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Digital Translanguaging: Harnessing Technology to Foster Intercultural Competence in Multilingual Educational Contexts

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ABSTRACT

Background. The increasing globalization of education has resulted in more diverse, multilingual classrooms, highlighting the need for intercultural competence alongside language proficiency. Translanguaging, a practice where learners utilize their entire linguistic repertoire to communicate, offers a potential framework for fostering this competence. With the rise of digital tools, the practice of digital translanguaging has emerged, enabling students to navigate and interact across multiple languages using technology.

Purpose. This study investigates how digital translanguaging, facilitated by technology, can foster intercultural competence in multilingual educational settings. It aims to explore the impact of digital tools in promoting both language proficiency and cultural awareness, providing students with the skills to communicate.

Method. A mixed-methods approach was employed, combining pre- and post-test surveys to measure language proficiency and intercultural competence, alongside qualitative interviews and focus groups to explore students' experiences with digital translanguaging tools.

Results. The findings indicate significant improvements in both language proficiency (23% increase) and intercultural competence (24% increase) in the experimental group using digital translanguaging tools. Students reported enhanced engagement and a deeper understanding of cultural diversity.

Conclusion. Digital translanguaging tools effectively enhance both language learning and intercultural competence, suggesting that technology can play a pivotal role in multilingual education.

KEYWORDS

Digital Translanguaging, Intercultural Competence, Multilingual Education

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INTRODUCTION

In the age of globalization, educational systems across the world are witnessing an increasing influx of multilingual and multicultural students. These students bring with them a variety of linguistic and cultural backgrounds, creating both opportunities and challenges in the classroom (Ortega dkk., 2025; Yan dkk., 2025). Traditionally, language learning has been seen as a linear process, where students are expected to master one language at a time. However, the complexity of real-world communication, especially in multilingual societies, often requires students to navigate multiple languages



simultaneously. This phenomenon has led to the rise of a concept known as translanguaging, where individuals use their full linguistic repertoire to communicate and understand content in diverse ways (Ivanić dkk., 2025; Pietzuch dkk., 2025).

As technology continues to evolve, it plays a crucial role in facilitating translanguaging practices. Digital tools, such as language learning apps, collaborative platforms, and real-time translation tools, provide new opportunities for students to engage with multiple languages in dynamic and context-specific ways. These tools offer the potential to go beyond traditional language learning methods, promoting not only linguistic skills but also intercultural competence, which is crucial in today's interconnected world. However, while digital tools offer new avenues for language learning, the integration of translanguaging practices into digital platforms has yet to be fully explored in multilingual educational contexts (Al-Enazi, 2025; Basantes-Andrade dkk., 2025).

This research focuses on how digital translanguaging can be harnessed to foster intercultural competence in multilingual educational contexts. It examines the role of technology in enabling students to bridge linguistic and cultural gaps, facilitating communication and understanding in ways that traditional methods may not be able to achieve. The growing presence of technology in education presents an opportunity to explore how digital environments can support the development of both language proficiency and intercultural understanding, which are essential skills in globalized societies (Al-Enazi, 2025; Sabadash dkk., 2025).

While the concept of translanguaging has gained traction in the field of language education, there is a notable lack of research on how digital technologies can support or enhance these practices in multilingual educational settings. Most studies on translanguaging focus on its theoretical foundations or its implementation in traditional classrooms, where the teacher and students are physically present and primarily use one language or a limited number of languages. The use of technology in this context has often been overlooked, despite the growing reliance on digital tools in modern education. Furthermore, while translanguaging is acknowledged for its potential to enhance language learning, there remains a gap in understanding how it can contribute to the development of intercultural competence, which is increasingly seen as a key outcome in multilingual and multicultural education (Borrego, 2025; Yeşil Demirci dkk., 2025).

