailored feedback, which is critical for addressing individual learning deficiencies. However, the inclusion of gamified elements and an adaptive difficulty system in this study represents a significant advancement over prior research, offering a more engaging and dynamic learning environment.

In addition, Gao (2024) emphasizes the role of advanced NLP systems in enhancing pronunciation accuracy. While that study focuses primarily on algorithmic efficiency, this research builds on those findings by demonstrating practical classroom applications of such technologies, showing how they can improve fluency and conversational skills alongside pronunciation.

Furthermore, the results support the conclusions of Peña-Acuña and Crismán-Pérez (2022), who explored AI's potential to reduce psychological barriers like anxiety and low confidence. This study expands upon their work by providing empirical evidence that gamification and judgment-free feedback not only improve learner confidence but also sustain higher levels of motivation and engagement over time.

Finally, while Li and Tang (2022) examine AI's contributions to oral English communicative competence, this study provides a more granular analysis of specific sub-competencies such as intonation and fluency. The inclusion of adaptive learning mechanisms ensures that these competencies are addressed in a personalized manner, further distinguishing this research from prior studies.

### **Impact of the Study**

This research makes a significant contribution to the field of educational technology and language teaching. It provides empirical evidence on the effectiveness of AI in improving specific language skills, offering a way to integrate advanced technologies into the classroom. The study also highlights the importance of personalization in language learning and opens new avenues for research on the role of AI in education. Ultimately, this work lays the groundwork for a more innovative and effective approach to language teaching, with the potential to significantly improve educational outcomes in an increasingly globalized and technologically advanced world.

The impact of this research can be significant and far-reaching. Below are some of the most important potential impacts:

#### ***Improvement in Communicative Competence***

By implementing an AI-based application, students are expected to improve their communicative competence in English, especially in oral expression. This translates into greater fluency, accuracy, and confidence when speaking English, which is essential for their academic and professional development (Crandall et al., 2023).

#### ***Accessibility and Equity***

The implementation of AI technologies in language learning can democratize access to high-quality educational resources, overcoming geographic and socioeconomic barriers. This is particularly relevant in contexts such as Colombia, where access to educational resources may be limited (Dandu & Gomatam, 2023).

### ***Pedagogical Innovation***

This study contributes to innovation in language teaching pedagogy by integrating advanced technologies into the educational process. Thus, AI will not only be used as a complementary tool but will be integrated coherently with effective language teaching principles and approaches, as suggested by Stamer et al. (2023).

### ***Reduction of Anxiety and Improvement of the Educational Environment***

Creating a safer and less anxious learning environment can have a positive impact on the overall educational climate. In this way, students who feel more comfortable and confident when practicing English, especially in peer feedback settings, tend to participate more actively in classes, which improves the learning environment for everyone, as previously addressed by Yoo and Chae (2011).

### **Study Limitations and Future Research**

Despite the promising results, it is important to acknowledge certain limitations of this study:

- **Sample Size:** The study was conducted with a relatively small sample of 40 students, which may limit the generalization of the results to larger populations.
- **Study Duration:** The intervention lasted only 16 weeks, which may not be sufficient to assess the long-term effects of using an AI-powered APP in language learning.
- **Novelty Effect:** It is possible that the students' initial enthusiasm for using new technology influenced their motivation and participation. Longer-term studies would be needed to determine if this effect persists over time.
- **Specific Context:** The study was conducted in a specific educational context (fifth-grade students in Colombia), which may limit the generalization of the results to other cultural contexts or educational levels.
- **Focus on Oral Expression:** Although the study specifically focused on improving oral expression, other language skills such as listening comprehension, reading, or writing were not assessed.

Based on the identified results and limitations, the following recommendations are proposed for future research and for improving the AI-powered APP:

- **Longitudinal Studies:** Conduct long-term studies to evaluate the sustained impact of the AI-powered APP on language learning and determine whether the positive effects are maintained over time.
- **Expansion to Different Contexts:** Replicate the study in different educational levels, age groups, and cultural contexts to evaluate the generalization of the results.
- **Integration with Other Methodologies:** Investigate how the AI-powered APP can be effectively integrated with other language teaching methodologies.

