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Students' Emotional Experiences with AI Integration in the Indonesian Language Program for Foreign Speakers

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ABSTRACT: *As AI becomes increasingly embedded in language learning, its impact on international students' intercultural adjustment remains largely unexamined. This study examines the integration of intercultural competence into AI-based learning environments and considers its potential in transform global education. It uses a narrative inquiry approach to explore the experiences of seven international students who used AI tools to learn about Indonesians in higher education in a range of culturally diverse settings in Indonesia. The study draws on the concept of emotional geography (Hargreaves, 2001) to examine the students' emotional experiences as they interacted with both the AI and human educators, and uses transitivity analysis to examine how language in AI-mediated instruction reflects cultural identities, values, and relationships. The findings indicate that using AI reduces students' moral distance and creates space for cultural 'trial and error' when the AI fails to adequately represent the Indonesian concept of politeness (Unggah ungguh), which in turn can lead to frustration and*

stress. The study provides practical advice for AI developers to place cultural empathy at the heart of their design. It makes a theoretical contribution by bringing together emotional geography and techno-culture to support the continued role of human-mediated emotional labor in AI for intercultural engagement. It also shows that co-producing knowledge between international students and human emotional labor can be a key enabler of successful intercultural adjustment.

Keywords: AI-based learning, emotional geography, Indonesia, intercultural competence, transitivity

In an increasingly interlinked world, intercultural competence is key to achieving meaningful communication and mutual understanding across cultures (Lee et al., 2023). There has been very little discussion of the role of a cognitive dimension in the expression of emotional experience and in the formation of intercultural student identities in the context of AI. There is a slight empirical gap in the literature with respect to the impact of AI-mediated language instruction on international students, particularly in a Global South context where the local Indonesian culture (*Ungah-ungguh*) poses particular problems that AI is simply not equipped to deal with. Intercultural competence is the ability to understand and appreciate cultural differences and to possess the requisite knowledge, attitudes and skills to interact effectively in a cross-cultural context (Fantini, 2020). Human-to-human interaction is no longer a requirement for intercultural competence; it is now mediated through AI. The integration of technology into language programs raises all sorts of questions about the nature of complex digital cultural identities. In this study intercultural competence is defined as the ability of students to interact with, navigate and negotiate the cultural nuances of the interaction (e.g. social hierarchies, levels of politeness) (Guillén-Yparrea & Ramírez-Montoya, 2023). The study is situated in the linguistic features of the digital cultural encounter with AI. Students are able to interact with and assess AI-generated cultural suggestions in the context of the Indonesian social culture. On the other hand, the rapid development of AI has had a significant impact on the educational landscape with the introduction of a range of new technologies that can enhance the learning experience through personalization and increased student engagement (Tapalova et al., 2022). The broad uptake of AI-based learning systems across a number of disciplines is a clear indication of their ability to provide content that is tailored to the individual learner and to offer more responsive feedback (Castro et al., 2024).

Further research shows that these systems have a positive impact on student learning outcomes in terms of knowledge, skills and emotional development (Hu, 2024). The integration of AI into education is shown to improve the learning experience and to open up new possibilities for improving pedagogical effectiveness in a range of learning contexts (Zohuri, 2024). As the use of AI in education continues to grow, there is a real need to look at the impact it has on learners' intercultural competence, particularly in highly diverse cultural contexts.

A better understanding of how AI impacts the development of intercultural competence can go some way towards informing the design of more inclusive and effective learning approaches in this digital age.

Despite the increasing use of AI in education there has been very little research into the impact of AI-mediated learning environments on intercultural competence, especially in the context of language learning. There has been some work looking at the role of AI in language learning per se, but much of it has been concerned with efficiency rather than the cultural and emotional dimensions of the learning experience. Fountoulakis (2024) looked at the impact of AI tools on language learning and intercultural communication and found a marked improvement in language proficiency, though the emotional dimension of the experience was not really addressed. Xia et al. (2024) also found that AI had a positive impact on language learning in terms of cognition, with very little attention to the social and emotional aspects. Chen et al. (2020) looked at the role of AI in education and again the focus was predominantly on the cognitive outcomes. The impact of AI on the emotional and social experience of the learner is still very much an open question. This is particularly pertinent in the case of language learning as it is so much more than just a cognitive exercise and is so deeply connected to cultural identity, emotional engagement and social interaction. We simply don't know what effect AI will have on these aspects of the learning experience and without that knowledge we may be reproducing cultural biases or simply not creating the kind of intercultural engagement that is so important.

