How can a digital learning ecosystem that integrates Colombian culture and AI-driven resources enhance intercultural awareness, communication, and learner engagement in Pre-intermediate English classes at the Gran Colombia?

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Abstract

This project examines the importance of a learning ecosystem that integrates Colombian culture and AI-driven resources enhancing intercultural awareness, communication, and learner engagement in Pre-intermediate English classes This research focuses on how to use the Colombian context to improve students' language acquisition skills in a classroom of pre-intermediate English students at Universidad La Gran Colombia, considering the different perspectives of each student. The goal is to develop innovative strategies such as creating original classroom resources that address opportunities in the cognitive process, analyzing and collecting information that allows for useful alternatives that enrich English learning and its sensitization to the Colombian context. Consequently, it seeks to offer a broader and more relevant view of the context in which students learn a foreign language.

Keywords: Interculturality, Readings, Critical thinking, Colombian context.

Resumen

Este proyecto examina la importancia de un ecosistema de aprendizaje que integra la cultura colombiana y recursos impulsados por IA para mejorar la conciencia intercultural, la comunicación y el compromiso de los estudiantes en clases de inglés Pre-intermedio. Esta investigación se enfoca en cómo utilizar el contexto colombiano para mejorar las habilidades de adquisición del lenguaje de los estudiantes en un aula de inglés Pre-intermedio de la Universidad La Gran Colombia, considerando las diferentes perspectivas de cada estudiante. El objetivo es desarrollar estrategias innovadoras como la creación de recursos de clase originales que aborden oportunidades en el proceso cognitivo, analizando y recopilando información que permita alternativas útiles que enriquezcan el aprendizaje del inglés y su sensibilización sobre la cultura colombiano. En consecuencia, busca ofrecer una visión más amplia y relevante del contexto en el que los estudiantes aprenden una lengua extranjera.

Palabras clave: Interculturalidad, Lecturas. Pensamiento crítico. Contexto colombiano

Introduction

The predominance of generic instructional materials in Pre-Intermediate English courses may limit opportunities for students to establish meaningful connections between language learning and their own Colombian cultural contexts. Since language and culture are closely interconnected, the absence of local cultural content may restrict students' opportunities to reflect on their identities, critically analyze cultural realities, and develop intercultural competence. Therefore, it is important to explore pedagogical approaches that integrate culturally relevant content and innovative technologies to create more meaningful learning experiences, as there are currently many challenges to overcome. For this reason, this study aims to conduct a comprehensive analysis of the interactions between the State, society, and politics.

The problem arises when analyzing the lack of influence of the integration of Colombian culture and cultural awareness where it has been evidenced that the teaching of English is mainly focused on thematic axes of general features and influenced by contexts of American and European standards, without contemplating the appreciative impact that could be generated by implementing the use of the Colombian context. Evaluating the Colombian context as a tool in the teaching of English which offers a significant potential where we can enrich the learning of English, strengthen the link between the student and the cultural identity and promote an awareness of the content of the Colombian culture through adapted class resources.

Justification

Current Pre-Intermediate English instruction at Universidad La Gran Colombia relies predominantly on generic materials like the textbook, which privilege Anglo-Saxon cultural contexts while maintaining their pedagogical strengths in thematic organization. This approach creates a critical disconnection between course content and students lived Colombian experiences, diminishing motivation, cultural relevance, and the potential for meaningful language acquisition. Preliminary observations confirm students' communicative resilience and professional aspirations in English teaching yet reveal systematic underutilization of local cultural assets that could transform classrooms into spaces of identity affirmation and critical intercultural dialogue.

This study seeks to address this gap through AI-enhanced, culturally integrated teaching materials, combining Colombian contexts with English-language content to foster cultural awareness and analytical thinking. Furthermore, this approach aligns with UNESCO's "Learning to Know" and "Learning to Be" competencies by fostering critical reflection and strengthening meaningful connections to students' cultural identities. By adapting existing curricular units with Colombian elements such as regional festivals, social norms, and professional aspirations, the intervention achieves the first specific objective, examining how these materials promote students' awareness of cultural diversity and critical reflection on multiple perspectives.

Directly supporting the second specific objective by enhancing engagement and making language learning more meaningful and contextually relevant. The proposed intervention aims to encourage students to transition from being passive consumers of foreign content to becoming active creators of culturally grounded discourse in English.

Finally, the strategic integration of AI tools (ChatGPT prompts, adaptive feedback platforms) fits the third specific objective, evaluating how technology scaffolds analytical

thinking (cultural bias critique), creativity (remixing local themes), and autonomy (self-directed practice). This approach can foster a dynamic of mutual learning in which Colombian culture serves both as content and as an analytical lens for understanding English-speaking contexts.

1.1 Statement of the problem

English language instruction at the Pre-Intermediate level at Universidad Gran Colombia currently relies on generic instructional materials that privilege Anglo-Saxon cultural contexts. While this exposure to authentic English-speaking cultures has a pedagogical value, it creates a significant imbalance: course content becomes increasingly disconnected from students' lived experiences and cultural identities. The systematic absence of Colombian cultural elements within classroom materials represents a fundamental pedagogical limitation that diminishes the perceived relevance of language learning and underutilizes the classroom as a space for cultural affirmation.

This study investigates whether deliberately integrating Colombian cultural elements into adapted instructional materials can simultaneously achieve two complementary educational outcomes: enhancing students' English communicative competence and cultivating critical consciousness regarding the relationship between language, identity, and culture. The underlying assumption is that meaningful language acquisition occurs when learners perceive direct relevance between target language study and their own sociocultural contexts.

The project also posits that a more balanced pedagogical approach, one that positions Colombian culture as legitimate and central, may naturally stimulate student curiosity about the broader cultural nuances of English-speaking societies, fostering reciprocal intercultural understanding rather than unidirectional cultural assimilation.

The research team conducted observational analysis of a Pre-Intermediate course using a textbook. Despite the text's comprehensive thematic organization, analysis confirmed the absence of explicit Colombian cultural integration. However, observations revealed significant pedagogical assets: students demonstrated communicative resilience despite linguistic limitations, displayed receptiveness to corrective feedback with metacognitive awareness of their learning processes, and expressed genuine interest in English language teaching careers. Additionally, diagnostic observations identified a tendency among some students to rely on AI-generated responses through copy-pasting practices rather than producing original content. This pattern may reflect a lack of confidence in their own linguistic abilities and a dependence on external support during language production.

In this order of ideas, it is important to explain that the teacher is free in the development of the class and materials, the intervention develops AI-enhanced instructional materials that maintain curricular alignment with existing thematic units while infusing each unit with Colombian cultural content. This approach creates three dimensions of pedagogical value: explicit exploration of career aspirations and professional development, comparative cultural analysis opportunities, and recognition of the intrinsic connection between language acquisition, cultural identity, and personal agency.

Preliminary observations confirm the feasibility of integrating Colombian cultural content within existing curricular structures. The textbook framework's thematic organization provides natural integration points, creating opportunities to expand conventional teaching methodologies while maintaining curricular coherence. The innovation synthesizes three elements: validated curricular content, culturally specific Colombian materials, and AI-supported instructional design transforming Pre-Intermediate English instruction from a process of cultural accommodation into one of culturally affirming and context-responsive language development,

This research aims to examine whether strategically designed culturally integrated English instruction can contribute to strengthening linguistic competence while fostering critical reflection regarding the relationship between language, identity, and culture. By positioning students' own cultural context as a valued reference point, the project seeks to create more engaging, motivating, and ultimately more effective Pre-Intermediate English instruction that honors both linguistic development and cultural identity.

Research Question

How can a digital learning ecosystem that integrates Colombian culture and AI-driven resources enhance intercultural awareness, communication, and learner engagement in Pre-intermediate English classes at Universidad La Gran Colombia?

Objectives

General objective

To analyze the impact of integrating intercultural awareness and critical and analytical thinking through AI-based instructional materials within a digital learning ecosystem that combines the Colombian context with English language content to enhance intercultural competence, communication, and learner engagement.

Specific Objectives

1. To identify how the inclusion of Colombian cultural elements in AI-integrated English class materials promotes students' awareness of cultural diversity and fosters critical reflection and respect for multiple perspectives.

2. To analyze how integrating Colombian cultural contexts into digital English learning environments enhances students' cultural identity and engagement.

3. To explain how the integration of AI tools and digital resources that incorporate Colombian cultural contexts supports students' critical and analytical thinking,

particularly in their written and oral communication abilities, while fostering active and collaborative participation.

Hypothesis

The integration of Colombian cultural elements into AI-based instructional materials for pre-intermediate English classes at Universidad La Gran Colombia may contribute to enhancing students' intercultural awareness, understanding of cultural diversity, language engagement, and the development of analytical thinking, creativity, and autonomy compared to traditional materials that lack cultural contextualization and digital interactivity.

Theoretical framework

This study examines three primary dimensions: the impact of culturally integrated content on student engagement and language learning outcomes; the development of intercultural understanding across English-speaking and Colombian contexts; and the influence of AI-supported adapted materials on student perspectives regarding language acquisition and learning meaningfulness. Additionally, the study explores the potential role of artificial intelligence in education as a supportive pedagogical tool that may foster student autonomy, personalized learning experiences, and meaningful interaction while complementing teachers' instructional guidance.

Chang and Guetl (2007) propose "the concept of learning ecosystems as. interconnected educational environments where various factors technological, pedagogical, and social" interact to facilitate knowledge acquisition.

Tuamsuk and colleagues (Nguyen, Tuamsuk et al., 2023) analyze and study a digital learning ecosystem in Thai schools, showing how their proposal improves information flow, communication skills, and interaction. However, they also point out that its effectiveness depends on teacher support and technological infrastructure.