### **Funding**

No funding was received to assist with the preparation of this manuscript.

### **Conflicts of interest/Competing interest**

As authors, we wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome. We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. All authors were included in the manuscript. We confirm that we have given due consideration to the protection of intellectual property associated with this work and that there are no impediments to publication, including the timing of publication, with respect to intellectual property. In so doing we confirm that we have followed the regulations of our institution concerning intellectual property and ethical issues. We confirm we prepared a complete text suitable for anonymous review and we have seen, read, and understood journal's guidelines on copyright.

### **Authors' Contributions**

All authors contributed to the preparation of this article. All authors read and approved the final manuscript.

### **Acknowledgments**

We thank Universidad de La Sabana (Group Technologies for Academia – Proventus (Project EDUPHD-20-2022), for the support received in the preparation of this article.

## References

- Backhaus, K., Erichson, B., Gensler, S., Weiber, R., & Weiber, T. (2023). Analysis of Variance. En K. Backhaus, B. Erichson, S. Gensler, R. Weiber, & T. Weiber, *Multivariate Analysis* (pp. 147-202). Springer Fachmedien Wiesbaden. [https://doi.org/10.1007/978-3-658-40411-6\\_3](https://doi.org/10.1007/978-3-658-40411-6_3)
- Barboza, J. R. R., Sánchez, G. A. Á., Saavedra, S. S. P., Rojas, C. N. R., & Flores, J. A. (2022). Enfoque comunicativo como estrategia didáctica para mejorar la expresión oral del inglés en tiempos de pandemia. *Archivos Venezolanos de Farmacología y Terapéutica*, 41(1), 1-6. <https://doi.org/10.5281/ZENODO.6370130>
- Chai, C. S., Lin, P.-Y., Jong, M. S.-Y., Dai, Y., Chiu, T. K., & Qin, J. (2021). Perceptions of and behavioral intentions towards learning artificial intelligence in primary school students. *Educational Technology & Society*, 24(3), 89-101.
- Chao, C.-J., & Lin, H.-C. K. (2013). *From a perspective on foreign language learning anxiety to design an affective tutoring system*. 1-8. Scopus.
- Chicaiza Chicaiza, R. M. (2018). *Analysis of the teachers approaches in the development of oral communication skills with third year Baccaalaureate students at Mariano Benitez Public School*. <https://core.ac.uk/download/pdf/486910581.pdf>
- Cifuentes Medina, J. E., Chacón Benavides, J. A., & Moreno Pinzón, I. A. (2018). Análisis de los resultados de las pruebas estandarizadas Saber Pro en profesionales de la educación. *RHS revista humanismo y sociedad*, 6(2), 22-48.
- Cislowska, A. I., & Pena-Acuna, B. (2024). Integration of Chatbots in Additional Language Education: A Systematic Review. *European Journal of Educational Research*, 13(4), 1607-1625. <https://doi.org/10.12973/eu-jer.13.4.1607>
- Crandall, K. A., Khosa, D., Conlon, P., Hewson, J., Lackeyram, D., O'Sullivan, T., & Reniers, J. (2023). Investigating the Relationship between Multiple Mini-Interview Communication Skills Outcomes and First-Year Communication Skills Performance and Reflections in Students at the Ontario Veterinary College. *Journal of Veterinary Medical Education*, 50(3), 370-378. <https://doi.org/10.3138/jvme-2021-0152>
- Dandu, G., & Gomatam, M. (2023). An impact of artificial intelligence tools on technical students' ESL oral communication skills: A study. En S. Kumar Alla, S. Thomas, & Ch. V. V. Ramana (Eds.), *International Conference on Emerging Materials for Technological Applications (ICEMTA 2022)* (p. 9). SPIE. <https://doi.org/10.1117/12.2686324>
- De Vos, L., Nevens, J., Van Eecke, P., & Beuls, K. (2024). Construction grammar and procedural semantics for human-interpretable grounded language processing. *Linguistics Vanguard*, 0(0). <https://doi.org/10.1515/lingvan-2022-0054>
- Gao, J. (2024). Pronunciation Correction for Learners of Oral English in College English under Artificial Intelligence Algorithms: Based on Pronunciation Correction Model of Graph Neural Network. *Proceedings of the International Conference on AI and Metaverse in Supply Chain Management*, 1-6. <https://doi.org/10.1145/3648050.3648078>
- Gass, S. M., Behney, J., & Plonsky, L. (2020). *Second language acquisition: An introductory course*. Routledge. <https://www.taylorfrancis.com/books/mono/10.4324/9781315181752/second-language-acquisition-susan-gass-jennifer-behney-luke-plonsky>