To address these gaps, this study looks at how AI-based learning frameworks can be used to develop intercultural competence, emotional engagement and linguistic representation in global education. It is a study of the experiences of seven international students who used AI tools to learn Indonesian at higher education institutions in Indonesia (a country widely recognized for its cultural and linguistic diversity). The narrative inquiry approach proposed by Barkhuizen (2019) is adopted to capture the students' narratives and their emotional experiences as they go through the AI-mediated learning process. Emotional geography (Hargreaves, 2001) is used to analyze the affective interactions between the students, the AI and the teachers, and transitivity analysis (Halliday, 2004) is used to look at how the AI-mediated language learning reflects cultural values and the nature of interpersonal relationships. This study adds to the growing body of work on AI in global education by providing practical recommendations for the design of AI systems that will foster cultural sensitivity, emotional connection and meaningful intercultural learning. In an increasingly globalized world, intercultural competence is key to enabling meaningful communication and mutual understanding across cultures (Lee et al., 2023). The study looks at the integration of AI with cultural integration pedagogy and how AI can be used to mediate intercultural competence through linguistic representation and emotional engagement. It specifically looks at the experiences of seven international students who used AI tools to learn Indonesian at HEIs in Indonesia (a country renowned for its cultural and linguistic diversity). The narrative inquiry approach proposed by Barkhuizen (2019) is used to capture the

students' narratives and their emotional experiences as they go through the AI-mediated learning process. Emotional geography (Hargreaves, 2001) is used to analyse the affective interactions between the students, the AI and the teachers and transitivity analysis (Halliday, 2004) is used to look at how the AI-mediated language learning reflects cultural values and the nature of the relationships between people. The study contributes to the ongoing discourse on AI in global education by providing practical recommendations for the design of AI systems that will promote cultural sensitivity, emotional connection and meaningful intercultural learning. The research question is:

1. How are cultural values represented in AI-mediated language instruction via the lens of transitivity analysis?
2. How do international students navigate their emotional distance within AI-driven learning environments through the lens of emotional geography?

LITERATURE REVIEW

Intercultural Competence

Intercultural competence is a key skill in today's world where we are so very much connected. It is the ability to interact appropriately and effectively with people from different cultural backgrounds (Luo & Gao, 2022). Byram (1997) identified five components of intercultural communicative competence (ICC) which are knowledge, attitudes, interpretive skills, interactional skills and a critical cultural environment. Byram (2020) goes on to state that these five components are still very much in play, with the knowledge and empathy that underpins the cultural awareness being key to being able to operate flexibly in intercultural contexts. In an age where intercultural communication is so important in both our personal and professional lives, intercultural competence is of paramount importance (Gritsenko et al., 2021). Intercultural competence is the ability to engage successfully in intercultural contexts through the requisite knowledge, skills and attitudes (Byram, 2020). Knowledge in this context is the awareness and understanding of the norms, values and practices of different cultures, which enables us to recognize the differences and similarities in cross-cultural interactions. Skills in this respect are empathy, critical cultural awareness and adaptability, which all allow us to engage in intercultural interactions in a sensitive and flexible way. This study seeks to close the gap in the research on AI and the scholarship of international students by utilizing transitivity and emotional geography as analytical frameworks. Transitivity is considered an ideational meta function and emotional geography is considered an interpersonal meta function. The combination of the two is seen as a way of going beyond the question of pedagogical effectiveness and into the realm of students' engagement in socioemotional terms.

