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Augmented Reality in Multicultural Education: Bridging Language and Cultural Barriers through Immersive Tools

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ABSTRACT

Background. The increasing globalization of education necessitates innovative approaches to overcome language and cultural barriers in multicultural classrooms. Augmented Reality (AR) technology offers immersive tools that can bridge these gaps, enhancing both language learning and cultural understanding.

Purpose. This study explores the role of AR in multicultural education, specifically how it can facilitate communication and cultural exchange among students from diverse backgrounds. The research aims to evaluate the effectiveness of AR tools in promoting language acquisition and cultural awareness in multicultural educational settings.

Method. A mixed-methods approach was used, combining quantitative data from pre- and post-intervention language proficiency tests and qualitative data from student and teacher interviews. The study was conducted in three multicultural schools, involving 200 students and 10 teachers.

Results. Results showed that AR significantly improved students' language skills, particularly in speaking and comprehension, and increased their cultural sensitivity. Teachers also reported that AR provided a more engaging and interactive learning experience, fostering a deeper understanding of cultural contexts.

Conclusion. The study concludes that AR technology can be an effective tool in multicultural education, facilitating better communication, enhancing language learning, and fostering respect for cultural diversity. Future research should focus on the long-term impact of AR in diverse educational settings and explore how to further integrate AR tools into existing curricula.

KEYWORDS

Augmented Reality, Multicultural Education, Language Barriers

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INTRODUCTION

In the era of globalization, educational environments are becoming increasingly multicultural, as students from diverse cultural backgrounds come together in classrooms across the world. While this diversity presents significant opportunities for cultural exchange, it also brings challenges, particularly in overcoming language and cultural barriers that can hinder communication and learning (Makkos et al., 2025; "Mi Primer Idioma Es Ingles: A Systematic Review of Gifted Access for Multilingual Students," 2025). Effective communication is essential for students to fully engage with their peers and

the learning material, and without adequate tools, these barriers can contribute to feelings of isolation, misunderstanding, and low academic performance. Traditional methods of language and cultural education often struggle to bridge these gaps effectively.

Recent advancements in educational technology, particularly Augmented Reality (AR), offer innovative solutions to these challenges. AR, which overlays digital content onto the physical world, has shown promise in enhancing learning experiences by providing immersive, interactive environments where students can engage with both language and culture in meaningful ways. Through AR, students can explore diverse cultural settings and practice language skills in a dynamic, engaging manner that traditional methods may not provide (de Los Ángeles Rodríguez-Rodríguez et al., 2025; Lee, 2025). This technology allows for hands-on experiences that can foster deeper understanding and empathy, making it a powerful tool in multicultural education. The increasing availability and affordability of AR tools suggest that these technologies could play a crucial role in transforming how we approach language and cultural education in diverse classrooms.

As the integration of AR in education continues to grow, it becomes vital to explore its potential specifically within multicultural education settings. Research into how AR can bridge language and cultural barriers is still relatively limited, and understanding its impact could provide valuable insights into its role in shaping future educational practices. The growing interest in immersive learning tools highlights the need for more evidence-based studies that can demonstrate how these technologies work in practice and contribute to the development of inclusive, effective learning environments (Duc, 2025; Tai & Wei, 2025).

Despite the growing popularity of AR in educational contexts, there is limited research focused on its role in bridging language and cultural barriers in multicultural classrooms. Most studies on AR in education have primarily focused on enhancing engagement and academic performance in general, without specifically addressing how AR can support language learning or foster cross-cultural understanding. In multicultural settings, where students may come from diverse linguistic and cultural backgrounds, traditional methods of teaching language and culture often fail to provide the interactive, context-rich learning experiences that students need to truly understand and appreciate the diversity around them. Moreover, while AR has been used in various aspects of education, including history, science, and art, its application in multicultural education remains underexplored (Gönültaş & Kağnici, 2025; Lundqvist et al., 2025). Teachers in multicultural classrooms often struggle with integrating culturally relevant content into their teaching, especially when students' language proficiency varies significantly. There is a gap in understanding how AR can not only enhance language skills but also provide students with the cultural immersion necessary to foster respect, understanding, and empathy. Without clear research into how AR tools can be used to bridge these gaps effectively, educators may miss out on the opportunity to leverage this powerful tool to its fullest potential.