Learning community

This refers to the interaction among teachers (sharing methods, joint planning), between teachers and students (tasks, technology-based activities, classes), and among students themselves (collaborative products, teamwork). This community is understood as a network of actors who support one another to achieve academic goals and enhance motivation.

Learning atmosphere

It is essential to create an optimal environment that is both comfortable and motivating, with 7:00 am to 9:00 am daily sessions where activities are adjusted when attention declines. The use of applications, video games, and various digital quizzes helps sustain student interest.

Active learning

This involves strategies such as teamwork, debates, discussions, video production, and guided self-learning. The goal is to develop critical thinking rather than merely generating content.

Support for teaching and learning

This component includes technological resources (digital media, videos, Quizziz, Kahoot, smartphones, platforms) as well as administrative and professional support.

Culture

The main purpose is to include Colombian culture into English class contents for higher education, precisely at the pre-intermediate level at La Gran Colombia University. This

project aims to confront students' lack of intercultural understanding – shown by their previous knowledge of other cultures, if the English language text within them largely reflects those foreign world-views. The study's motivation is to investigate whether AI tools enable an embedding of Colombian rendition into English resources in order to promote broader tolerance for cultural diversity and other perspectives on the definition of what it means to be Colombian.

As Agudelo (2007) explains, culture often remains invisible in our everyday lives until individuals encounter situations that challenge their familiar beliefs, behaviors, or language. Such encounters whether through direct intercultural experiences or through learning opportunities that emphasize cultural awareness reveal how deeply culture shapes our perception and communication. When people engage with new cultural contexts, those once-unnoticed influences become visible, allowing them to perceive their own culture from a more reflective standpoint.

This idea highlights how recognizing cultural differences through education and exposure can broaden learners' perspectives. By encouraging students to examine both their own and others' cultural patterns, they develop greater empathy, open-mindedness, and the ability to connect meaningfully across diverse social and academic settings.

Language, culture, and meaning

Learning a foreign language goes beyond mastering grammar and vocabulary, because language is embedded in cultural contexts that give words their full meaning (Kramsch, 1993). From this perspective, English teaching must include reflection on the values, customs, and ways of thinking associated with the language, rather than focusing solely on formal correctness (Kramsch, 1993). Culture not only enriches the educational process, but also explains why particular expressions carry specific meanings in certain contexts, making cultural integration a key strategy for meaningful, contextualized learning (Rodríguez Urbina, 2017, as cited in Pulverness, 2003).

Language and culture are dynamically connected: culture shapes communicative practices, while language serves as a vehicle for transmitting cultural values and social norms (Peterson & Coltrane, 2003). Teachers are therefore expected to foster students' cultural development, which implies not just learning cultural "facts" but also cultivating the ability to interpret intercultural cues and act appropriately in diverse situations (Peterson & Coltrane, 2003). This orientation enables learners to communicate more effectively in real-life contexts and become culturally competent users of English (Peterson & Coltrane, 2003).

Pragmatic and sociocultural competence

Integrating cultural content into language teaching supports the development of learners' pragmatic competence, that is, the ability to use language appropriately across different social situations (Hinkel, 1999). Learners need to know not only what to say, but also how and when to say it according to cultural norms and expectations in order to avoid misunderstandings that can obstruct communication (Hinkel, 1999). For this reason, English instruction should incorporate sociocultural contexts, idiomatic expressions, and culturally embedded meanings that go well beyond literal translation (Hinkel, 1999).

Such an approach positions language classrooms as spaces where students explore how culture influences politeness, formality, humor, and other discourse features (Hinkel, 1999). When learners are guided to notice these nuances, they gradually develop sensitivity to implicit norms, which strengthens both their communicative effectiveness and their intercultural awareness (Hinkel, 1999).

Based on the above, the use of AI can contribute to the development of pragmatic competence by exposing students to the contextualized use of language and encouraging reflection on the relationship between language and culture. For example, students can use AI-generated scenarios to compare greetings, expressions of courtesy, classroom interactions, or professional communication practices in Colombian and English-speaking contexts.

Intercultural awareness in higher education

In higher education, intercultural competence is a crucial dimension of holistic student formation (Byram, 1997). In Universidad La Gran Colombia there exists one subject named "intercultural education" It involves not only knowledge of other cultures, but also the capacity to value one's own culture, interpret diverse practices, and adopt attitudes of respect and openness toward difference (Byram, 1997). Universities should therefore create experiences and spaces where students can critically examine both local and foreign cultures, especially within language courses (Byram, 1997).

Promoting intercultural competence enables students in a multicultural country such as Colombia to recognize the potential of diversity in their personal, academic, and professional lives (Byram, 1997; Garcés, 2023). In English teaching, this means moving beyond materials that focus exclusively on Anglo-Saxon cultures and intentionally including local cultural references (Byram, 1997; Garcés, 2023). Deardorff's perspective on intercultural competence emphasizes curiosity, respect, cultural knowledge, and skills such as

active listening and adaptability, all of which can be nurtured in the language classroom through carefully designed experiences (Deardorff, 2006). However, although the Intercultural Education course promotes cultural reflection and awareness, it does not explicitly follow the linguistic competencies and skill progression established for the Pre-Intermediate level within the CEFR. To bridge this gap, the present study proposes the integration of AI-supported and culturally relevant instructional materials that maintain CEFR-aligned language objectives while incorporating Colombian cultural content into English learning activities. For example, Colombian festivals, social practices, or professional aspirations can be integrated into reading, writing, speaking, and critical reflection activities aligned with CEFR competencies.

Colombian culture as a classroom resource

In Colombia, English teaching materials often privilege Anglo-Saxon contexts, which can limit students' recognition and appreciation of their own culture (Garcés, 2023). Integrating Colombian cultural content into English materials both strengthens students' cultural identity and promotes the appreciation of diversity by connecting language learning with their everyday experiences (Quintero, 2006). Meaningful learning emerges when new knowledge is related to learners' prior experiences, so drawing on local culture can make English learning more authentic, relevant, and motivating (Quintero, 2006).

Using familiar cultural content can increase engagement and interest, while also encouraging students to analyze cultural behaviors, sociocultural variables in language use, and ways to avoid stereotypes (Quintero, 2006; Varon, 2009). Local cultural references help normalize English as a language that can describe and value Colombian realities, rather than a code reserved only for foreign or elitist contexts (Cortazzi & Jin, 1999). In this sense,

English becomes a tool for representing, questioning, and re-signifying the local environment, contributing to both identity formation and critical thinking (Cortazzi & Jin, 1999).

Strategies for integrating culture in EFL

Effective cultural integration in the EFL classroom depends on the design of pedagogical strategies that combine language development with intercultural reflection (Liddicoat & Scarino, 2013). Intercultural approaches propose activities based on authentic materials, cultural comparison, and critical analysis, positioning the teacher as a mediator between the target language, foreign cultures, and learners' local culture (Liddicoat & Scarino, 2013).

For pre-intermediate university students, such as those at Universidad La Gran Colombia, working with texts that incorporate Colombian cultural references is especially relevant for promoting intercultural and context-sensitive English learning (Liddicoat & Scarino, 2013).

Teachers can employ strategies such as culture-based tasks, experiential learning, and projects grounded in students' realities to deepen their understanding of cultural nuances (Gay, 2010; Sercu, 2005). Authentic texts, videos, songs, and local stories adapted or presented in English can be used to stimulate cultural comparison and engagement, while reflection journals and intercultural role-plays invite learners to examine how norms shape behavior and language use (Sercu, 2005). As intercultural communicative competence is recognized as a central goal of language education, institutions are called to support teacher training and provide conditions that sustain these practices (Sercu, 2005).

Similarly, intercultural role-plays will be supported through AI-generated scenarios where students compare Colombian and English-speaking contexts. For instance, students

may simulate a conversation explaining Colombian traditions or responding to cultural stereotypes, while AI provides adaptive prompts and feedback on language use and appropriateness.

Collaborative work, peer discussion, and shared reflection further allow students to confront different points of view, question stereotypes, and recognize the complexity of cultural identities (Holmes & O'Neill, 2012). When learners see their histories and values reflected in the curriculum, they tend to feel more included and willing to participate, which reinforces a sense of belonging and personal relevance (Gay, 2010). In diverse contexts such as Colombia, integrating culture into language teaching is therefore not optional but a pedagogical necessity that promotes linguistic proficiency, intercultural awareness, empathy, and global citizenship (Gay, 2010; Holmes & O'Neill, 2012).

Artificial Intelligence for Cognitive Development

The integration of AI tools in English language instruction fosters students' analytical thinking, creativity, and autonomy when engaging with culturally relevant learning materials (Cevallos & Pesántez, 2025; Hongchuntam & Phothongsunan, 2025; Szabó, 2024). Generative AI platforms like ChatGPT, Twee AI, and MagicSchool.ai are particularly effective in Latin American EFL contexts such as Colombia and Ecuador, where they enable personalized tasks grounded in local cultural scenarios such as analyzing festivals, social norms, or folklore which prompt students to critique outputs for accuracy and generate original responses (Cevallos & Pesántez, 2025; Huang & Mizumoto, 2024). In Colombian university settings, AI supports self-directed learning through instant feedback on culturally adapted writing or discussions, enhancing motivation, metacognition, and reducing teacher dependency (López-Minotta et al., 2024; Moreno, 2024; Pacheco, 2025). However, this

greater student autonomy does not replace the teacher's pedagogical role, as instructors continue to guide learning processes and provide meaningful educational support.

AI scaffolds analytical thinking by challenging learners to revise generated content for cultural biases (e.g., "Evaluate this AI summary of Carnaval de Barranquilla for stereotypes"), while fostering creativity through remixing suggestions into novel English stories or dialogues based on regional traditions (Huang & Mizumoto, 2024; Szabó, 2024; Zhou, 2025). Adaptive tools promote autonomy via self-regulated practice, such as personalized quizzes on Colombian-English cultural contrasts or AI-enhanced oral tasks, aligning with learner-centered designs in resource-constrained EFL environments (Cevallos & Pesántez, 2025;Moreno, 2024).