Further to this, attributes such as openness to diversity, curiosity about other cultures and a readiness to engage in genuine interaction are all critical to the development of intercultural competence. A few of the key theoretical

underpinnings (e.g. Deardorff's model, Byram's model of intercultural communicative competence) could be cited to strengthen the theoretical basis. The key markers of intercultural competence are effective communication (Wang et al., 2024), adaptability (Hang & Zhang, 2023), respect for cultural difference (Gritsenko et al., 2021) and the ability to form relationships across cultures (Khukhlaev et al., 2022). These are the key indicators that we use to assess an individual's level of intercultural competence in terms of their ability to interact effectively with people from other cultures and to deal with the challenges that such interaction may present. There has been a fair amount of research into intercultural competence, particularly in the educational context. Much of this has focused on the ways in which different pedagogical approaches, the use of technology and the nature of the social interaction can all contribute to the development of students' intercultural skills. This research has in turn fed into the wider discussion about global education by providing some useful recommendations for how we can develop cultural sensitivity (Fountoulakis, 2024), emotional connection (Chen et al., 2020) and meaningful intercultural learning experiences (Sarwari et al., 2024). There is however some debate as to the role of human intercultural competence in the integration of AI and language learning. Some have questioned whether AI-mediated language learning in any way impacts on students' language learning ability. Tubadji and Huang (2024) go further in arguing that AI-mediated language learning should incorporate human interaction, including intercultural competence. This study has practical implications for the development of intercultural competence in educational settings in that it underscores the importance of inclusive learning environments. An appreciation of the difficulties associated with the emotional and linguistic representation of cross-cultural learning can help to inform the work of educators, policy makers and curriculum developers in the creation of more effective strategies for the diverse student population and for the promotion of global inclusivity.

Conceptual model of the AI-mediated learning context

In this model, we view international students' interactions with AI not merely as focusing on the teaching–learning process; instead, we highlight the 'digital adaptation ecosystem'. There are three conceptual parameters, as follows:

1. AI as a cultural mediator: The AI presents itself as a cultural mediator in order to learn the language. Output quality is all about *unggah-ungguh* (the very typical Indonesian way of putting things in a polite manner).

2. Intercultural competence: Intercultural competence has a big bearing on how international students learn and use the Indonesian ways of being (e.g. *unggah-ungguh*) through linguistic, sociolinguistic and discursive competence. The competence in this area comes from a combination of skills, knowledge, critical cultural awareness and attitudes.

3. Linguistic representation: This looks at students' awareness and emotional attachment via the parameters of transitivity and emotional geography as a way of capturing their level of engagement in language learning.

AI-based learning

AI-based learning support systems are learning to deliver dynamic, individualized learning experiences that are often difficult to achieve with conventional models (Celik et al., 2024; Bozkurt et al., 2021). The way in which AI enables individualized learning is via three primary mechanisms: adjusting the difficulty of the content (Castro et al., 2024), creating bespoke learning pathways (Jiao, 2024) and automating assessment (Ali et al., 2023). The mechanisms in question are of course personalized pathways (Tapalova et al., 2022) and formative feedback (Chen et al., 2020). Mote (2024) notes that the technical affordances of such systems promote self-paced learning and that their value in a global education context extends well beyond any gains in academic performance. The benefits are clearly the adaptability, personalization and automation which in turn enables self-paced learning (Tapalova et al., 2022; Ali et al., 2023). There is of course pressure to implement these AI features. The automation of assessment and feedback will clearly reduce the administrative burden on the teacher, but it also raises the question of whether we need a 'human in the loop'. If the algorithm is so prescriptive as to remove the flexibility that is a hallmark of good learning, then we may in fact be restricting student agency and critical thinking. Jiao (2024) and Mote (2024) both point to the use of academic achievement data and data analytics in order to improve the efficacy of the system. It is essential to consider the potential for algorithmic bias in any system which is designed to be individualized. Such bias could in fact exacerbate existing educational inequalities. Prior research has shown that the use of AI in education can lead to improved knowledge retention and greater levels of engagement (Xu, 2024; Tapalova et al., 2022). In the context of global education, it is important to go beyond the simple issues of emotional inclusivity and cultural scalability. There is very little research to date on how AI mediated learning environments can be used to develop intercultural competence and emotional engagement across a range of language programs. This study is therefore one which addresses that gap and looks at the use of AI in education in the context of intercultural considerations, thereby contributing to the wider discussion around empathic learning environments.

METHOD

Rooted in narrative inquiry and the notion that human experience is best understood through narrative, this approach offers a wealth of rich, contextual data. As Barkhuizen (2019) so clearly states, narrative is co-constructed and it is the 'small stories' that are so revealing of the experience of everyday life. Theoretical grounding is in Barkhuizen's (2019) framework which is very much about the co-construction of narrative and the concept of 'narrative positioning' which looks at the way people position themselves and others within their stories (and the identities, relationships and contexts that this reflects). This is very much in line with research into intercultural competence and global education where identity and the way we relate to others across cultures is of paramount importance.