This research addresses the gap by exploring how digital translanguaging practices can foster intercultural competence in educational settings. By focusing on how technology facilitates the simultaneous use of multiple languages, the study aims to highlight the pedagogical potential of digital platforms in promoting a more inclusive, culturally responsive, and effective language learning environment. The research examines how digital tools can support students in navigating their linguistic and cultural identities, enabling them to engage in meaningful interactions that extend beyond language proficiency alone (Anuar dkk., 2025; Rudik dkk., 2025).

The specific problem this research aims to address is the underutilization of digital technologies to promote translanguaging practices and intercultural competence in multilingual classrooms. While there is significant literature on digital tools for language learning, there is a lack of comprehensive studies examining the intersection of digital technologies, translanguaging, and intercultural competence. This research seeks to fill that gap and provide a deeper understanding of how these elements can be integrated effectively in multilingual educational contexts (Cong-Lem, 2025; Hussain dkk., 2025).

The primary objective of this study is to explore how digital translanguaging can be employed in multilingual educational contexts to enhance intercultural competence. This research seeks to identify how digital tools can facilitate the use of multiple languages simultaneously, allowing students to draw from their full linguistic repertoire in a way that fosters understanding across

cultural boundaries. The study will examine specific digital tools that support translanguaging practices, such as language learning apps, collaborative online platforms, and real-time translation tools, to determine their effectiveness in promoting intercultural competence (Çelik & Erbay-Çetinkaya, 2025; Cong-Lem, 2025).

In addition to identifying effective digital tools, the research aims to investigate how digital translanguaging influences students' perceptions of their cultural identities and their ability to engage with others from different cultural backgrounds. By exploring the relationship between language use and cultural understanding, the study seeks to provide insights into how digital technologies can help students navigate multilingual environments and develop the skills necessary for cross-cultural communication. The research will also explore how these tools can be integrated into classroom settings, with a focus on best practices for educators seeking to incorporate digital translanguaging into their teaching methods (Sánchez-Castro dkk., 2025; Wenqi dkk., 2025).

Ultimately, this research aims to provide a comprehensive framework for integrating digital translanguaging into multilingual education, offering practical recommendations for educators, policymakers, and technology developers to support the development of both linguistic skills and intercultural competence in students. The study will contribute to the growing body of literature on the role of technology in language education, with a specific focus on how it can support the goals of intercultural communication and understanding (Amalia dkk., 2025; Ward dkk., 2025).

Although the concept of translanguaging has been widely discussed in the literature, there is limited research on how digital technologies can support or extend translanguaging practices in the classroom. Most existing studies focus on the linguistic aspects of translanguaging, such as the ways in which students blend languages to facilitate understanding or express complex ideas. However, there is a lack of attention to how these practices can be enhanced through digital tools that support real-time interaction and communication in multiple languages. Moreover, while digital tools have been widely used in language learning, there is a paucity of research on their potential to foster intercultural competence, a critical component of language acquisition in a globalized world (Koukouraki & Zhou, 2025; Usquiano dkk., 2025).

This research fills a significant gap by focusing on the intersection of digital translanguaging and intercultural competence. It addresses the need for more empirical studies on the role of digital tools in facilitating multilingual learning experiences and promoting cultural understanding. While previous studies have explored the role of technology in supporting language learning, there is a lack of research on how digital environments can specifically promote the use of multiple languages simultaneously and enhance students' abilities to navigate cultural differences. This study contributes to a broader understanding of how digital tools can be integrated into multilingual classrooms to support both language learning and the development of intercultural competence (Schelfhout dkk., 2026; Yuan dkk., 2025).

The research also provides a much-needed perspective on the pedagogical implications of digital translanguaging. By exploring how technology can support translanguaging practices in a way that fosters intercultural understanding, the study contributes to the development of more inclusive and culturally responsive educational practices. It offers new insights into how digital tools can be used to promote more meaningful and dynamic interactions in multilingual classrooms, where language and culture intersect in complex ways (Spathopoulou & Pitychoutis, 2025; Vu dkk., 2025).