- Goh, C. C., & Vandergrift, L. (2021). *Teaching and learning second language listening: Metacognition in action*. Routledge. <https://www.taylorfrancis.com/books/mono/10.4324/9780429287749/teaching-learning-second-language-listening-christine-goh-larry-vandergrift>
- Gong, Y. (Frank), Gao, X. (Andy), Li, M., & Lai, C. (2021). Cultural adaptation challenges and strategies during study abroad: New Zealand students in China. *Language, Culture and Curriculum*, 34(4), 417-437. <https://doi.org/10.1080/07908318.2020.1856129>
- Guilloteaux, M.-J. (2013). Motivational strategies for the language classroom: Perceptions of Korean secondary school English teachers. *System*, 41(1), 3-14. <https://doi.org/10.1016/j.system.2012.12.002>
- Habib, R. B. (2019). Alternative Learning Experiences: An Innovative Project Stimulating Creative Faculty of Humanities Students. En A. Reyes-Munoz, P. Zheng, D. Crawford, & V. Callaghan (Eds.), *EAI International Conference on Technology, Innovation, Entrepreneurship and Education* (Vol. 532, pp. 39-61). Springer International Publishing. [https://doi.org/10.1007/978-3-030-02242-6\\_4](https://doi.org/10.1007/978-3-030-02242-6_4)
- Hismanoglu, M., & Hismanoglu, S. (2011). Task-based language teaching: What every EFL teacher should do. *Procedia - Social and Behavioral Sciences*, 15, 46-52. <https://doi.org/10.1016/j.sbspro.2011.03.049>
- ICFES. (2023). *Informe nacional de resultados Saber Pro y Saber TyT 2022*. ICFES - Ministerio de Educación Nacional. [https://www.icfes.gov.co/documents/39286/21440788/Informe\\_Nacional\\_Superior\\_2022.pdf](https://www.icfes.gov.co/documents/39286/21440788/Informe_Nacional_Superior_2022.pdf)
- Khamkhen, A. (2011). QUANTITATIVE AND QUALITATIVE VIEWS OF THAI EFL LEARNERS' LEARNING ORAL COMMUNICATION SKILLS. *Academic Research International*, 1(1), 90.
- Kim, H.-S., Cha, Y., & Kim, N. Y. (2021). Effects of ai chatbots on efl students' communication skills. *Korean Journal of English Language and Linguistics*, 2021(21), 712-734. Scopus. <https://doi.org/10.15738/kjell.21..202108.712>
- Laboratorio de Economía de la Educación. (2023). *Informe No. 69. Inglés, el factor de competitividad pendiente en Colombia*. Pontificia Universidad Javeriana. <https://www.javeriana.edu.co/recursosdb/5581483/8102914/INF-69-INGLE%CC%81S-LEE2023.pdf>
- Li, J., & Tang, S. (2022). Research on the Application of Artificial Intelligence Technology in the Cultivation of Oral English Communicative Competence. En S. Sun, T. Hong, P. Yu, & J. Zou (Eds.), *Signal and Information Processing, Networking and Computers* (Vol. 895, pp. 1126-1131). Springer Nature Singapore. [https://doi.org/10.1007/978-981-19-4775-9\\_145](https://doi.org/10.1007/978-981-19-4775-9_145)
- Li, X., Zhang, F., Duan, P., & Yu, Z. (2024). Teacher support, academic engagement and learning anxiety in online foreign language learning. *British Journal of Educational Technology*, bjet.13430. <https://doi.org/10.1111/bjet.13430>