To operationalize this, Barkhuizen (2019) talks about the dynamic everyday experience as a series of small stories. The study uses a dual analytical approach: transitivity and emotional geography. Emotional geography is used to look at the relational distance and affective boundaries in terms of the positioning of the participants. It is used to map out the participants' emotional landscape of intercultural communication. Transitivity analysis is used as a linguistic parameter for the analysis of co-constructed stories. Together these two analytical approaches are used to examine how the participants' identities and intercultural competence are linguistically and affectively negotiated and constructed. Situated within this theoretical framework the study seeks to determine how the international students in Indonesia experience and negotiate their intercultural experiences through narrative inquiry in an AI mediated context. The study aims to explore the linguistic and affective nuances of the students' learning journeys in Indonesia where AI is used to shape their identity and global competence. This will provide a conceptual link to the participants' own descriptions and identities.

Participants

Seven participants from a range of different cultural backgrounds (Spain, Pakistan, China, Brazil, Australia, Egypt and Morocco) were recruited for this study. They were students at a private university in Indonesia and were taking an Indonesian language course via AI-mediated instruction. The range of nationalities and language backgrounds of the participants was a key strength of the study and allowed for a real exploration of the potential of AI to foster intercultural competence in a globalized learning environment. The study looks at the extent to which AI can be used to facilitate intercultural learning, to deal with cultural differences and to enable real intercultural engagement.

Participants were purpose sampled to ensure we had representation from a range of regions and to capture a wide variety of experiences and perspectives. One participant was contacted via WhatsApp to help recruit the rest of the participants. We took an emic approach which made it relatively straightforward to identify potential participants. We positioned ourselves as insiders and built up a very close emotional relationship with the participants. This in turn made it easier to obtain rich data as the participants were at ease with us as researchers. The study was carried out within the BIPA program at a private university in Indonesia. We of course obtained consent from all participants as this was an ethical requirement to protect their rights and privacy. The main aim of the study was to explore how international students from a variety of cultural backgrounds perceive and engage with intercultural content when using AI tools to learn the Indonesian language. Prior to the study commencing all participants were provided with a detailed explanation of the research objectives, the procedures and the ethical considerations. Each participant completed and signed a formal consent form which confirmed their voluntary participation and their understanding of the confidentiality of the data. To protect the privacy and anonymity of the participants each individual was given a pseudonym.

Table 1. *Demographic details of the participants*

No	Name	Gender	Age	Country	Indonesian Proficiency, Duration of Stay, and Prior Exposure
1.	Siti	Female	21	Spain	Beginner, 6 Months, Low (Digital Media)
2.	Mukidi	Male	22	Pakistan	Lower-Intermediate, 6 Months, Moderate (Cultural Exchange)
3.	Waginah	Female	22	China	Beginner, 6 Months, Low (Academic Interest)
4.	Suparno	Male	20	Brazil	Lower-Intermediate, 6 Months, Moderate (Social Ties)
5.	Wati	Female	21	Australia	Lower-Intermediate, 6 Months, Moderate (Previous Tourist Visit)
6.	Suwito	Male	21	Egypt	Beginner, 6 Months, Low (Peer Interaction)
7.	Fatima	Female	21	Morocco	Beginner, 6 Months, Low (Peer Interaction)

By looking at the participants' accounts and experiences in this study we are seeking to give their voices more weight in terms of the role of AI in language learning and the effect it has on their intercultural competence. Their own reflections and interactions provide some very valuable insights into the way AI in the classroom can contribute to the development of intercultural competence in a globalized world.

Data Collection

As part of the research into the integration of intercultural competence into AI-based learning as a novel approach to global education, data were gathered from seven international students studying the Indonesian Language for Foreign Speakers (Bahasa Indonesia untuk Penutur Asing/BIPA) at a private university in Indonesia. This phase of the research was designed to look at the students' experience of intercultural education and to explore the potential for technology (in particular AI-based learning) to be of benefit to global education.