The novelty of this research lies in its exploration of digital translanguaging as a tool for fostering intercultural competence in multilingual educational contexts. While translanguaging has been explored extensively in language education, its intersection with digital technologies and

intercultural competence remains under-researched. This study introduces a new perspective by examining how digital tools can be used to facilitate the simultaneous use of multiple languages, allowing students to engage with their linguistic and cultural identities in a more flexible and dynamic way. The research also highlights the role of technology in promoting intercultural competence, offering a new lens through which to understand the potential of digital tools in multilingual education.

The justification for this research is grounded in the increasing demand for intercultural competence in today's globalized world. As students from diverse linguistic and cultural backgrounds interact more frequently, educational systems must provide them with the tools and skills necessary to communicate across cultures effectively. Digital translanguaging, facilitated by technology, offers an innovative approach to language learning that goes beyond traditional methods. By exploring the role of digital tools in enhancing intercultural competence, this study contributes to the development of new pedagogical frameworks that can be applied in multilingual classrooms to support students in becoming more effective communicators and global citizens.

RESEARCH METHODOLOGY

This study adopts a mixed-methods design, integrating both quantitative and qualitative approaches to explore how digital translanguaging fosters intercultural competence in multilingual educational contexts. The quantitative component involves a quasi-experimental design, where participants are assigned to either an experimental group (using digital translanguaging tools) or a control group (engaging in traditional multilingual learning activities) (Bejko & Muço, 2025; Gavilano & Pozzo, 2025). The pre- and post-test assessments measure the participants' intercultural competence and language proficiency before and after the intervention. The qualitative component consists of semi-structured interviews and focus group discussions to capture students' experiences with digital translanguaging tools, their perceptions of the tools' effectiveness, and how these tools influence their understanding of cultural diversity. This mixed-methods approach allows for a comprehensive understanding of both the cognitive outcomes and the subjective experiences of students engaging with digital translanguaging in multilingual educational settings.

The study targets university students enrolled in multilingual and multicultural courses at a large public university. A purposive sampling technique was used to select participants who are actively engaged in courses where digital tools and multilingual learning are integral. The sample consists of 150 students, with 75 students in the experimental group (using digital translanguaging tools) and 75 in the control group (using traditional multilingual methods). The participants come from diverse linguistic backgrounds, including English, Spanish, French, and Mandarin, to reflect a wide range of intercultural contexts. These students were selected based on their proficiency in multiple languages and their enrollment in courses where intercultural competence and language acquisition are key learning outcomes. The study aims to ensure a representative sample that reflects the multilingual diversity typically found in educational settings (Prilutskaya dkk., 2025; Vu dkk., 2025).

The primary instruments for data collection are pre- and post-test surveys, semi-structured interview guides, and focus group protocols. The pre- and post-test surveys assess intercultural competence and language proficiency, using validated scales that measure understanding of cultural differences, communication styles, and empathy across cultures. The intercultural competence test includes items focused on knowledge of cultural norms, communication behaviors, and attitudes toward diversity. The language proficiency test evaluates students' abilities to navigate and use

multiple languages effectively in various communicative contexts (Hinse dkk., 2025; Nurkhamidah, 2025).

In addition, semi-structured interviews and focus group discussions are used to capture qualitative data on students' experiences with digital translanguaging. The interview guides and focus group protocols include open-ended questions designed to explore students' perceptions of the digital tools, their challenges and successes with translanguaging, and how they feel these tools influence their intercultural competence. The qualitative data collected through these instruments will be transcribed and analyzed thematically to identify recurring themes related to digital translanguaging and intercultural learning.

The study follows a five-step procedure, beginning with the recruitment of participants and the pre-assessment phase. In the first step, students in both the experimental and control groups complete the pre-test surveys to assess their baseline levels of intercultural competence and language proficiency. In the second step, the experimental group engages with digital translanguaging tools for eight weeks. These tools include language learning apps, real-time translation software, and collaborative platforms that encourage the use of multiple languages in communication. The control group, meanwhile, follows traditional multilingual learning activities in a classroom setting, with no specific focus on digital translanguaging.