This research addresses the gap by investigating how AR can be used in multicultural education to bridge language and cultural barriers, improving students' language acquisition and cultural understanding. By exploring the effectiveness of AR in this context, the study seeks to provide concrete evidence of its potential as a transformative tool in multicultural classrooms. The study will specifically explore how AR can be utilized to enhance the learning experience of students from diverse linguistic and cultural backgrounds, providing them with the immersive tools necessary to thrive in an interconnected, globalized world (Gönültaş & Kağnici, 2025; Tang, 2025).

The primary objective of this study is to evaluate the role of AR in reducing language and cultural barriers in multicultural elementary school settings. Specifically, the research aims to

investigate how AR tools can support language learning and foster cultural understanding among students from diverse backgrounds. The study seeks to determine whether AR technology can facilitate more interactive and engaging language practice, making learning both more effective and enjoyable. Additionally, the research will assess how AR can promote cultural exchange by providing students with virtual experiences that expose them to different cultures, thus broadening their perspectives and increasing empathy (Culp, 2025; Samsari et al., 2025).

A key aspect of the research is to assess the impact of AR on students' attitudes towards cultural diversity. By using AR, students can be exposed to a variety of cultural contexts and languages in a way that goes beyond traditional classroom activities. The study will explore whether this exposure leads to increased openness to other cultures and improved social interactions among students from different backgrounds. Furthermore, the research will examine the effectiveness of AR in improving language acquisition, focusing on both receptive skills (listening and reading) and productive skills (speaking and writing). Through these objectives, the research aims to provide insights into the ways AR can contribute to more inclusive and effective multicultural education (Häbler & Spernes, 2025; Jingyi & de Dios, 2025).

The findings of this study could inform the development of AR-based educational tools specifically designed for multicultural classrooms. By providing evidence of the benefits of AR in bridging language and cultural barriers, the research aims to offer recommendations for educators and policymakers on how to integrate this technology into multicultural education practices. The study will also contribute to the broader field of educational technology by demonstrating the potential of AR to enhance language learning and cultural awareness in diverse educational settings (Armijo-Rivera et al., 2025; Naralieva et al., 2025).

While there is substantial research on AR's use in general education, much of it has focused on enhancing engagement in subjects like science, math, and history, with limited attention given to its application in multicultural education. Few studies have explored the intersection of AR technology and multicultural education, particularly in terms of language learning and cultural immersion (Altman et al., 2025; Mensah et al., 2025). While some research has shown that AR can improve language skills and cultural understanding, these studies often focus on homogenous settings or particular cultural groups, leaving a gap in knowledge regarding its effectiveness in multicultural classrooms where students have diverse language backgrounds.

Moreover, much of the existing literature on AR and language learning tends to focus on the individual impact of AR on language acquisition, without addressing its broader role in promoting cultural awareness and sensitivity. This study aims to fill this gap by investigating how AR can be used to create immersive cultural experiences for students, allowing them to practice language skills in context and develop empathy for other cultures. By examining how AR can bridge both language and cultural barriers, the study will contribute to the literature by providing new insights into the role of AR in fostering inclusivity and cross-cultural understanding in education (Ayeo-Eo, 2025; Gan et al., 2025).

Another gap in the existing research is the lack of studies that address the practical challenges and considerations of implementing AR in multicultural classrooms. While AR technology has been shown to have potential benefits, the challenges of integrating it into diverse educational settings where students' linguistic and cultural backgrounds may differ greatly are not well understood. This study will explore these challenges and provide recommendations for effectively implementing AR tools in multicultural educational environments.

This research is novel because it specifically focuses on the use of AR in multicultural education, an area that has received limited attention in the academic literature. While much of the

existing research on AR has focused on enhancing subject-specific learning, this study shifts the focus to language learning and cultural understanding, two key aspects of multicultural education (Kantelinen et al., 2025; Wang & Smith, 2025). By exploring how AR can bridge language and cultural barriers, the study will provide new insights into how immersive technologies can be leveraged to promote inclusivity and understanding in diverse educational settings.

The justification for this research lies in the growing need for effective tools to address language and cultural challenges in multicultural classrooms. As classrooms become increasingly diverse, there is a need for innovative educational technologies that can support students' language acquisition while fostering greater cultural sensitivity. AR presents a unique opportunity to address these needs by providing immersive, interactive experiences that allow students to explore different languages and cultures in a meaningful way. This research is timely and necessary, as it will provide valuable evidence on how AR can be used to enhance multicultural education and bridge the gaps in language and cultural understanding that often exist in diverse classrooms.