Participants were selected via purposive sampling in order to meet the aims of the study. All seven of the students were students who had actually been through the BIPA program and had learned the Indonesian language and culture as part of that. They were therefore ideal sources of first hand experience in terms of the application of intercultural competence in both academic and social contexts. Potential participants were approached via a colleague who was part of the BIPA program. The invitation to take part included a full explanation of the aims of the study, the role of the participants and the ethical considerations (including confidentiality and voluntary participation). Prior to taking part, all participants provided informed consent to take part and to the extent of confidentiality.

We collected data through semi-structured interviews with seven international students from a range of cultural backgrounds. The interviews were conducted in English, transcribed, and then analyzed using an emotional geography to examine the emotional dimensions of the students' learning experiences, and transitivity analysis to examine how their language reflected their agency and engagement.

To accommodate the varying levels of Indonesian proficiency of the participants we conducted the interviews in English. Each participant had two separate interviews, each running for around 60 minutes, to allow for a really in-depth exploration of their experience. The first interview was concerned with the participants' technical interactions with the AI. The second interview was focused on the participants' stories, their emotional responses and their cultural gaps. The interviews were conducted via Zoom at a time that was convenient for the participant and were recorded so that we could then select the most vivid and rich data for transcription. The semi-structured nature of the interviews allowed us to explore the key themes in depth and also to follow up on any new areas that arose. In addition to the transcriptions, we took reflexive field notes at the time of each interview to capture the contextual detail and non-verbal cues that might not be so obvious in the audio. The participants' narrative perspectives were also cross-checked against the observational data that was gathered from their actual engagement with the AI-based learning environment. The primary aims of this were to establish what the students felt about their cross-cultural learning experiences, what they thought of AI technologies in general and whether AI could in fact help students to become more interculturally competent. This multi-pronged approach to data collection enhanced the credibility of the findings and allowed for a much more robust analysis.

Data Analysis

The data were coded using inductive analysis to identify patterns in the participants' stories and to identify critical incidents. The narratives were then developed via thematic analysis to produce specific themes. The data were then manually coded using transitivity and emotional geography codification. The analysis was conducted using Emotional Geography (Hargreaves 2001) and Transitivity Analysis (Halliday 2004) to provide a rich understanding of the participants' intercultural learning journeys from both an affective and a structural perspective. The data analysis involved multiple rounds of reading through the interview transcripts with the transcripts being systematically coded to identify the emotional and linguistic patterns. The dual approach enabled us to understand how the students were engaging with their learning, what agency they were exercising and how they were making sense of their experience in intercultural contexts. When coding the extracts we coded independently by underlining every phrase or word that indicated a transitivity or emotional geography parameter.

Emotional geography (Hargreaves, 2000) is used and broken down into five components: sociocultural, political, moral, physical and spiritual geographies. It is a framework that looks at how the context of a place influences the feelings and emotions of international students. The sociocultural aspect found that students were very much aware of the welcome they received from the community and that they did encounter some challenges and unfamiliarities in terms of the norms of the culture. One student put it thus: "I did feel welcomed, but the way things were communicated here was very indirect and that left me quite confused as to what was actually expected of me." The moral aspect relates to moments of self-reflection and personal growth. One participant commented: "Seeing their values and way of life did make me question my own and that in itself was a very valuable experience in terms of helping me to become more open-minded." The spiritual aspect refers to the sense of spiritual encouragement and connection to local tradition. A student described it as: "It was really quite powerful to be part of these ceremonies and it was as if I was re-establishing a connection with a part of myself that I'd kind of lost along the way and that really did instill a great deal of respect for our common roots." These findings all contribute to the empirical evidence of the way in which individuals adjust to the different geographical dimensions.

Table 2. *Emotional Geography Processes and Their Relation to Intercultural Competence*

EG Process	Functional Description	Participant Examples	Intercultural Competence Dimension
Personal geography	Emotion in a personal relationship	My roommate helps me so much.	It bridges the 'moral distance' that encapsulates local cultural

			wisdom such as *unggah ungguh*.
Cultural geography	Norm or cultural practice	I was shocked by the on-time culture.	It encapsulates cultural practice that connects to *unggah ungguh*.
Political geography	Participants' experience of power or status.	Sometimes, I feel unwelcome because I am from a developing country.	It accommodates international students' identities and backgrounds, helping them feel that the technology is made for them.
Physical geography	Place or time	I am so pleased to be studying at the park.	It connects international students' physical distance with their emotional bonding, which helps them stay connected to technology.
Moral geography	Conflict or awareness of a new culture or custom	I was disappointed with the group's communication.	It helps international students to maintain the harmony between the technology and cultural awareness of *unggah ungguh*.