In the third step, post-test surveys are administered to both groups, measuring any changes in intercultural competence and language proficiency. The fourth step involves conducting semi-structured interviews and focus group discussions with students from both groups to gather qualitative insights into their experiences. The interviews and focus groups will explore how the digital tools impacted their understanding of cultural diversity, their ability to communicate across cultures, and their perceptions of the effectiveness of digital translanguaging in enhancing intercultural competence. In the final step, the quantitative and qualitative data are analyzed. The quantitative data are analyzed using statistical methods such as paired sample t-tests to compare pre- and post-test results, while the qualitative data are analyzed thematically to identify key themes and patterns in students' experiences with digital translanguaging (Spathopoulou & Pitychoutis, 2025; Yuan dkk., 2025). This methodological approach ensures a thorough examination of the impact of digital translanguaging on students' intercultural competence, combining objective measures of learning outcomes with rich, descriptive insights into students' experiences and perceptions.

RESULT AND DISCUSSION

The data from the pre- and post-test surveys show a significant improvement in intercultural competence and language proficiency among students in the experimental group, who used digital translanguaging tools, compared to those in the control group. The average pre-test score for intercultural competence in the experimental group was 58%, with a post-test score of 82%, reflecting a 24% improvement. In contrast, the control group showed a smaller increase, from an average pre-test score of 60% to a post-test score of 73%, an improvement of only 13%. Table 1 presents the detailed data for both groups.

Table 1. Pre and post-test scores for intercultural competence and language proficiency

Group	Pre-Test Score (%)	Post-Test Score (%)	Improvement (%)
Experimental Group (Digital Translanguaging)	58	82	24
Control Group (Traditional Methods)	60	73	13

The results indicate that the use of digital translanguaging tools significantly enhanced intercultural competence and language proficiency in the experimental group. The AR and language learning apps, along with collaborative online platforms, provided students with a rich environment to engage with multiple languages, which promoted understanding of cultural norms and diverse communication styles. The 24% improvement in intercultural competence among the experimental group demonstrates the effectiveness of technology in fostering cross-cultural learning, which is essential in today's globalized educational contexts. The tools enabled students to move beyond passive learning and actively apply their linguistic knowledge to real-world, culturally diverse situations.

On the other hand, the control group, which engaged in traditional multilingual learning without a focused emphasis on digital translanguaging, showed more modest gains in intercultural competence. The 13% improvement suggests that while traditional methods are beneficial for language learning, they may not provide the same level of exposure to diverse cultural contexts or encourage the same depth of engagement with multiple languages. This difference underscores the potential of digital tools in providing more dynamic, interactive, and culturally diverse learning experiences that traditional methods may lack.

Further analysis of the data shows that the improvement in intercultural competence was accompanied by a corresponding increase in language proficiency in the experimental group. The average pre-test score for language proficiency in the experimental group was 62%, with the post-test score rising to 85%, a 23% improvement. In the control group, language proficiency scores increased from 64% in the pre-test to 75% in the post-test, showing a 11% improvement. The results demonstrate that digital translanguaging tools not only enhanced students' understanding of cultural diversity but also contributed to their language skills, indicating the effectiveness of these tools in fostering both linguistic and intercultural competence.

The relationship between intercultural competence and language proficiency was also evident in the qualitative data, where students in the experimental group reported that the digital tools helped them engage more meaningfully with content by integrating their linguistic abilities with cultural understanding. These findings highlight the interconnected nature of language and culture and suggest that fostering one can directly influence the development of the other. The combined improvement in both areas suggests that digital translanguaging tools offer an effective means of bridging the gap between language learning and intercultural competence in multilingual educational contexts.

The statistical analysis of the pre- and post-test results using paired sample t-tests revealed significant differences in the cognitive learning outcomes between the experimental and control groups. For the experimental group, the t-value for intercultural competence improvement was 6.12 ($p < 0.01$), indicating that the change in scores was statistically significant. Similarly, the t-value for the improvement in language proficiency was 5.85 ($p < 0.01$), confirming that the digital tools had a robust impact on both intercultural competence and language skills. For the control group, the improvements in both areas were also significant, but the effect size was smaller, with a t-value of 4.21 ($p < 0.05$) for intercultural competence and 3.97 ($p < 0.05$) for language proficiency. These results confirm the greater effectiveness of digital translanguaging tools in enhancing both cognitive and linguistic outcomes.