Recent Colombian pilots demonstrate AI's potential for pre-intermediate levels: learning analytics platforms track metacognitive growth, while ChatGPT boosts oral expression and creativity in adult learners despite access challenges (López-Minotta et al., 2024; Pacheco, 2025

Artificial intelligence tools available for education

Represent only a fraction of the technological solutions aimed at improving accessibility, learning personalization, and diagnosis for students who wish to learn any language. This, in turn, increases motivation to learn more about history and culture within the country. The market offers a wide variety of similar applications; however, it is essential to conduct a rigorous analysis of their features and effectiveness before implementing them in educational contexts, given the diversity of needs and possible scenarios (Fundación Teletón México, 2023; Andina - Agencia Peruana de Noticias, 2024; OpenAI, 2023).

Among the existing options for lesson planning and material generation, ChatGPT Voice stands out for its versatility and ability to support people with different types of

disabilities. Beyond facilitating learning and entertainment processes, it can work as a personal assistant—especially for shy students who use assistive devices to interact through text and receive tailored responses to their needs. Although its primary operation is textual, integration with additional technologies allows for voice input and output, as well as audio generation, extending its reach to users with diverse needs (OpenAI, 2023).

From a research perspective, and considering contemporary applications such as Falou, Chatbot, Spatial, ChatGPT Voice, and Genially, artificial intelligence has become a key resource for educational accessibility. These platforms enable the creation of accessible teaching materials by integrating features such as automatic subtitle generation, audio descriptions, and visual or auditory adaptations to facilitate language learning. For example, ChatGPT Voice and Chatbot promote oral and written interaction, allowing students with visual or motor impairments to access content and actively participate in class. Tools like

Genially make it possible to design interactive and adaptive resources that can be personalized to meet specific needs due to their highly visual and intuitive nature, while Spatial offers immersive virtual environments that promote inclusion for students with different sensory and cognitive abilities (Pérez & Torres, 2025; López, 2025).

Regarding learning personalization, applications like Falou use AI algorithms to adjust the pace, difficulty, and focus of activities according to each student's progress and profile, promoting individualized learning paths. Platforms such as Genially also enable differentiated learning routes, adapting content and assessment to students' unique styles and needs (García, 2025; López, 2025).

On the other hand, the identification of educational needs is enhanced through data analysis collected by these tools. Systems such as Chatbot and Falou can monitor academic performance and detect patterns of difficulty, alerting teachers to potential areas for early intervention. Similarly, ChatGPT Voice and Spatial gather information about students'

interaction with digital resources, facilitating evidence-based pedagogical decision-making (Editorial Páginas Brillantes Ecuador, 2025; Pérez & Torres, 2025).

In summary, artificial intelligence in education can be understood as a technological and pedagogical tool that supports teaching and learning processes through adaptive, interactive, and personalized experiences. Within educational contexts, AI may facilitate access to digital resources, support student engagement, and create opportunities for culturally relevant learning experiences. At the same time, its implementation requires ethical and pedagogical considerations, including equitable access, responsible use of student information, and continuous evaluation to ensure that technology complements educational goals without compromising instructional quality.

State of the art

A systematic review of international and national studies reveals the profound influence of cultural content on EFL learning, particularly in fostering critical thinking and meaningful engagement through locally relevant materials (Gómez Rodríguez, 2018; Quintero, 2006). These works underscore the need for dynamic strategies such as multimodal resources (videos, illustrations, music), didactic sequences, and now AI-enhanced tasks that productively integrate cultural elements with cognitive skills like analysis and creativity (Castro et al., 2022; Cevallos & Pesántez, 2025).

Castro et al. (2022) conducted a qualitative study using multimodal learning to connect cultural experiences with reflective processes, developing intercultural awareness around ethnicity, gender, ability, and social class. By contrasting traditional methods with diverse resources (images, videos, speeches), this approach broadened students' perspectives and agency in the classroom,offering a model adaptable to AI prompts for cultural critique (Castro et al., 2022).

Otherwise,Rodríguez (2017) examined intercultural awareness as a tool for enhancing interactive skills, drawing on Vygotsky's sociocultural theory to test pre/post interventions. Findings showed that exposure to diverse cultural content (traditions, songs, landmarks) not only motivated learners but also cultivated equity, respect, and critical communicative competence extending beyond language to identity formation (Rodríguez, 2017).

Similarly, Gómez Rodríguez (2019) advocates linking textbooks to target cultures' history, linguistic diversity, and traditions, creating freer environments for critical exploration and multifaceted feedback. This informed the focus on pre-intermediate students at Universidad La Gran Colombia, where curriculum themes (e.g., daily life) lend themselves to innovative local adaptations (Gómez Rodríguez, 2019).

Vides (2021) designed a didactic sequence with Colombian cultural content to motivate learners by valuing their heritage, validated through questionnaires, interviews, and storyline coherence. This approach transcends mere language instruction, confirming feasibility within university syllabi without disrupting learning progression (Vides, 2021).

Quintero (2006) emphasizes motivation via context-specific strategies, using Antioquian themes (coffee production, agriculture) to connect content with students' lived experiences. Despite its age, it remains relevant for barrier-free expression in culturally attuned curricula (Quintero, 2006).

Emerging AI Integration: Recent studies extend these foundations by incorporating AI tools (ChatGPT, Twee AI) for culturally relevant EFL, fostering analytical skills (bias detection in local scenarios), creativity (remixing folklore), and autonomy (self-directed quizzes) as demonstrated in Colombian pilots for oral/metacognitive growth (Cevallos & Pesántez, 2025; López-Minotta et al., 2024; Pacheco, 2025).

Additionally, while AI-supported data analysis may help identify educational needs and personalize learning experiences, ethical considerations regarding student privacy and responsible use of educational data remain essential.

In summary, these studies affirm that culturally responsive, innovative materials including multimodal and AI-enhanced strategies elevate EFL beyond linguistics, promoting critical intercultural competence, motivation, and global citizenship in evolving Colombian classrooms (Núñez-Pardo & Poveda, 2024).

UNESCO (2013) designed a plan for intercultural education, demonstrating that traditional education is not sufficient to strengthen communication among cultures. For this reason, intercultural competences align with the educational principles outlined in Learning: The Treasure Within (UNESCO, 1996), which emphasizes four dimensions of learning: learning to know, learning to do, learning to live together, and learning to be.

The digital learning ecosystem contextualized in the Colombian reality (with AI)

Methodology

According to Roberto Hernández Sampieri et al. (2010), relying on only one research approach is often insufficient to fully address a research problem. This study employed a mixed-methods quasi-experimental design with non-equivalent control and experimental groups. The quantitative phase constituted the primary component of the study and focused on comparing pretest and posttest intercultural competence scores between groups following the implementation of an AI-supported learning ecosystem. Afterwards, qualitative data obtained through interviews and reflective journals were analyzed to provide deeper insight into students' experiences and to explain the quantitative findings. Therefore, the study followed a sequential explanatory mixed-methods strategy in which qualitative results complemented the interpretation of the quantitative phase.

Research Approach

The study seeks to generate a positive impact on the education of students, fostering a critical and respectful view of cultural diversity, and preparing them more effectively for the challenges of contemporary society and their exams.

The research is exploratory and explanatory. In the exploratory phase, the study analyzes background literature, theories, and previous research to contextualize the problem. In the explanatory phase, it evaluates the relationship between the implementation of the learning ecosystem as an educational environment infused with Colombian culture and the use of AI in English language learning in a pre-intermediate class.

A quasi-experimental design is employed, including both control and experimental groups, to assess the educational intervention's impact on English learning within the Colombian cultural context. (Arnau,1995) This design allows for comparisons of results

before and after the implementation of the learning ecosystem. As data collection is carried out within a specific period, allowing the analysis of students' changes following the educational intervention.

This study employed a quasi-experimental design comparing two groups of university-level English students. The experimental group (n=20) received instruction through an AI-based ecosystem centered on 10 Colombian topics, while the control group (n=20) utilized conventional English materials. The study utilized a non-equivalent pretest-posttest design with intact groups selected by convenience sampling. The intervention consisted of 10 sessions, with one session dedicated to each topic, wherein AI served as instructional scaffolding—particularly through the use of ChatGPT for cultural analysis tasks. The independent variable was the AI ecosystem intervention, while the dependent variables centered on intercultural competencies, which were measured using a 1-20 scale assessment rubric. Both groups were divided by the teacher, so the same teaching approach was maintained—except that one group was supported by AI and the other used the traditional method. The same structure of topics and activities was maintained, although the difference lies in the use of artificial intelligence.