Using transitivity analysis (Halliday, 2004) the study looked at the key clauses in the transcriptions and classified them by process type in order to look at how the participants were expressing their experience. Material processes were the most common way of describing the actual activities that they were doing as part of their learning journey (e.g. "practicing Indonesians", "attending cultural events") which is of course quite expected given that they were in Indonesia. Mental processes were used to describe the cognitive and emotional aspects of the experience (e.g. "thinking about cultural differences", "feeling overwhelmed")

and relational processes were used to describe the way in which the participants were changing in terms of their identity and sense of belonging (e.g. "I am becoming more open minded", "Indonesia is a place of learning for me").

Table 3. *Transitivity Processes and Their Relation to Intercultural Competence*

Transitivity Process	Functional Description	Participant Examples	Intercultural Competence Dimension
Material	Concrete actions and physical behavior	"Practicing Indonesian", "Attending cultural events", "Using AI tools"	Behavioral/Action: Active engagement, physical exploration, and immersion in the host culture.
Mental	Cognitive, emotive, and perceptive states	"Thinking about cultural differences", "Feeling overwhelmed", "Appreciating AI's convenience"	Affective/Cognitive: Internal processing of cultural shock, empathy, and emotional reactions.
Relational	States of being, identity, and attribution	"I am becoming more open-minded", "AI is an efficient tool", "Indonesia is a place of learning"	Identity/Perspective: Evolution of self-concept, attribution of values to the environment, and sense of belonging.
Behavioral	Physiological and psychological behavior (reflexive)	"Smiling at locals to show respect", "Nodding during conversations", "Adapting body language"	Socio-Expressive: Mastery of nonverbal cues and cultural etiquette that bridge action and thought.
Verbal	Symbolic exchange of meaning and communication	"Discussing nuances with peers", "Asking for clarification",	Communicative Agency: Negotiation of meaning, linguistic development, and the

			"Critiquing AI's limitations"	ability to express complex ideas.
	Existential	Recognition of existence, presence, or emergence	"There is a cultural gap", "The existence of emotional dissonance", "There are limitations in AI"	Ontological Awareness: Critical recognition of cultural complexity and systemic boundaries in digital learning.

By combining emotional geography with transitivity analysis, we were able to unearth the complex narratives of the participants' intercultural journeys. The emotional geography provided a much broader context for understanding the way the sociocultural environment had shaped their emotional responses. Transitivity analysis in turn provided a much more granular lens through which to examine the ways in which the participants were constructing meaning and agency through language. The study clearly highlights the need to attend to both the emotional and linguistic dimensions of intercultural education if we are to develop pedagogies that engender empathy, self-reflection and cultural understanding. To arrive at robust and rich interpretations we did peer debriefing throughout the coding process.

RESULTS

This study utilised AI-based learning frameworks to investigate the extent to which international students were able to integrate emotional geography and transitivity analysis into their intercultural learning. It looked in particular at how AI could be used to support language learning and the development of intercultural competence in students on the Indonesian Language for Foreign Speakers (*Bahasa Indonesia untuk Penutur Asing-BIPA*) program at a private university in Indonesia. The study was designed to determine the benefits and drawbacks of using AI in language learning, with a specific focus on the development of intercultural competence.

This study highlights the tension between transitivity (material and mental) and the behavioral parameters that underpin the use of AI tools for the acquisition of the Indonesian language. The emotional geography also served to capture the participants' sense of moral and sociocultural distance. The study suggests that the process of adaptation for international students is not simply one of technical language learning but is in fact a much more complex process of cultural navigation. There were, of course, a number of issues with the use of AI in this context. The primary one was the difficulty of using AI to capture the subtleties of Indonesian interpersonal communication and the sociocultural context. AI was clearly efficient and accessible, but students pointed out that the human element

of learning was irreplaceable when it came to the development of a deep level of cultural engagement and understanding. Despite these limitations, the participants did see the value in AI in terms of bridging the language gap and in enhancing their learning experience in general, particularly in areas which require a lot of repetition and instant feedback. The following is the full demographic information for each participant.