The inferential analysis suggests that the digital tools had a more profound impact on students' learning compared to traditional multilingual methods. The larger effect sizes in the experimental group demonstrate the potential of technology to foster deeper, more meaningful engagement with language and culture. These findings align with previous research on the effectiveness of

technology-enhanced language learning, supporting the idea that digital tools can significantly enhance both cognitive and linguistic competencies by providing a more immersive and interactive learning environment.

The relationship between the students' reported engagement with the digital translanguaging tools and their cognitive outcomes was examined through correlation analysis. The results showed a strong positive correlation between engagement levels and improvements in both intercultural competence ($r = 0.76, p < 0.01$) and language proficiency ($r = 0.74, p < 0.01$). This indicates that students who reported higher levels of engagement with the digital tools were more likely to experience greater cognitive improvements. The data suggests that the interactive nature of the tools, which encouraged active participation and real-time language use, played a key role in enhancing students' learning outcomes.

These findings emphasize the importance of engagement in language learning and intercultural competence development. The digital translanguaging tools provided opportunities for students to actively interact with content in multiple languages and cultural contexts, which likely led to increased motivation and deeper cognitive processing. The positive correlation between engagement and learning outcomes further underscores the effectiveness of technology in creating more engaging and interactive learning environments that can foster both language proficiency and intercultural competence.

A case study involving a student, Maria, from the experimental group provides further insight into the impact of digital translanguaging tools on learning outcomes. Maria, who was initially hesitant to use multiple languages in her learning, showed a significant improvement in both intercultural competence and language proficiency after engaging with the digital tools for eight weeks. Maria's pre-test scores for intercultural competence and language proficiency were 55% and 58%, respectively. After the intervention, her post-test scores rose to 85% and 88%, reflecting a 30% and 30% improvement in both areas. Maria reported that the use of interactive AR-based tools allowed her to visualize cultural scenarios and use language in context, which boosted her confidence and understanding of cultural diversity.

This case study highlights the transformative potential of digital translanguaging tools for students who may struggle with traditional language learning methods. Maria's improvement in both cognitive areas suggests that digital tools, by offering immersive, interactive experiences, can help students overcome barriers to learning and engage more effectively with language and culture. The case study serves as a concrete example of how digital translanguaging can foster intercultural competence and enhance language skills, making it a valuable tool in multilingual educational contexts.

The case study of Maria illustrates how digital translanguaging tools can cater to students' individual learning needs, particularly in terms of building confidence and facilitating deeper engagement with both language and culture. Maria's significant improvement demonstrates how interactive and visual tools, such as augmented reality, can help students bridge the gap between theoretical knowledge and practical application. The ability to explore cultural scenarios through the digital tools provided Maria with a context-rich learning environment, enabling her to apply her language skills in real-world situations, which is often a challenge in traditional classroom settings.

Maria's experience also highlights the potential for personalized learning through digital tools. Unlike traditional methods, where the pace and scope of learning are often fixed, digital translanguaging offers students more control over their learning experience. Maria's progress underscores the importance of providing students with tools that allow for exploration and experimentation with language and culture, ultimately enhancing both their linguistic abilities and

intercultural understanding. This case study exemplifies the broader trends observed in the experimental group, where students who actively engaged with digital translanguaging tools showed substantial improvements in cognitive learning outcomes.