Furthermore, this study's findings could have significant implications for the development of AR-based educational tools and strategies that are specifically designed for multicultural environments. By demonstrating how AR can be effectively used to reduce language and cultural barriers, the research will provide educators and policymakers with evidence-based recommendations for integrating AR into their teaching practices. The research will also contribute to the broader field of educational technology by highlighting the potential of AR to promote inclusivity and foster a deeper understanding of cultural diversity.

RESEARCH METHODOLOGY

This study employed a mixed-methods design to evaluate the effectiveness of Augmented Reality (AR) in bridging language and cultural barriers in multicultural educational settings. A combination of quantitative and qualitative methods was utilized to provide a comprehensive understanding of how AR can enhance language learning and cultural understanding (Chahkandi, 2025; Wang Guénier et al., 2025). The quantitative aspect involved pre- and post-test assessments to measure students' language proficiency and attitudes toward cultural diversity. The qualitative component involved interviews with students and teachers to gain insights into their experiences with AR and its impact on language and cultural comprehension. This design enabled a holistic analysis of both the measurable effects of AR tools and the personal experiences of users, ensuring that the study captured both statistical outcomes and rich, contextual data.

The study was conducted in three multicultural elementary schools, with a total of 300 students from grades 4 and 5 (ages 9–11). The sample was selected using a stratified random sampling method to ensure diversity in terms of cultural backgrounds, including students from various ethnic groups and linguistic backgrounds. The sample included both native and non-native speakers of the local language to represent a broad range of language learning needs. From the total sample, 150 students participated in the AR intervention program, while 150 students in the control group followed traditional language learning methods. The study also included 15 teachers who facilitated the AR program and provided feedback during the post-intervention interviews. This selection of diverse student participants and teachers ensured the study's findings would reflect the experiences of different cultural groups in a multicultural educational context.

The main instruments for data collection included the Language Proficiency Test (LPT) and the Cultural Awareness Scale (CAS). The LPT was designed to assess students' language skills in listening, speaking, reading, and writing, before and after the AR intervention. It was developed specifically for this study, with an emphasis on the skills necessary for language acquisition in a

multicultural context. The CAS, also designed for the study, measured students' attitudes toward cultural diversity, their understanding of different cultural norms, and their willingness to engage with peers from diverse backgrounds. Both instruments were validated through expert review and pilot testing, ensuring their reliability and relevance to the study's objectives. Additionally, semi-structured interviews were conducted with both students and teachers at the end of the intervention to gather qualitative data on their experiences and perceptions of AR's impact on language and cultural understanding (Salas-SantaCruz, 2025; Sanchez, 2025).

The study began with obtaining consent from the participating schools, students, and their parents. After receiving ethical approval, baseline data were collected by administering the LPT and the CAS to both the experimental and control groups. Following this, the experimental group participated in a six-week AR intervention program, which involved interactive AR applications designed to immerse students in virtual environments where they could practice language skills and engage with cultural content. The AR tools used in the intervention included virtual cultural tours, language learning games, and context-specific simulations that allowed students to interact with native speakers and explore cultural norms in a virtual setting. The control group, meanwhile, continued with traditional language instruction, which primarily consisted of textbook exercises and group discussions. After the intervention, both groups completed the LPT and the CAS again to assess any changes in their language proficiency and cultural awareness. In addition to the tests, semi-structured interviews were conducted with a subset of 30 students and 10 teachers from the experimental group to explore their personal experiences with the AR tools. These interviews were audio-recorded, transcribed, and analyzed using thematic analysis to identify common themes related to the impact of AR on language learning and cultural understanding. Quantitative data were analyzed using paired t-tests and analysis of covariance (ANCOVA) to compare the pre- and post-test results of the experimental and control groups, while the qualitative data were coded and categorized to identify key themes and insights. This combination of methods allowed for a comprehensive evaluation of the effectiveness of AR in a multicultural educational setting.

RESULT AND DISCUSSION

The quantitative dataset consisted of 300 students enrolled in three multicultural elementary schools, with 150 students assigned to the AR-intervention group and 150 students to the control group. The Language Proficiency Test (LPT) assessed listening, speaking, reading, and writing skills, while the Cultural Awareness Scale (CAS) measured students' understanding of cultural norms and attitudes toward diversity. Descriptive results indicated that the AR group showed a marked increase in LPT scores, improving from a pre-test mean of 60.5 (SD = 10.2) to a post-test mean of 78.3 (SD = 8.7). CAS scores similarly increased from 3.1 (SD = 0.75) to 4.2 (SD = 0.65). The control group demonstrated minimal improvements in both assessments. Table 1 summarizes the descriptive statistics.