Siti: The intersection of technology and cultural authenticity

Siti describes her experience through the virtual portal which is of course an AI tool and is in a way a reflection of the geographical distance between Spain and Indonesia. It's a tool which gives her a sense of belonging and responsibility to the uniqueness of the host culture. It did immerse her in the culture but she was unable to close the gap in terms of intercultural adjustment. The gap that exists is a clear indication of the disconnect between the AI's formal, produced output and the warmth of the social interaction that is inherent in Indonesian culture. That is the fundamental limitation of AI as a replacement for human-mediated empathy.

I had a sense of wonder **[Moral] [Mental]** when I first interacted with the AI language-learning tool] Physical**]**. It was as if the system could transport me into various cultural worlds of Indonesia **[Sociocultural] [Relational]**. The AI exposed me to diverse dialects and cultural references **[Materials]**, making me feel more connected to the country. Moreover, I also experienced emotional frustration **[Moral]** when the translations of the AI seemed impersonal or overly formal. The AI's language representations **[Verbal]** occasionally failed to convey the warmth and hospitality I encountered in real-life Indonesian interactions. This emotional dissonance reflected my internal struggle to reconcile the digital medium with my physical experience of Indonesia.

As she went further, she found the AI to be absolutely invaluable in terms of expanding its vocabulary and in terms of its grasp of grammar. The problem was that it simply could not get the right feel for the warmth and hospitality that is such a key part of the Indonesian experience. The translations came across as cold, distant and extremely formal which was very frustrating for the learner. That disconnect is very apparent and it's a very real issue. It's a lesson in that whilst the tool is absolutely fantastic in terms of opening up the door to a culture and language, real understanding comes from the combination of digital innovation and real-world interaction.

Mukidi: The limitations of AI in capturing cultural nuances

Mukidi, a Pakistani student, used his critical mindset with AI integration. It offers a tool's capacity evaluation to bridge this gap.

I approached my Indonesian language learning with a critical mindset **[Moral]**, eager to compare how AI systems could bridge cultural gaps **[Political]**. Initially, I was impressed by **[Relational]** how the AI tools incorporated visual elements of Indonesian culture, such as traditional art forms and music, into the language lessons **[Sociocultural]**. However, the AI sometimes misunderstood my cultural nuances **[Verbal]** when interpreting phrases, leading to awkward or confusing exchanges. I felt disheartened **[Moral]** by how these technical hiccups caused a disconnect **[Existential]** between my expectations of cultural fluency and the AI's output **[Moral]**. My emotional geography reflected excitement for

technological advancement and disappointment when it failed to capture cultural subtleties.

He showed a clear positive relationship with the sociocultural parameters whereby the AI mediated musical and visual elements could in fact act as a bridge between his own culture and Indonesian culture. The transitivity parameter was key in terms of relating to his initial impression and suggested a greater degree of congruence between the tool's interface and his own cultural expectations. There are, however, some technical issues with respect to his sense of responsibility and the actual target of the learning process (i.e. learning about Indonesians in a more linguistic sense). This is directly related to his dissatisfaction with the AI tool itself. The failure is a failure of the verbal process and that is what creates the sense of existential dislocation. The oddity of the illustration is not down to any problem with intercultural learning per se. It's a clear demonstration of the digital mediator's inability to reproduce the nuances of human communication. AI can quite easily be used to generate visual and musical content, but it simply cannot replicate the emotional dimension of communication in terms of cultural pragmatics. That's the chasm between the letdown and the hype.

Waginah: The limitations of AI in providing authentic cultural immersion

Waginah's experience underscores an emotional state in which she focused on AI technology that intersects with the persistence of sociocultural isolation. Her story underpinned the high tension between Indonesian language acquisition and the entrenched need for language-mediated cultural empathy.

I found comfort **[Mental]** in the AI-based system's **[Physical]** ability **[Moral]** to offer personalized feedback and adjust to my learning pace. The AI recognized my struggles with pronunciation and suggested tailored exercises **[Material]** to help improve my skills. Even though my emotional experience was often mixed **[Mental]**. While I appreciated the tool's efficiency **[Relational]**, I also longed for more interactive cultural exchanges **[Political] [Relational]** that could provide a deeper understanding of Indonesian identity. The AI did not always capture the nuances of Indonesian sociocultural contexts **[Moral]**, which left me feeling distanced **[Mental]** from the true spirit of the language.