The results of this study reveal that digital translanguaging significantly enhances intercultural competence in multilingual educational contexts. The data showed that students who used digital tools to facilitate translanguaging practices demonstrated substantial improvements in both language proficiency and intercultural competence. The experimental group, which engaged with digital translanguaging tools such as language learning apps and collaborative platforms, exhibited a 24% increase in intercultural competence and a 23% improvement in language proficiency. In contrast, the control group, which relied on traditional multilingual learning methods, showed smaller improvements of 13% in intercultural competence and 11% in language proficiency. These findings suggest that digital translanguaging not only supports language acquisition but also fosters deeper understanding and engagement with cultural diversity. Furthermore, qualitative data from interviews and focus groups indicated that students felt more confident in using multiple languages in diverse contexts, which contributed to a greater sense of intercultural awareness and competence.

The findings align with previous studies on translanguaging and digital tools in education. Research by García and Li (2014) emphasized the value of translanguaging in promoting more fluid and natural language use across contexts, which enhances both linguistic and cultural learning. However, this study extends the existing literature by comparing the effects of digital translanguaging with traditional multilingual education methods, offering insights into how technology can deepen intercultural competence in ways traditional methods may not. While previous studies have shown that translanguaging can improve language learning outcomes (Cummins, 2007), this research specifically examines how digital tools, by facilitating the use of multiple languages in real-time, provide students with a unique opportunity to bridge linguistic and cultural boundaries. This comparative analysis emphasizes that digital environments can significantly enhance the interactive and dynamic nature of translanguaging practices, leading to more significant improvements in both language and intercultural learning.

Despite the growing body of research on the benefits of digital tools in language learning, few studies have directly explored the relationship between digital translanguaging and intercultural competence in multilingual contexts. Some studies, such as those by Kress et al. (2005), have explored the role of multimodal communication in language learning, but they have not focused on the specific contribution of digital translanguaging in fostering intercultural understanding. By highlighting this gap, the current study provides new insights into how digital tools not only support language proficiency but also actively promote cultural exchange and understanding, a dimension often overlooked in traditional educational settings.

The results signify that the integration of digital translanguaging tools in multilingual educational settings offers a promising approach to fostering intercultural competence. The enhanced engagement and cognitive improvements observed in the experimental group suggest that these tools provide an effective means of bridging linguistic gaps while promoting deeper cultural understanding. The fact that students in the digital translanguaging group showed greater intercultural awareness indicates that technology can serve as a powerful medium for facilitating cross-cultural communication and learning. This highlights the importance of incorporating technology in modern language education, as it allows for more flexible, interactive, and personalized learning experiences that are difficult to achieve through traditional methods alone.

The findings also signal a shift in how language learning and cultural competence are traditionally viewed in educational contexts. Traditionally, language learning has been focused on

grammar, vocabulary, and proficiency in a single language, with limited emphasis on cultural awareness. However, this study suggests that learning multiple languages in tandem, with the support of digital tools, offers students an opportunity to engage with the cultural nuances of language. The integration of digital translanguaging, therefore, represents a holistic approach to language education, where linguistic proficiency and intercultural competence are developed simultaneously.

The implications of these findings are significant for both educational practices and policies in multilingual contexts. First, they suggest that digital translanguaging tools should be more widely integrated into curricula to enhance both language learning and intercultural competence. Educators and policymakers need to recognize the value of these tools not just for language acquisition, but also for promoting cultural understanding in increasingly diverse classrooms. The study highlights that digital tools can offer scalable, adaptable, and interactive environments that facilitate learning in ways traditional methods cannot, providing students with a more inclusive and comprehensive educational experience.

Additionally, these findings call for the development of more advanced and culturally responsive digital tools that cater to the needs of multilingual students. Educational technology companies and institutions should work together to create platforms that go beyond language learning and actively integrate intercultural competence into the curriculum. By doing so, they can prepare students not only to communicate effectively in multiple languages but also to navigate the complexities of global citizenship in a multicultural world. This research underscores the importance of designing educational tools that reflect the multilingual and multicultural realities of today's globalized society.

The results occurred because digital translanguaging tools create an interactive and immersive learning environment that encourages students to use their full linguistic repertoire. Unlike traditional methods, which often limit students to working within a single language, digital tools facilitate the simultaneous use of multiple languages, allowing students to draw upon their diverse linguistic backgrounds to solve problems, interact with content, and understand cultural contexts. This active engagement with multiple languages promotes not only language learning but also cultural awareness, as students are encouraged to engage with linguistic and cultural content in dynamic ways.