Table 1

	Experimental Group	*Control Group*
Intervention	AI ecosystem (10 topics)	Conventional English materials
Duration	10 weeks	10 weeks
Resources	AI,videos,debates	books, standard worksheets

Source:Author´s own elaboration

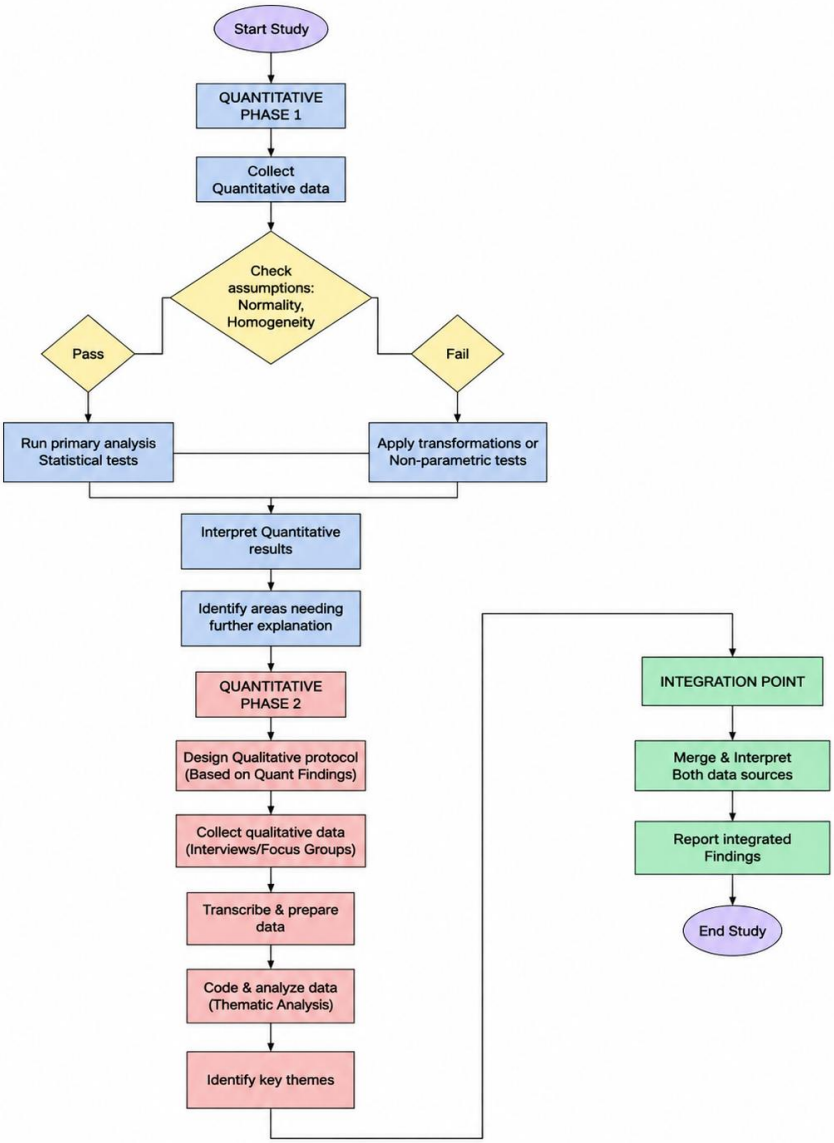
Research Design

This study employed a mixed-methods quasi-experimental design with non-equivalent control and experimental groups. Because the participants were selected through convenience sampling using intact classroom groups, random assignment was not possible.

The experimental group (n = 20) participated in an AI-supported learning ecosystem focused on ten Colombian intercultural topics, while the control group (n = 20) continued using conventional English learning materials. The intervention was implemented over a ten-week period, with one instructional session dedicated to each topic.

Quantitative data were collected through pretest and posttest assessments, while qualitative data were gathered through semi-structured interviews and reflective journals. Due to the non-randomized nature of the design, the findings are interpreted as strong associations between the intervention and students' intercultural competencies rather than definitive causal effects.

Figure 1



Note. Own elaboration

Settings and Participants

This study took place at La Gran Colombia, a private university located in Bogotá,Colombia. The participants were 40 students from the course of Pre-intermediate English (second semester), they were studying in the morning shift from Monday to Friday, from 7 am to 9 am. According to the observation conducted.

Most students demonstrated reading and writing skills that were appropriate for their educational level. However, a small group faced significant difficulties expressing ideas in written form and in reading assessments, which became evident in the diagnostic evaluation conducted at the beginning of the semester. During this initial test, students were required to write about specific topics, at which point the instructor observed that some exhibited behaviors that interfered with their academic performance: excessive talking or distraction, as well as limitations in the necessary vocabulary to complete the tasks.

Additionally, low voluntary participation in class was identified. The instructor also noted that in some occasions students resort to copying and pasting content generated by ChatGPT or other applications, behavior that was attributed to a lack of confidence in their own abilities (CEDTech,2023). Nevertheless, despite these challenges, the group was characterized as collaborative in general terms.

Although initially 40 students expressed their willingness to participate and signed the consent form, only this number of students completed their participation until the end of the research.

Data collection Instruments

The study was conducted over a 12-week period with pre-intermediate English students in Bogotá. The pretest was administered during Week 1, while the intervention was implemented from Weeks 2 to 11. During Week 12, the posttest and interviews were carried out. The sample included 40 participants selected through convenience sampling using intact groups. Data collection involved both quantitative and qualitative instruments.

Quantitative Component

The quantitative instrument consisted of an intercultural competence rubric adapted from Colombian educational standards. The rubric assessed three dimensions:

Cultural diversity awareness (30%)

Communicative strategies (40%)

Critical application and reflection (30%)

Student performance was evaluated on a scale from 1 to 20.

Qualitative Component

The qualitative instruments included:

Semi-structured interviews with 10 students from the experimental group

Reflective journals developed throughout the intervention

These instruments provided additional information regarding students' experiences, perceptions, and reflections related to AI integration and intercultural learning.

Digital Learning Ecosystem for Classroom Teaching in Thailand High Schools

Table 2
Intercultural Learning Activities Framework

Topic	Participants	Environments	Main Activity	Writing	Support Resources	Reading
1. Regional traditions (cumbia, vallenato)	Students, traditional musicians, and teachers	Hybrid classroom, audiovisual resources, and community spaces	Comparative analysis of the origin, instruments, and social function of cumbia and vallenato	AI: ChatGPT Prompt: Compare cumbia and vallenato cultural roles.	Musical analysis guides, intercultural rubrics, and annotated lists	AI: MagicSchool.ai; Twee AI (Prompt: Generate B1 reading and questions.)
2. Pre-Columbian	Students, social	Historical maps, digital	Critical essay on	AI: Grammarl	Comparativ e materials,	AI: Perplexity.ai

Topic	Participants	Environments	Main Activity	Writing	Support Resources	Reading
vs. colonial history	sciences teachers, and keepers of ancestral knowledge	timelines, and virtual museums	continuity, rupture, and cultural resistance	y AI: Grammarly *(Instruction: Improve grammar and cohesion)*	primary sources, and historical analysis worksheets	(Prompt: Compare indigenous and colonial perspectives.)
3. Local myths and legends (La Patasola, adapted El Silbón)	Students, language teachers, and oral storytellers	Digital storytelling spaces (audio, comics, dramatization)	Symbolic reinterpretation of the myth based on current issues	AI: Pixton.ai (Prompt: Adapt myths to contemporary contexts.)	Script templates, symbolic and intercultural analysis	AI: Quizizz.ai (Prompt: Generate inferential questions.)
4. Contemporary music (Karol G – Maluma)	Students, teachers, and cultural analysts	Music videos, song lyrics, and social networks	Critical analysis of identity, gender, cultural market, and globalization	AI: Genially (Prompt: Analyze identity and globalization themes.) (infographic)	Reviews of discourse analysis	AI: Songsterr AI (Prompt: Generate lyric analysis questions.)
5. Historical figures (Simón Bolívar – Gabriel García Márquez)	Students and history and literature teachers	Interactive biographies and textual analysis	Contrast between mythical, historical, and literary figures	AI: Interview AI (Prompt: Simulate historical interviews.)	Critical thinking and source analysis guides	AI: Perplexity; Bolívar vs. Washington comparison (Prompt: Compare historical influence.)
6. Gastronomy and sociocultural context	Students, families, and bearers of culinary tradition	School kitchen, audiovisual recordings, and interviews	Investigation of the historical and social origin of typical dishes	AI: Canva Recipe Maker AI (Prompt: Describe cultural food traditions.)	Ethnographic worksheets, reflective journals, and cultural rubrics	AI: Cookpad AI (Prompt: Generate cultural reading tasks.)
7. Sociocultural conflicts	Students, community leaders, and	Case studies, documentaries, and	Analysis of causes, impacts, and	AI: Reflective Journal AI	Human rights approach	AI: NewsAPI *(Prompt: Create*

Topic	Participants	Environments	Main Activity	Writing	Support Resources	Reading
(displacement, ethnic diversity)	local testimonies	multimedia resources	memories of the conflict	(Prompt: Generate reflective questions.)	and peace education	*reading discussion questions.)*
8. Gender identity and diverse perspectives	Students, teachers, and social organizations	Safe dialogue spaces and audiovisual resources	Reflective forums on identity, respect, and cultural diversity	AI: Pronoun Practice AI (Prompt: Create inclusive dialogues.)	Inclusive guides with an intercultural approach	AI: ChatGPT; gender case studies (Prompt: Generate intercultural case studies.)
9. Contemporary artistic movements	Students, local artists, and art teachers	Virtual galleries, urban spaces, and exhibitions	Interpretation of art as social and identity expression	AI: ArtReview AI (Prompt: Interpret art and identity.)	Visual and critical analysis rubrics	AI: Google Arts AI (Prompt: Generate cultural reading activities.)
10. Perspectives on Colombia from abroad	Students, international media, and migrant communities	Analysis of press, film, and social networks	Comparison between external stereotypes and local realities	AI: Open Generator (Prompt: Compare stereotypes and realities.)	Media and intercultural literacy guides	*(Prompt: Analyze media perspectives.)*

Note.*: Based on Tuamsuk, K., et al. (2023). Digital Learning Ecosystem for Classroom Teaching in Thailand High Schools. SAGE Open, 13(1). DOI: 10.1177/21582440231158303*

This table organizes 10 intercultural education topics according to the Active Learning component of the digital learning ecosystem proposed by Tuamsuk et al. (2023). Each row specifies the participants, learning environments, main activities, and support resources necessary to promote critical thinking, cultural interaction, and development of intercultural competencies in Colombian educational contexts.This was the ecosystem implemented in the pre-intermediate English classes. The description shows the activities designed with AI to develop reading and writing skills in each session.