Tabel 1. Descriptive Statistics of Language Proficiency and Cultural Awareness

Group	**LPT Pre-Test (Mean, SD)**	**LPT Post-Test (Mean, SD)**	**CAS Pre-Test (Mean, SD)**	**CAS Post-Test (Mean, SD)**
AR Group	60.5 (10.2)	78.3 (8.7)	3.1 (0.75)	4.2 (0.65)
Control Group	60.8 (9.9)	62.0 (9.5)	3.0 (0.70)	3.1 (0.72)

The descriptive data show a consistent pattern of improvement in both linguistic and cultural competencies among the AR-intervention group. Students exposed to immersive AR experiences

demonstrated significantly higher gains compared to the control group, indicating the strong potential of AR as an instructional tool for multicultural education. The improvement in LPT and CAS scores among the AR group suggests that immersive learning environments foster deeper cognitive engagement and contextual understanding. Students were able to interact with virtual cultural scenarios, strengthening vocabulary retention, pragmatic language use, and cultural comprehension. The results imply that AR supports situated learning, where students experience cultural practices rather than merely reading about them, enhancing their ability to internalize new knowledge.

The minimal improvement in the control group emphasizes the limitations of conventional teaching methods when addressing multilingual and multicultural learning needs. Traditional instruction lacks the multimodal stimuli offered by AR, making it less effective in capturing learners' attention or providing realistic cultural exposure. The contrast between groups highlights the unique affordances of AR in transforming abstract cultural concepts into tangible, interactive experiences.

A breakdown of results by linguistic background revealed that bilingual and multilingual students benefited most from AR interventions. Their LPT scores increased by an average of 22 points, compared to a 15-point increase among monolingual students. Similarly, CAS improvements were higher among students who already had exposure to diverse cultural environments, suggesting that AR amplified their existing cultural schema. Platform-specific data indicated that features such as virtual cultural tours, simulated dialogue with avatars, and contextualized storytelling had the strongest impact. Students who engaged more frequently with these AR components demonstrated higher gains in speaking and cultural empathy scores. These findings identify the specific AR features most influential in supporting language and cultural learning.

Inferential statistics confirmed that the difference between the AR and control groups was statistically significant. An ANCOVA controlling for prior language ability yielded a significant effect of the AR intervention on LPT scores ($F(1,297) = 32.14$, $p < 0.001$). A similar ANCOVA for CAS scores also revealed a significant effect ($F(1,297) = 28.75$, $p < 0.001$). These results indicate that AR uniquely contributed to learning gains beyond individual student differences. Regression analysis further showed that AR engagement frequency was a strong predictor of both language proficiency ($\beta = 0.49$, $p < 0.01$) and cultural awareness ($\beta = 0.46$, $p < 0.01$). This suggests a dose-response pattern: the more students interacted with immersive AR tasks, the greater their improvement across both domains.

The strong correlation between LPT and CAS improvement ($r = 0.57$, $p < 0.01$) indicates that enhanced language learning occurred alongside improved cultural understanding. The relationship suggests that experiencing cultural contexts through AR enriched linguistic comprehension by embedding language within meaningful cultural narratives, supporting the view that language acquisition and cultural learning are mutually reinforcing processes. The data also revealed a structural pattern where AR's visual, auditory, and interactive modalities reduced cognitive load, facilitating better retention of both linguistic and cultural information. This finding aligns with multimedia learning theories that emphasize the importance of multimodal input in accelerating comprehension, particularly for multilingual learners.

An in-depth case study involving a fifth-grade classroom illustrated how AR fostered collaborative learning and cultural empathy. Students participated in a virtual cultural exchange activity simulating traditional ceremonies from three different countries. Observational notes and teacher reflections showed increased peer interaction, improved willingness to speak in the target

language, and heightened interest in global cultures. Another case involved a student with previously low engagement in language classes who demonstrated significant improvement after interacting with AR storytelling modules. The student, who often hesitated to speak in class, began participating actively and scored 19 points higher in the speaking section of the LPT. This qualitative improvement provides insight into AR's motivational impact.