- Liu, D., Ji, H., & Kliger, D. (2023). Stealth Assessment in Game-Based and Task-Based Language Teaching: A Framework From Teachers' Perspective. En M. P. McCreery & S. K. Krach (Eds.), *Advances in Educational Technologies and Instructional Design* (pp. 289-313). IGI Global. <https://doi.org/10.4018/979-8-3693-0568-3.ch013>
- Lukman, L., Abdulhak, I., & Wahyudin, D. (2016). Learning Model Development to Improve Students' Oral Communication Skill. *International Journal of Linguistics, Literature and Culture*, 2(2), 147-166.
- Marchante, B. M. (2022). The use of ICTs and artificial intelligence in the revision of the writing process in Valencian public universities. *Research in Education and Learning Innovation Archives*, 28, 16-31.
- Montiel-Ruiz, F. J., & López Ruiz, M. (2023). Inteligencia artificial como recurso docente en un colegio rural agrupado. *Revista Interuniversitaria de Investigación en Tecnología Educativa*, 28-40. <https://doi.org/10.6018/riite.592031>
- Mora, A. B. (2020). El desarrollo de la expresión escrita en inglés a través del entorno virtual de aprendizaje. *Contribuciones de la tecnología digital en el desarrollo educativo y social*, 1-11. <http://www.adayapress.com/wp-content/uploads/2020/09/contec1.pdf>
- Oflaz, A. (2019). The Effects of Anxiety, Shyness and Language Learning Strategies on Speaking Skills and Academic Achievement. *European Journal of Educational Research*, volume-8-2019(volume8-issue4.html), 999-1011. <https://doi.org/10.12973/eu-jer.8.4.999>
- Palanisamy, B., & Rajasekaran, V. (2024). Insights into the Dynamic Relationship between Technology and Task-Based Language Teaching: A Critical Review. *International Journal of Learning, Teaching and Educational Research*, 23(2), 402-420. <https://doi.org/10.26803/ijlter.23.2.19>
- Peña-Acuña, B., & Crismán-Pérez, R. (2022). Research on Papua, a digital tool with artificial intelligence in favor of learning and linguistic attitudes towards the learning of the English language in students of Spanish language as L1. *Frontiers in Psychology*, 13, 1019278. <https://doi.org/10.3389/fpsyg.2022.1019278>
- Puli Quito, F. E. (2023). *Self-confidence and its Relationship with the Development of English Oral Communication Competence* [B.S. thesis, Riobamba]. <http://dspace.unach.edu.ec/handle/51000/10423>
- Razmeh, S. (2024). From screen to society: Second language learners' cultural adaptation and identity reconstruction in virtual knowledge communities. *Journal for Multicultural Education*, 18(1/2), 139-152. <https://doi.org/10.1108/JME-10-2023-0106>
- Rossi, M. (2021). *Design-based research and planning of training courses: The application model of Future Education Modena*. 2817. Scopus.
- Ruiz Cordero, M. B. (2022). Nivel de expresión oral en inglés en centros bilingües y no bilingües de Castilla-La Mancha. *Revista Complutense de Educación*, 33(2), 201-213. <https://doi.org/10.5209/rced.73909>
- Salazar, L. J. R., & Maldonado, L. F. (2020). Autonomous learning of english as a foreign language in a culturally integrated b-learning ecosystem. *Revista Boletín Redipe*, 9(7), 182-202.