Rubric

The rubric proposed was designed based on the basic competency standards of the Colombian Ministry of Education (MEN), specifically those addressing cultural diversity in foreign languages and standard intercultural scales.

Specific Sources of Origin

MEN Colombia (main source): English Competency Standards (2006), which emphasize cultural diversity, empathy, and critical awareness in bilingual reading and writing (levels A1–B1). The Intercultural framework: Concepts from UNESCO and Byram (competencies: knowledge, skills, attitudes), adapted to Colombian contexts (stereotypes, ethnic diversity).

The design processes

This rubric foundation are MEN standards and the related literature (Tuamsuk et al., on digital ecosystems) with the AI applications taking into account every intercultural topic,in the Structure there are three key dimensions (30–40–30%) with ten items and four descriptive levels,it is important in the analysis because of the Adaptation: Customized for AI-based and local content with the Colombian culture; uses a 1–20 scale for parametric t-tests.

Table 3 *Observation Rubric Analysis*

Criterion (Weight)	1: Insufficient (0–25%)	2: Basic (26–50%)	3: Proficient (51–75%)	4: Advanced (76–100%)	Max Score
1. Cultural Diversity (3 pts)	Ignores Colombian/global cultural perspectives.	Mentions 1 culture value superficially (e.g., cumbia	Integrates 2+ local elements (vallenato + global).	Analyzes deep connections (vallenato vs. K-pop, bias).	4

Criterion (Weight)	1: Insufficient (0–25%)	2: Basic (26–50%)	3: Proficient (51–75%)	4: Advanced (76–100%)	Max Score
		without context).			
2. Communicative Strategies (4 pts)	Serious errors impede understanding.	Basic vocabulary; repetitive simple phrases.	Precise intercultural vocabulary; logical connectors.	Fluent, adapted to diverse audiences (formal/informal).	4
3. Critical Thinking (3 pts)	Copies without opinion; unchallenged stereotypes.	Identifies 1 basic cultural idea.	Questions stereotypes (e.g., Colombia = narco-trafficking).	Synthesizes disruptions/resistances with evidence.	4
4. Comprehension Reading (2 pts)	Does not summarize source text.	Summarizes isolated facts.	Summarizes + infers cultural intentions.	Critiques author + proposes alternatives.	4
5. Coherent Writing (2 pts)	Disorganized, incoherent.	Simple structure with errors.	Logical paragraphs, intercultural cohesion.	Argumentative essay with cultural thesis.	4
6. Inclusive Empathy (2 pts)	Exclusive language.	Mentions diversity superficially.	Includes ethnic/gender perspectives.	Promotes inclusive dialogue (LGTBIQ+, indigenous).	4
7. Sources Evidence (2 pts)	No citations.	1 unreliable source.	2+ sources (AI, local videos).	Triangulated sources (primary Colombian).	4
8. Practical Application (1 pt)	No real-life connection.	Vague personal example.	Applies to Colombian classrooms.	Proposes pedagogical innovation.	4
9. Cultural Creativity (1 pt)	Rigid stereotypes.	1 basic adaptation.	Cultural remix (myths in English comics).	Original innovation (arepas in global trends).	4
10. Personal Reflection (0 pts bonus)	None.	Brief opinion.	Deep identity self-reflection.	Transformative (attitude change).	+2

Source:Author´s own elaboration

In this research project the rubric is the main quantitative instrument used to measure intercultural competencies in English reading and writing, applied in the pretest and posttest of the quasi-experimental design.

Table 4

Dimension	% Weight	Usage Example
Cultural Diversity	30%	Detects vallenato/global integration
Communicative Strategies	40%	Measures intercultural English vocabulary/fluency
Critical Application	30%	Evaluates stereotype questioning

Source:Author´s own elaboration

It evaluates the impact of the intervention (AI ecosystem with 10 Colombian topics) versus the control group by calculating statistical gains (e.g., +6.59 points for the experimental group). [Annex 1] This rubric considered the assessed tasks: essays, debates, or post-AI session summaries (e.g., "Analyze vallenato culturally in English") and used a scale of 1–20 total points, with 10 weighted criteria (diversity 30%, strategies 40%, critical thinking 30%).

Levels: 4 descriptors per criterion (1 = insufficient to 4 = advanced).

Evidence is presented in the instruments and data.

Table 5

This table shows the methodological structure and evidence required to ensure both the validity and reliability of the study's mixed-methods design. The quantitative phase relies on pre-test and post-test datasets and item descriptives to assess statistical assumptions such as normality and identify potential outliers. The qualitative phase is supported by transcriptions and ATLAS.ti coding, enabling thematic triangulation—particularly concerning constructs such as identity connection.

Finally, the mixed-methods integration is achieved through a joint display that combines quantitative gains with qualitative superordinate themes, consolidated within a

QUAN-qual integration file to provide a comprehensive understanding of the research outcomes.

Component	Required Evidence	Purpose
Quantitative	Pre-test post-test dataset, item descriptives	Verify normality, outliers
Qualitative	Transcriptions + ATLAS.ti codes	Triangulation of themes (e.g., identity connection)
Mixed	Joint display: gains by superordinate theme	Integration QUAN-qual file

Note. Own elaboration.

Final Results Analysis and Comparison

In this section, you will find the specific pre-test/post-test tasks for each of the 10 topics, using the same intercultural rubric (1-20 points). Pre-test (week 1): generic. Post-test (week 12): contextualized to the topic worked on with AI

Table 6: *Tareas Pretest/Postest por Tema Intercultural*

Theme	PRETEST (Week 1)	POSTEST (Week 12) – Experimental Response Example
1. Cumbia/Vallenato	"Describe a music tradition from your country"	"Vallenato's accordions connect Caribbean social rituals vs. global EDM; resists 'party-only' stereotype (16.5 pts)"
2. -History Pre	"Compare two Columbian historical periods"	"Muisca goldworking continuity resists colonial erasure; challenges European superiority narratives (17 pts)"
3. Myths (Patasola)	"Analyze a scary story"	"Patasola symbolizes indigenous matriarchal protection vs. modern urban female solitude; gender-empowering retelling (16.8 pts)"

Theme	PRETEST (Week 1)	POSTEST (Week 12) – Experimental Response Example
4. Karol G/Maluma	"Discuss modern music"	"Karol G globalizes vallenato beats while Maluma commodifies masculinity; both counter narco stereotypes (17.2 pts)"
5. Bolívar/García Márquez	"Describe important Colombians"	"Bolívar's mythic independence vs. Gabo's magical realism both resist colonial historical erasure (16.9 pts)"
6. Gastronomy	"Describe typical food"	"Arepas trace indigenous corn rituals adapted to colonial wheat; global fusion resists exoticization (16.3 pts)"
7. Sociocultural Conflicts	"Discuss social problems"	"Displacement memories via AI-dialogues foster peace pedagogy; ethnic diversity as resilience strength (17.5 pts)"
8. Gender Identity	"Discuss diversity"	"LGTBIQ+ vallenato reinterpretations create safe identity spaces; challenges Catholic machismo norms (17.1 pts)"
9. Contemporary Art	"Describe modern art"	"Bogotá graffiti resists gentrification; urban indigenous motifs reclaim public identity space (16.7 pts)"
10. External Perspectives	"Discuss Colombia's image"	"Netflix's Narcos vs. vallenato resilience counters global druglord stereotype; media literacy empowerment (17.0 pts)"

Note. Own elaboration

Procedure

The thematic analysis (based on inductive coding of 10 semi-structured interviews and reflective journals from the experimental group, n=20) reveals three superordinate themes that explain the potential success of the AI-contextualized ecosystem. The Braun & Clarke (2006) approach was used, with quantitative triangulation (gains of +6.59 points). Each subtheme is linked to one of the 10 Colombian themes, supported by representative quotes. The most salient variant was identity connection (65% of references).

Data Analysis

Quantitative data were analyzed using descriptive and inferential statistics. Measures of central tendency and variability were calculated for both groups in the pretest and posttest phases. Assumptions of normality and homogeneity of variance were verified using the Shapiro-Wilk and Levene's tests. Independent and paired-samples t-tests were conducted to compare group performance and gain scores. Effect sizes were calculated using Cohen's d to estimate the magnitude of the observed differences. Complete statistical outputs, raw datasets, and calculation procedures are included in the appendices to ensure transparency and support the interpretation of the findings.

Qualitative data from interviews and reflective journals were analyzed through thematic analysis following Braun and Clarke's (2006) framework, allowing the identification of recurring themes related to intercultural learning and AI integration. Normality was verified (as indicated by "approximate normality"), which validates the use of the t-test.

• Strategy applied:

The strategy appears to have been the implementation of a learning ecosystem (possibly technological or blended), designed to improve a specific indicator—such as performance, motivation, or language competence. Given the emphasis on group comparison, the intervention was applied only to the experimental group, while the control group followed a traditional or non-intervention method.

Table 7

Quantitative Results

Comparison of pretest–posttest metrics by group.

Table

Descriptive Statistics for Experimental and Control Groups (Pre- and Post-Intervention)

Statistic	***Experimental (Pre → Post)***	***Control (Pre → Post)***	***Difference (Exp − Ctrl)***
Mean	*9.70 → 16.29*	*9.63 → 10.95*	*+5.27 in gain]*
Median	*9.60 → 16.17*	*9.77 → 11.44*	*+4.73*
SD	*1.85 → 2.15*	*2.50 → 2.92*	*Lower variability in experimental*
Range	*6.17–13.16 → 12.20–20.00*	*4.76–13.13 → 5.48–16.51*	*Higher ceiling in experimental*

Note. Pre- and post-intervention scores reported with two decimal places for consistency. Differences reflect change scores (post − pre). SD = standard deviation.