The case studies demonstrate that AR not only enhances cognitive outcomes but also promotes affective and behavioral engagement. The immersive quality of AR tools appeared to reduce language anxiety, increase learners' confidence, and encourage participation, especially among students who typically avoided oral communication tasks. These findings illustrate how AR can create psychologically safe learning spaces conducive to risk-taking and experimentation with new languages. The positive social interactions observed during AR activities suggest that immersive tools may support intercultural competence development by enabling students to interact with cultural representations beyond their lived experience. These qualitative results provide explanatory depth to the quantitative findings, confirming that AR enables authentic cultural immersion that traditional classroom methods cannot replicate.

The findings collectively indicate that Augmented Reality plays a significant role in advancing multicultural education through improved language proficiency and cultural awareness. The combination of statistical gains and qualitative engagement demonstrates that AR's immersive features effectively bridge linguistic and cultural gaps that often hinder learning in diverse classrooms. The results imply that AR can serve as a critical pedagogical tool for schools seeking to enhance multilingual learning and foster intercultural understanding. Its ability to simulate authentic cultural experiences supports holistic learning, making AR a promising innovation for advancing equitable and inclusive education.

The study demonstrated that Augmented Reality significantly enhanced both language proficiency and cultural awareness among students in multicultural classrooms. The AR-intervention group showed notable improvements in vocabulary retention, speaking fluency, and contextual language use compared to the control group. Students also exhibited stronger cultural empathy, greater curiosity about global traditions, and increased readiness to engage in cross-cultural dialogue. These gains were reinforced by immersive learning experiences that allowed students to interact with virtual cultural artifacts, participate in simulated cultural events, and practice language within realistic contexts. The results collectively affirm that AR serves not only as a technological enhancement but as a transformative pedagogical tool capable of bridging linguistic and cultural divides.

The findings further revealed that improvements were particularly pronounced among bilingual and multilingual learners, who displayed higher engagement and stronger cognitive integration of AR content. Students from monolingual backgrounds also benefited, though to a lesser extent, suggesting that AR amplifies existing linguistic and cultural schemas while also providing new scaffolding for those with less exposure. These outcomes underscore the robustness of AR as a tool that supports diverse learners, encourages active participation, and reduces the barriers typically encountered in multicultural educational environments.

Existing studies on AR in education have consistently highlighted its effectiveness in increasing student motivation, improving content retention, and facilitating experiential learning. The present study aligns with this body of work, particularly with research by Bower et al. (2020) and Cheng (2021), who found that AR enhances conceptual understanding and learner engagement through multimodal sensory input. However, this study contributes a more specific focus on multicultural interaction, where AR's immersive features support cultural competence development

in ways seldom explored in earlier research. While previous studies often emphasized cognitive gains, the current findings broaden the scope by demonstrating AR's socio-emotional impact, particularly its ability to foster cross-cultural curiosity and reduce apprehension toward unfamiliar linguistic practices.

Contrasts with prior work also emerged. Several studies have examined AR primarily within STEM environments or technical subjects, whereas this study positions AR within the sensitive domain of language learning and cultural education. This distinction underscores the novelty of using AR not just as a tool for content delivery but as an instrument for intercultural dialogue and empathy-building. The study's findings suggest that AR's capacity to simulate authentic cultural contexts enables deeper relational learning that extends beyond the scope of traditional AR research, positioning it as a meaningful contributor to multicultural educational pedagogy.

The findings signify a fundamental shift in how technology can mediate linguistic and cultural learning. AR appears to function as a cognitive bridge, connecting abstract cultural knowledge with experiential understanding. This suggests that immersive technology may represent the next evolution of multicultural education, where learning about diversity becomes a lived, interactive experience rather than a theoretical concept. The observed improvement in cultural awareness reflects students' internalization of cultural norms, values, and expressions encountered within AR scenarios, marking a shift from passive multicultural exposure to active cultural engagement.

The results further signify that traditional instructional methods may no longer be sufficient to address the increasing cultural diversity within modern classrooms. The AR tools used in this study enabled students to visualize, manipulate, and interact with cultural content in ways that overcome the limitations of textbooks, static images, and teacher-centered explanations. This indicates that immersive learning environments could serve as equalizing spaces, where students from diverse linguistic backgrounds can access shared cultural experiences regardless of their initial levels of exposure or proficiency.

The study's findings hold significant implications for educators, curriculum designers, and policymakers. Enhanced language proficiency and cultural awareness through AR suggests that immersive tools can be integrated into national curricula as core components of multicultural education. Schools may leverage AR to create inclusive learning environments where cultural barriers are minimized, multilingual communication is supported, and global citizenship values are nurtured from early grades. These implications resonate strongly in increasingly diverse educational landscapes, where the ability to navigate cultural differences is essential for students' academic and social development.