- Slomp, E. M., Ropelato, D., Bonatti, C., & Da Silva, M. D. (2024). Adaptive Learning in Engineering Courses: How Artificial Intelligence (AI) Can Improve Academic Outcomes. *2024 IEEE World Engineering Education Conference (EDUNINE)*, 1-6. <https://doi.org/10.1109/EDUNINE60625.2024.10500580>
- Souza, A. S. C. D., & Debs, L. (2024). Concepts, innovative technologies, learning approaches and trend topics in education 4.0: A scoping literature review. *Social Sciences & Humanities Open*, 9, 100902. <https://doi.org/10.1016/j.ssaho.2024.100902>
- Stamer, T., Steinhäuser, J., & Flägel, K. (2023). Artificial Intelligence Supporting the Training of Communication Skills in the Education of Health Care Professions: Scoping Review. *Journal of Medical Internet Research*, 25, e43311. <https://doi.org/10.2196/43311>
- Sugden, R. (2024). Self-realisation and Usefulness: A Critical Examination of Self-determination Theory. *Review of Behavioral Economics*, 11(2), 211-234. <https://doi.org/10.1561/105.00000187>
- Tomlinson, B. (2023). *Developing materials for language teaching*. Bloomsbury Publishing. [https://books.google.com/books?hl=es&lr=&id=aZG\\_EAAAQBAJ&oi=fnd&pg=PP1&dq=Materials+development+for+language+learning+and+teaching&ots=G58XKXATzQ&sig=\\_HG9f1TE\\_NxRxtPdvQwG5\\_2RVR0](https://books.google.com/books?hl=es&lr=&id=aZG_EAAAQBAJ&oi=fnd&pg=PP1&dq=Materials+development+for+language+learning+and+teaching&ots=G58XKXATzQ&sig=_HG9f1TE_NxRxtPdvQwG5_2RVR0)
- Ubani, S., & Nielsen, R. (2022). Review of Collaborative Intelligent Tutoring Systems (CITS) 2009-2021. *2022 11th International Conference on Educational and Information Technology (ICEIT)*, 67-75. <https://doi.org/10.1109/ICEIT54416.2022.9690733>
- Vargas, E. G., Chiappe, A., & Durand, J. (2024). Reshaping education in the era of artificial intelligence: Insights from Situated Learning related literature. *Journal of Social Studies Education Research*, 15(2), 1-28. Scopus.
- Vega, Y. X. T. (2023). Secuencia didáctica para fomentar la expresión oral en inglés caso: Escuela Nueva Santo Domingo de Silos, Norte de Santander. *Revista Investigación & praxis en CS Sociales*, 2(4), 104-126.
- Vergara-Pareja, C. M., Nielsen-Niño, J. B., & Niño-Vega, J. A. (2021). La gamificación y el fortalecimiento de la habilidad oral en inglés a niños de primera infancia. *Revista de Investigación, Desarrollo e Innovación*, 11(3), 569-578. <https://doi.org/10.19053/20278306.v11.n3.2021.13355>
- Villeda Menjivar, E. Y., Alvarado Galdámez, N. G., & Hernández Ayala, A. B. (2018). *Target language speaking problems in students taking Advanced Intensive English I, intermediate Intensive English I and Readings and Conversation I at the Foreign Languages Department, University of El Salvador, semester II, 2016. A diagnostic study from the teachers' perspective* [PhD Thesis, Universidad de El Salvador]. <https://oldri.ues.edu.sv/id/eprint/18871/>
- Voicu, G. C., Ciolofan, S. N., & Drăgoicea, M. (2023). Making children read more and better by integrating natural language processing and gamification techniques into mobile applications. *2023 24th International Conference on Control Systems and Computer Science (CSCS)*, 144-151. <https://doi.org/10.1109/CSCS59211.2023.00031>

- Yang, J. (2020). *Using contextualized materials to teach English grammar*. <https://repository.usfca.edu/capstone/1133/>
- Yoo, M. S., & Chae, S.-M. (2011). Effects of Peer Review on Communication Skills and Learning Motivation Among Nursing Students. *Journal of Nursing Education*, 50(4), 230-233. <https://doi.org/10.3928/01484834-20110131-03>
- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education – where are the educators? *International Journal of Educational Technology in Higher Education*, 16(1), 39. <https://doi.org/10.1186/s41239-019-0171-0>
- Zheng, L. (2016). Reflection on Design-Based Research: Challenges and Future Direction. In Y. Li, M. Chang, M. Kravcik, E. Popescu, R. Huang, Kinshuk, & N.-S. Chen (Eds.), *State-of-the-Art and Future Directions of Smart Learning* (pp. 293-296). Springer Singapore. [https://doi.org/10.1007/978-981-287-868-7\\_35](https://doi.org/10.1007/978-981-287-868-7_35)