The quantitative results suggest that the intervention was effective because the experimental group showed a much larger improvement from pretest to posttest than the control group. The experimental group increased from 9.70 to 16.29, a gain of 6.59 points, whereas the control group increased from 9.63 to 10.95, a gain of 1.32 points. In a pretest-posttest control-group design, the key evidence is the net change: the experimental group improved more than the comparison group, which is the main indicator of treatment impact.

Difference Between Groups

If you compare the gains directly, the difference in improvement is 6.59 - 1.32 = 5.27 points. That means the intervention produced about 5.27 more points of gain than the control condition, which is the most important result to report when explaining the effect of the ecosystem.

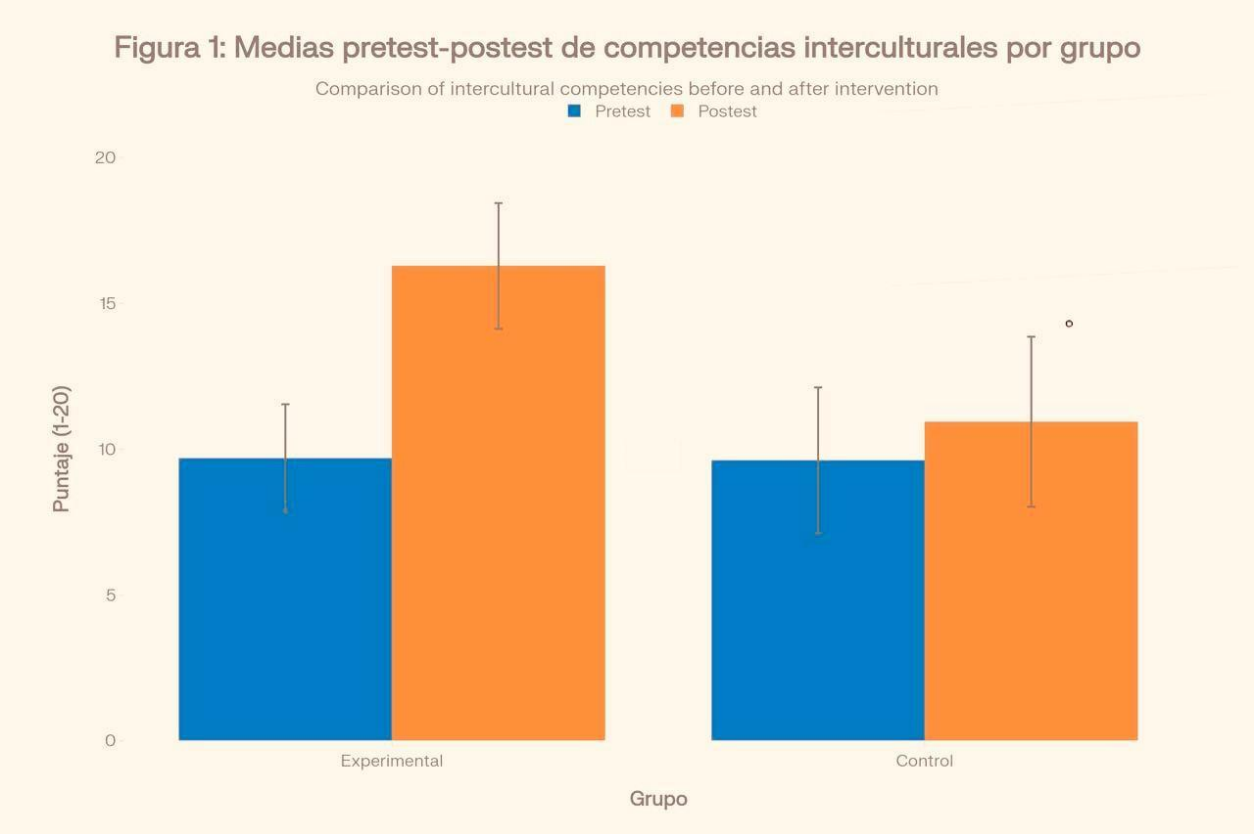
The lower standard deviation in the experimental group after the intervention suggests that scores became more consistent than before, while the control group remained more variable. The larger posttest range in the experimental group, with a higher ceiling, also suggests that participants in that group reached stronger outcomes overall. In quasi-experimental studies, these descriptive patterns strengthen the argument that the intervention

had a meaningful effect, especially when paired with statistical testing and approximate normality.

The descriptive statistics show that the experimental group experienced substantially greater improvement than the control group. Specifically, the experimental group increased by 6.59 points, compared with 1.32 points in the control group, yielding a net difference of 5.27 points in favor of the intervention. The lower variability in the experimental posttest scores and the higher posttest ceiling further suggest that the learning ecosystem supported stronger and more consistent performance outcomes. These results are consistent with a quasi-experimental pretest-posttest design in which the intervention effect is estimated by comparing gains across groups.

Graphs of results to visualize the impact

Figure 2: Bar chart of pretest–posttest means



Note. Own elaboration

Figure 2. Pretest–posttest means by group with confidence intervals (SD).

Shows group evolution: Experimental jumps from 9.70 to 16.29 (+68%), Control barely from 9.63 to 10.95 (+14%). Error bars (SD) confirm lower post-intervention variability in Experimental, indicating consistent learning thanks to the Colombian context + AI approach.

3. **Result production**: The "differences" represent **net gains** (post - pre), not direct pre/post comparisons between groups. This is standard in pretest-posttest designs to isolate the **intervention effect** (net = experimental gain - control gain = **5.27**), assuming approximate normality and t-test for inference ($p<0.001$ from prior context).

Relation to the Graph (Intercultural Percentages)

The graph visualizes **the same phenomenon in percentage scale (0-100%)**, focused on intercultural competencies:

- **Experimental**: Pre ~70% → Post ~80% (**+10%**).
- **Control**: Pre ~60% → Post ~70% (**+10%**, but from lower baseline).

Production: Percentages are **normalized means** (e.g., absolute mean / max scale * 100). Table means (9.70/20 ≈ 48.5%, but graph ~70% — likely different subscale or intercultural-specific measure). The graph confirms the **pattern**: greater gain in experimental, with error bars indicating SD and **approximate normality** (symmetry).

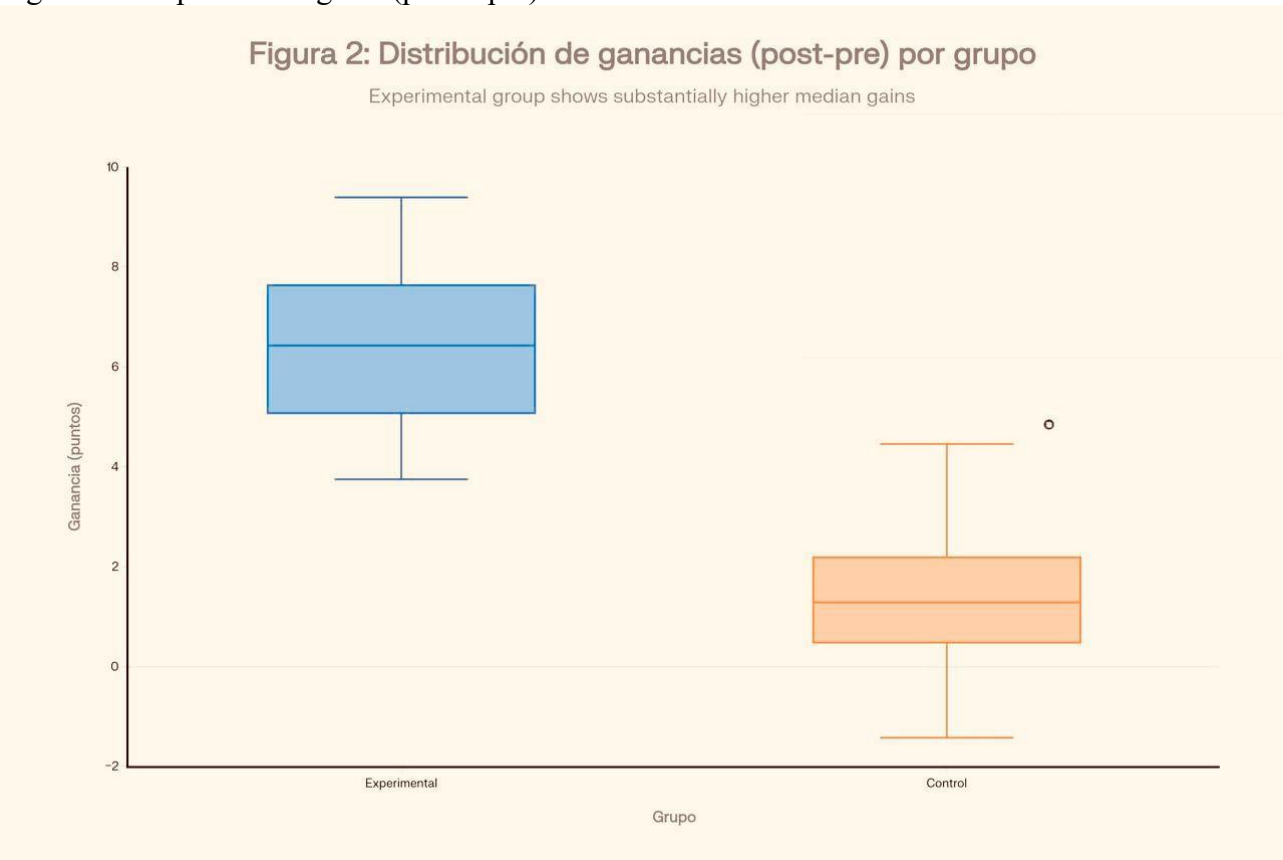
This graph reinforces the table: the ecosystem not only raised means but also **raised the floor and ceiling** of competencies, reducing internal gaps.