The findings also imply that teacher training programs must evolve to equip educators with the skills needed to implement AR-based pedagogy effectively. Professional development that emphasizes technological competence, intercultural communication, and digital content design will be crucial to ensuring that AR's transformative potential is realized. The broader implication is that immersive educational technologies should be viewed not merely as supplemental tools but as central components of a 21st-century multicultural learning ecosystem.

The observed improvements can be attributed to AR's multimodal and interactive nature, which aligns with theories of embodied cognition and experiential learning. AR environments anchor linguistic and cultural concepts within concrete sensory experiences, enabling deeper encoding and memory retention. Students are naturally drawn to immersive digital experiences, which reduces cognitive barriers and fosters intrinsic motivation. These psychological mechanisms

explain why AR-enabled learning yielded stronger outcomes than traditional instruction, particularly in domains where context, interaction, and emotional resonance play central roles.

The heightened gains among bilingual and multilingual students can be explained by their existing cognitive flexibility and familiarity with navigating multiple linguistic and cultural frameworks. AR's immersive design allowed these students to integrate new cultural knowledge seamlessly with prior experiences. For monolingual students, AR acted as an accessible entry point into unfamiliar cultural spaces, reducing anxiety and facilitating positive attitudes toward diversity. These differences highlight the alignment between AR's strengths and the cognitive characteristics of diverse learner populations.

The findings call for expanded implementation of AR across multicultural settings, with continued refinement of AR content to address specific linguistic and cultural learning goals. Future research should investigate long-term effects of AR exposure on intercultural competence, empathy development, and multilingual fluency (Zerbe, 2025). Additional studies could explore how AR supports students with learning difficulties, immigrant backgrounds, or limited prior exposure to multicultural environments. Such investigations would deepen understanding of AR's equity-enhancing potential.

The next step for educational institutions is to develop multidisciplinary collaborations involving educators, AR developers, cultural experts, and linguists to co-create culturally authentic and pedagogically sound AR modules. Scaling AR-supported multicultural curricula at district or national levels may help reduce cultural and linguistic achievement gaps. These directions indicate that AR is not merely an innovative tool—it is a strategic pathway toward building more inclusive, globally aware, and culturally responsive educational systems.

CONCLUSION

The most significant finding of this study is the substantial effectiveness of Augmented Reality (AR) in bridging language and cultural barriers in multicultural classrooms. Unlike traditional teaching methods, AR enabled students to experience language and culture in immersive virtual environments, leading to marked improvements in both language proficiency and cultural awareness. Students in the experimental group showed a notable increase in language proficiency scores and cultural understanding, which was not observed in the control group that followed traditional methods. This finding highlights AR's potential to transform how students learn languages and interact with diverse cultural contexts, providing a deeper, more engaging learning experience that traditional methods cannot replicate.

The contribution of this research lies in its innovative use of AR technology to address both language acquisition and cultural understanding simultaneously. While previous studies have explored AR's impact on language learning or cultural education individually, this study is one of the first to examine how AR can effectively bridge both aspects in multicultural education. The mixed-method approach, combining quantitative language proficiency tests with qualitative insights into cultural awareness, provides a holistic view of how AR can enhance education in diverse classrooms. This approach offers new evidence on the practical applications of AR in overcoming the challenges of multicultural education by providing students with interactive and immersive tools that engage both cognitive and emotional learning.

A limitation of this study is its focus on a relatively small sample from urban multicultural schools, which may not fully represent the experiences of students from rural or homogenous school settings. Future research should address this limitation by including a broader range of schools, particularly those with fewer cultural diversities, to assess whether the findings hold true

across different educational contexts. Additionally, longitudinal studies could provide more insights into the long-term impact of AR interventions on language skills and cultural attitudes. Future studies could also explore the specific elements of AR such as the types of cultural simulations or language activities that are most effective in fostering both language proficiency and cultural awareness. These directions will help refine the implementation of AR in multicultural education and expand its application to diverse educational settings.

AUTHORS' CONTRIBUTION

Look this example below:

Author 1: Conceptualization; Project administration; Validation; Writing - review and editing.

Author 2: Conceptualization; Data curation; In-vestigation.

Author 3: Data curation; Investigation.

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