The integration of digital tools likely contributed to students' increased motivation and confidence, which in turn enhanced their learning outcomes. Digital environments provide instant feedback, which helps students see the impact of their actions in real-time and adjust their learning strategies accordingly. Moreover, digital platforms often allow for greater flexibility and personalization, enabling students to engage with content at their own pace and according to their specific learning needs. These factors combined explain why students in the experimental group experienced greater cognitive improvements and intercultural competence than those in the control group, who relied on traditional learning methods without the support of digital tools.

The findings from this study point to several avenues for future research and application. First, future studies should explore the long-term effects of digital translanguaging on both language proficiency and intercultural competence to determine whether the improvements observed in this study are sustained over time. Additionally, future research could investigate how different types of digital tools such as virtual reality, gamified language platforms, or AI-powered translation services can further enhance students' engagement with language and culture in multilingual contexts.

In terms of educational practice, this research suggests the need for more targeted professional development for educators, particularly in terms of integrating digital translanguaging into their

teaching practices. Educators should be provided with the knowledge and resources to effectively incorporate these tools into their curricula. Furthermore, institutions should consider developing partnerships with technology providers to create tools that are not only linguistically focused but also designed to foster intercultural competence in diverse classroom settings. As digital tools continue to evolve, there is a growing opportunity to enhance language education and intercultural understanding in ways that traditional methods have not been able to achieve, preparing students to thrive in a globalized world.

CONCLUSION

The key finding of this study is that digital translanguaging tools significantly enhance both language proficiency and intercultural competence in multilingual educational contexts. Students who engaged with digital translanguaging tools demonstrated a substantial improvement in their ability to use multiple languages simultaneously, resulting in greater cognitive flexibility and a deeper understanding of cultural nuances. The experimental group, which utilized tools such as language learning apps and real-time translation platforms, showed a 24% improvement in intercultural competence and a 23% improvement in language proficiency. This contrasts with the control group, which showed more modest gains, highlighting the unique advantages of digital tools in fostering both linguistic and cultural understanding. These findings suggest that digital translanguaging not only enhances language acquisition but also promotes intercultural awareness by facilitating more dynamic interactions between students and diverse cultural content.

This study contributes both conceptually and methodologically to the field of language education and intercultural competence. Conceptually, it expands the understanding of translanguaging beyond its traditional linguistic framework by integrating digital tools as an essential medium for facilitating cross-linguistic and cross-cultural communication. The study highlights how digital translanguaging fosters real-time, interactive engagement with multiple languages, allowing students to move seamlessly between languages while gaining deeper insights into cultural diversity. Methodologically, the mixed-methods approach of combining quantitative assessments with qualitative interviews and focus group discussions offers a comprehensive evaluation of both the cognitive and experiential aspects of learning. By linking digital translanguaging with intercultural competence, this research provides a novel approach to understanding how technology can serve as a powerful tool in multilingual education, thus broadening the scope of research on digital tools in education.

While the findings provide valuable insights, there are several limitations to this study. One limitation is that it only examines the impact of digital translanguaging within a specific set of tools, namely language learning apps and collaborative platforms. Future research should explore a wider range of digital tools, such as virtual reality (VR) or gamified language applications, to assess their potential in enhancing digital translanguaging practices. Additionally, this study is based on a relatively short-term intervention, and future studies could investigate the long-term effects of digital translanguaging on intercultural competence and language retention. Another limitation is the sample size and the specific cultural context in which the study was conducted. Further research should include a more diverse sample of students from different cultural and linguistic backgrounds to explore how digital translanguaging can be applied in a broader range of multilingual educational settings. By addressing these limitations, future studies can deepen our understanding of the long-term benefits of digital translanguaging and its applicability in various educational contexts.

AUTHORS' CONTRIBUTION

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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