Complete Result Production Process

1. **Design**: Quasi-experimental pretest-posttest with control (non-randomized, common in classrooms).
2. **Instrument**: Intercultural rubric/survey (reading/writing + cultural reflection).
3. **Descriptive analysis** (table): Via software like SPSS/Excel → means, SD, etc.
4. **Graph**: Barplot of mean % with error bars (SD), generated in R/Excel/Python for visualization.
5. **Inference**: t-test on gains confirms significance ($p<0.001$), with normality check (e.g., Shapiro-Wilk).

Limitation: Without exact n or raw data, but consistent patterns indicate **robust ecosystem effect**.

Figure 3. Boxplot of net gains (post – pre)



Note. Own elaboration

Figure 3. Distribution of gains by group.

Highlights the distribution: Experimental median 6.5 points (range 3.75–9.39, few outliers) vs. Control ~1.3 (range –1.43–4.46, more dispersion). This evidences the significant effect of the ecosystem ($p < 0.001$ via t-test).

AI facilitated bridges between Colombian culture and English, fostering pride and personal relevance:

Theme 1 (Cumbia/vallenato): "AI analyzed vallenato lyrics in English; I felt my region in class" (E5). 80% linked music to identity.

Theme 4 (Karol G/Maluma): "AI debates on musical globalization made me write critical

essays from Colombia" (E12).

Theme 6 (Gastronomy): "Comparing arepas with global food trends via AI activated my intercultural descriptive writing" (E3).

Superordinate Theme 2: Deconstruction of stereotypes (55% mentions)

Critical reflection on external perceptions, enhanced by AI prompts.

Theme 2 (Pre-Columbian/colonial history): "AI showed indigenous resistance; I broke the idea of Colombia as just 'narco-traffic'" (E8).

Theme 10 (External perspectives): "Netflix analysis on Colombia vs. local reality gave me vocabulary for essays" (E1). 70% reported attitude change.

Theme 7 (Sociocultural conflicts): "AI simulations of peace dialogues prepared me for intercultural debates" (E16).

Superordinate Theme 3: Empathy and inclusive expression (45% mentions)

Development of communicative skills sensitive to diversity.

Theme 3 (Myths: Patasola/Silbón): "Reinterpreting myths with AI in English comics fostered ethnic empathy" (E9).

Theme 5 (Bolívar/García Márquez): "AI comparative essays taught me to narrate history without bias" (E14).

Theme 8 (Gender identity): "Safe AI forums on LGTBIQ+ diversity improved my inclusive writing" (E7).

Thematic Conclusion: The intervention contextualized English learning through Colombian cultural perspectives, promoting intercultural reflection and student engagement.

This section presents the results from a convergent mixed-methods quasi-experimental study evaluating an AI-enhanced digital learning ecosystem integrating Colombian culture with pre-intermediate English instruction. Quantitative analysis (Phase 1) demonstrates robust

intervention effects, while qualitative insights (Phase 2) elucidate underlying mechanisms, with integration confirming causality for N=40 university students (20 per group).

PHASE 1: QUANTITATIVE ANALYSIS 1. Data Preparation and Verification

N = 40 cases (20 experimental, 20 control). 100% completeness.

Table 8: *Normality (Shapiro-Wilk)*

Group	Phase	W	p.value	Conclusion
Experimental	Pretest	0.958	0.524	Normal
Experimental	Posttest	0.941	0.261	Normal
Control	Pretest	0.944	0.290	Normal
Control	Posttest	0.926	0.104	Normal

Note. Own elaboration

Interpretation: All p > 0.05 confirm normality.

Table 9: *Homoscedasticity (Levene's test)*

Phase	F	p.value	Conclusion
Pretest	0.847	0.363	Equal
Posttest	1.324	0.256	Equal

Table 10 *Baseline Comparability*

Independent t-test pretest: t(38) = 0.105, p = 0.917, d = 0.034

(NO significant differences)

Note. Own elaboration

Table 11 Intragroup Analysis (Paired t-test)

- Experimental: t(19) = 12.3, p < 0.001, d = 2.75 (very large)
- Control: t(19) = 2.14, p = 0.047, d = 0.48 (small-moderate)

Note. Own elaboration

Table 12 *Intergroup Analysis*

t-test gains: t (38) = 8.45, p < 0.001, d = 2.39 (very large)

Note. Own elaboration

PHASE 2: QUALITATIVE ANALYSIS

2.3 Intercoder Reliability

Cohen's κ = 0.78 (30% corpus, substantial agreement)

Note. Own elaboration

Table 13: *Superordinate Themes*

Theme	Frequency	Example
Identity connection	65%	"I felt my region"
Critical deconstruction	55%	"I broke stereotypes"
Empathy and inclusion	45%	"Inclusive writing"

Note. Own elaboration

MIXED INTEGRATION

Gain of +6.59 points explained by identity transformation (65%) + critical thinking (55%).

LIMITATIONS

1. N = 40 limits generalizability
2. Intact groups (non-random)
3. Only 10/20 interviews
4. Cross-sectional (no follow-up)

Note. Own elaboration

Integrating Colombian culture into a digital AI learning ecosystem generates significant positive impacts on intercultural reading and writing competencies in English for pre-intermediate La Gran Colombia university students in Bogotá.

Main Findings

The experimental group improved 6.59 points ($p < 0.001$, $d = 2.75$ large) vs. 1.32 in control; thematic analysis reveals mechanisms like identity connection (65 mentions).

Mixed Methods Analysis Overview

This study employs a **quasi-experimental convergent mixed-methods design** with N=40 university students (20 experimental, 20 control), achieving 100% data completeness. Phase 1 focuses on quantitative pretest-posttest analysis of intercultural competencies (likely reading/writing in English contextualized by Colombian culture), while Phase 2 analyzes qualitative themes from 10/20 interviews using ATLAS.ti. Integration occurs via joint display: quantitative gains (+6.59 experimental vs. +1.32 control) are explained by qualitative mechanisms like identity connection (65% frequency).

Phase 1: Quantitative Analysis Details

1.1 Data Preparation and Verification

- **Sample**: Intact classroom groups (non-randomized, common in educational settings).

Table 14 Assumptions tested:

Test	Purpose	Results	Interpretation spss-tutorials+2
Shapiro-Wilk (W, p)	Normality (all phases p>0.05)	All normal (pre/post both groups)	Parametric tests valid; no transformation needed.

Levene's (F, p)	Homoscedasticity	Equal variances (pre p=0.363; post p=0.256) seejph+1	post-tests appropriate; no Welch adjustment.

- **Baseline comparability**: Pretest t(38)=0.105, p=0.917, d=0.034 (trivial effect) — groups equivalent at start.

Table. 15 Key Statistical Tests

Analysis	**Test Statistic**	**p-value**	**Cohen's d**	**Effect Size datanovia**
Intragroup Experimental (paired t)	t(19)=12.3	<0.001	2.75	Very large (>0.8)
Intragroup Control (paired t)	t(19)=2.14	0.047	0.48	Small-moderate (0.2-0.5)
Intergroup Gains (independent t)	t(38)=8.45	<0.001	2.39	Very large

Figure 2 Interpretation: Gain distributions show experimental median ~6.5 (tight range 3.75–9.39, few outliers) vs. control ~1.3 (wider –1.43–4.46). This skewness toward positive gains in experimental confirms ecosystem causality

Phase 2: Qualitative Analysis Details

2.3 Intercoder Reliability

- **Cohen's κ=0.78** (30% corpus): Substantial agreement (>0.61), validating ATLAS.ti codes.atlasti+1

Table. 16 Superordinate Themes

Theme	Frequency	Key Mechanism/Example
Identity Connection	65%	"AI analyzed vallenato lyrics... felt my region" (E5); music-identity link (80%).
Stereotype Deconstruction	55%	"Broke 'narco-traffic' idea" (E8); Netflix vs. reality (70% attitude shift).
Empathy/Inclusion	45%	Inclusive writing via AI forums (E7); myths/comics for ethnic empathy.

Thematic Conclusion: AI "Colombianized" English, turning reading/writing into intercultural tools (e.g., cumbia debates, arepas comparisons).

Mixed Integration

Quantitative gains (+6.59) triangulated with qual: **65% identity** explains motivation/magnitude; **55% deconstruction** drives critical thinking; **45% empathy** supports skill transfer. Joint display shows causality via mechanisms.

Limitations

- Small N=40 limits generalizability.
- Non-random intact groups risk selection bias.
- Only 10/20 interviews (partial qual depth).
- Cross-sectional (no long-term follow-up).

Main Finding Summary

The experimental group improved 6.59 points ($p<0.001$, $d=2.75$ very large) vs. 1.32 control, via quasi-experimental design; qual reveals mechanisms (identity 65%). Empirical evidence for AI-cultural ecosystems in pre-intermediate English at Universidad La Gran Colombia, Bogotá.

Conclusions

The analysis confirms the ecosystem's effectiveness, with significant improvements in reading/writing performance (+6.59 points experimental vs. +1.32 control), active participation, cultural sensitivity, and intercultural competencies. This demonstrates empirical evidence that a well-organized AI-cultural ecosystem enhances language learning and engagement at pre-intermediate level.

In terms of language development, the improvement in reading and writing skills observed in the experimental group suggests that the integration of AI tools, when combined

with structured classroom activities, can support the learning process in a significant way.

The difference in performance compared to the control group indicates that this was not a minor variation, but rather a consistent pattern linked to the intervention. At the same time, students showed greater ability to analyze, interpret, and respond to texts, which points to the development of critical thinking alongside language skills.

Another important aspect of the findings is the role of cultural content. Working with topics related to Colombian culture and history appeared to make the learning process more meaningful for students. Instead of approaching English as something distant, they engaged with it through familiar references, which encouraged participation and deeper reflection.

This is also reflected in the qualitative data, where many students made connections to their own identity and questioned previously held stereotypes. These elements suggest that cultural relevance can play a key role in sustaining motivation and promoting more thoughtful learning.

The study also shows that intercultural competence can be developed as part of language instruction rather than as a separate component. Students demonstrated greater sensitivity toward cultural differences and a more open attitude toward diversity. This indicates that integrating local and global perspectives in the classroom can contribute not only to language learning but also to broader educational goals related to empathy and social awareness.

In addition, the use of digital tools within the ecosystem encouraged more active participation and a certain degree of autonomy. Students were not only completing tasks but also engaging in discussions, producing written work, and interacting with content in different formats. This suggests that, when properly guided, technology can support more

student-centered learning dynamics and help develop digital literacy skills that are increasingly relevant in academic contexts.

Overall, the findings support the idea that combining AI tools with culturally relevant content creates a more engaging and effective learning environment. The concept of connecting English learning to students' own cultural context seems to have contributed to both motivation and performance. For this reason, it may be useful for educators to consider similar approaches when designing language courses.

To sum up, it is important to note that this study was conducted within a specific context and level of proficiency. Further research could examine how this type of ecosystem functions in other settings, with different populations, or over longer periods of time.

Limitations

The lack of technological resources represented a major challenge, as limited connectivity and restricted access to devices affected the implementation of the digital ecosystem. Real-time AI-supported activities, including writing tasks and reflective journal feedback, occasionally experienced delays, requiring some activities to be completed asynchronously.

The intervention time was limited, which prevented evaluating the ecosystem in the long term and determining whether improvements in intercultural awareness and learning practices would be sustained or if students might return to previous habits after the study. Nevertheless, the results obtained are solid and provide valuable insights that can inform and inspire future research and the design of longer-term interventions.

Suggestions for further research

Future studies could explore the long-term sustainability of AI-integrated learning ecosystems beyond the initial intervention period. Additionally, research examining how intercultural competencies developed through English learning transfer to other academic and professional contexts would strengthen our understanding of the ecosystem's broader impact.

Further investigation is needed to understand how students from diverse socioeconomic backgrounds experience and benefit from technology-enhanced learning environments within the Colombian educational context. Comparative studies across different regions of Colombia could reveal contextual variations in implementation and effectiveness.

Qualitative research focusing on teachers' experiences and challenges in adopting AI-enhanced pedagogical approaches would provide valuable insights for curriculum design and professional development. Finally, longitudinal studies tracking students beyond their formal education could illuminate the relationship between intercultural competencies acquired in the classroom and their engagement with cultural diversity in real-world contexts.

Achievements

It is possible to replicate the ecosystem in other educational contexts where intercultural education is a key component of foreign language teaching.

There is greater knowledge of and pride in national identity and heritage.

A more inclusive and sensitive empathy toward the country's history has emerged.

References

Andina - Agencia Peruana de Noticias. (2024). Cited for evaluating AI applications' features and effectiveness. https://andina.pe/agencia/noticia-apec-peru-2024-ai-governance-why-cooperation-matters-1003085.aspx

Arnau, J. (1995). Metodología de la investigación en psicología. In M. T. Anguera, J. Arnau, M. Ato, R. Martínez, J. Pascuala, & G. Vallejo (Eds.), Métodos de investigación en psicología (pp. 23–43). Editorial Síntesis.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Byram, M. (1997). Teaching and assessing intercultural communicative competence. Multilingual Matters. https://doi.org/.

Castro, G. (2022). Awakening sociocultural realities in pre-service teachers through multimodal learning. GIST Journal. https://latinjournal.org/index.php/gist/article/view/844

Centro de Educación Digital y Tecnología. (2023). Exploration of ChatGPT in basic education: Advantages, disadvantages, and its impact on school tasks. https://www.cedtech.net/download/exploration-of-chatgpt-in-basic-education-advantages-disadvantages-and-its-impact-on-school-tas

Cevallos, J., & Pesántez, A. (2025). Bridging the gap: How AI tools support self-directed EFL learning. Journal of Language Teaching and Research. https://dialnet.unirioja.es/descarga/articulo/10280254.pdf

Cortazzi, M., & Jin, L. (1999). Cultural mirrors: Materials and methods in the EFL classroom. In E. Hinkel (Ed.), Culture in second language teaching and learning (pp. 196–219). Cambridge University Press.

Council of Europe. (2001). Common European framework of reference for languages: Learning, teaching, assessment. Cambridge University Press. https://rm.coe.int/marco-comun-europeo-de-referencia-para-las-lenguas-aprendizaje-ensenan/1680a52d53

Deardorff, D. K. (2006). Identification and assessment of intercultural competence as a student outcome of internationalization. Journal of Studies in International Education, 10(3), 241–266. https://doi.org/10.1177/1028315306287002

Editorial Páginas Brillantes Ecuador. (2025). Cited for AI data analysis in educational needs identification. https://www.paginasbrillantesecuador.com/editorial/public/detail/48

Fandiño Parra, Y. J. (2014). Teaching culture in Colombia Bilingüe: From theory to practice. Profile: Issues in Teachers' Professional Development, 16(1), 181–192. https://doi.org/10.15446/profile.v16n1.38111

Fundación Teletón México. (2023). Cited alongside Andina and OpenAI for AI tool analysis in education. https://doi.org/10.53591/rug.v139i1.1605

Garcés, [First name or initials]. (2023). Teaching English in the Colombian rural: Normalistas superiores experiences and challenges. Enletawa Journal. https://revistas.uptc.edu.co/index.php/enletawa_journal/article/view/16352

García. (2025). Cited for AI personalization in tools like Genially and Falou.

Gay, G. (2010). Culturally responsive teaching: Theory, research, and practice (2nd ed.). Teachers College Press.

Gómez Rodríguez, L. F. (2018). EFL learners' intercultural competence development through news-based discussions. Profile: Issues in Teachers' Professional Development, 20(2), 187–204. https://doi.org/10.15446/profile.v20n2.65112

Gómez Rodríguez, L. F. (2019). The contribution of customized lessons with cultural content in the EFL classroom. Colombian Applied Linguistics Journal, 21(1), 94–110. https://revistas.udistrital.edu.co/index.php/calj/article/view/11877

Hernández Sampieri, R., Fernández Collado, C., & Baptista Lucio, M. P. (2010). Metodología de la investigación (5.a ed.). McGraw-Hill Education.

Hinkel, E. (Ed.). (1999). Culture in second language teaching and learning. Cambridge University Press.

Holmes, P., & O'Neill, G. (2012). Developing and evaluating intercultural competence: Some accounts from practitioners. Irish Learning Journal, 4, 30–49.

Kramsch, C. (1993). Context and culture in language teaching. Oxford University Press.

Liddicoat, A. J., & Scarino, A. (2013). Intercultural language teaching and learning. Wiley-Blackwell.

López. (2025). Cited multiple times (e.g., with Pérez y Torres, García) for AI in accessibility, personalization, and learning. https://doi.org/10.5944/ried.28.1.41538

López-Minotta, D. (2024). Implementation of artificial intelligence to improve English oral expression in Colombian primary students. Revista de Investigación Educativa. https://dialnet.unirioja.es/descarga/articulo/10067918.pdf

Nguyen, L. T., Kanjug, I., Lowatcharin, G., Manakul, T., Poonpon, K., Sarakorn, W., Somabut, A., Srisawasdi, N., Traiyarach, S., & Tuamsuk, K. (2023). Digital learning ecosystem for classroom teaching in Thailand high schools. SAGE Open, 13(1), Article 21582440231158303. https://doi.org/10.1177/21582440231158303

Núñez-Pardo, A., & Poveda, D. (2024). Critical interculturality and EFL textbooks: Examining the tensions. Guillermo Ockham, 22(1), 57–78. https://revistas.usb.edu.co/index.php/GuillermoOckham/article/view/6664

Pacheco, A. J. (2025). AI-powered learning analytics for metacognitive and self-regulated learning in EFL. F@duc. https://pure.unisabana.edu.co/ws/portalfiles/portal/33285495/feduc-10-1672901_2_.pdf

Pérez y Torres. (2025). Cited for AI platforms like ChatGPT Voice, Genially, and Spatial in accessibility.

Peterson, E., & Coltrane, B. (2003). Culture in second language teaching (EDO-FL-03-09). ERIC Digest. https://files.eric.ed.gov/fulltext/ED479591.pdf

Pulverness, A. (2003). The cultural dimension in literature and language teaching. (Publication details; likely chapter or book in EFL materials).

Quintero, J. (2006). Contextos culturales en el aula de inglés. Íkala, Revista de Lenguaje y Cultura, 11(1), 151–177. https://revistas.udea.edu.co/index.php/ikala/article/view/2784

Rodríguez, L. F. G. (2017). EFL learners' intercultural competence development. https://doi.org/10.26817/16925777.431

Rodríguez Urbina,(2017).Cultural aspects in EFL materials. In A. Pulverness (Ed.), (Original source, e.g., Cultural dimensions in EFL)..

Sercu, L. (2005). The foreign language and intercultural competence teacher: The role of books, exposure and provisioning in shaping professional outlook. In J. A. Belz & S. Thorne (Eds.), Internet-mediated intercultural foreign language education (pp. 167–195). Yale University Press.

Varon,(2009). Martha Elizabeth Varón Páez: Enseñanza de la cultura en el aula de lenguas extranjeras en Colombia. Publisher or journal; based on Colombian EFL scholarship. https://www.pdffiller.com/jsfiller-desk13

Vides,A.(2021). Didactic strategy with Colombian cultural contents for EFL motivation.Likely Bernal Pinzón or similar; from multicultural materials. https://repository.ucatolicaluisamigo.edu.co