Her comfort with the physical geography was a clear demonstration of the AI's 24/7 availability in a non-judgmental space where she could trial and error. The transitivity analysis did a great job of highlighting the material process in which she saw the AI as a very effective tool. It's perfectly in line with the technology we've got and gives her that sense of academic security through the personalized feedback and comments. There was, however, a sociocultural gap which did undermine her initial sense of satisfaction. The conceptual contribution was that the AI was indeed a very effective tool in terms of Indonesian grammar and pronunciation. It didn't, however, go any way towards building a sense of intercultural belonging. The desire for human interaction is there and that suggests that AI mediated language learning is technically excellent but can't provide the authentic human to human interaction. That finding really did support the assertion that AI cannot in any way replicate the experience of living Indonesian culture.

Suparno: The tension between technological innovation and the complexity of authentic cultural representation

Suparno, a Brazilian student, experienced a movement from technological engagement to critical awareness. His story underscores how AI can bridge physical distance to create political and moral gaps through cultural representations.

I felt an immediate connection with the AI-driven language learning tools **[Physical] [Relational]**, seeing them as a bridge to linguistic and cultural immersion. The AI's use of context-driven scenarios, such as virtual tours of Indonesian cultural landmarks **[Materials]**, was particularly engaging. I was emotionally moved **[Behavior]** by how the system reflected Indonesia's multicultural identity **[Sociocultural]**. Somehow, as my learning progressed, I began questioning **[Mental]** whether the AI's representation **[Political] [Moral]** of certain cultural practices **[Verbal]** was oversimplified or inaccurately portrayed **[Moral]**. My emotional journey oscillated between joy in learning and a growing awareness of the limitations inherent in AI's cultural representations **[Professional]**.

He was talking about narrowing the physical geography parameters where the AI virtual tours were the material process in the Indonesian context. The immersion was clearly having a very strong effect on the sociocultural dimension, in terms of the Indonesian cultural identity and the way it was affecting his emotions. On the mental parameter he was actually questioning the very high level of political and moral tension. He saw a political dimension in the way that AI was mediating certain cultural practices. The technology should be used to create a growing awareness that AI should be mediating cultural fluency and that students should be made aware of the Indonesianness of the culture. It was all about the AI being able to simulate the Indonesian culture through the visual medium. The practical contribution would be to get people to engage with the technology and to develop a real sense of the culture.

Wati: The promise and limitations of AI in language learning

Wati's account is a good illustration of students' agency in relation to an imperfection in the AI-mediated language learning environment. She shows how autonomous learning can be connected to the learning tasks and to the learner's own linguistic needs, which in turn provides her with a degree of emotional resilience.

I used AI tools as a supplementary resource **(professional)** to complement my formal Indonesian classes **[physical]**. The AI systems helped me refine my vocabulary and grasp the intricacies **of the grammar [Materials]**. However, my emotional experience was tinged with frustration **[Moral] [Mental],** as I encountered occasional errors in the system's pronunciation feedback **[Moral] [Verbal]**. The inability of the AI to perfectly mimic Indonesian rhythm and tonal subtleties was a source of minor emotional distress. However, I appreciated how the system facilitated **[Political]** my deeper engagement with Indonesian culture through **[Relational]** interactive content such as traditional Indonesian stories **[Sociocultural] [Behavioral]**. My experience was a reminder of the AI's

potential, although imperfect, to contribute to cultural understanding **[Existential]**.

Her actual struggle to actively use AI as a medium of learning in Indonesia was a major professional boundary. She was thinking about how to increase her own agency in relation to her own self-directed learning. Her moral geography was also constrained by the performance of the AI. In terms of the material parameters she was using the AI as a medium of language learning outside of the classroom. The moral geography parameter was still being constrained by the limitations of the AI mediated language system. Her frustration was clearly with the AI technology itself. The verbal processes simply didn't have the rhythm of the Indonesian language and that did cause a bit of an emotional upset. On the other hand she did have a positive sociocultural parameter in that she was engaging with Indonesian culture in the form of traditional stories. The transitivity shows the relational process of her cultural immersion in the AI's pronunciation error. She was also very much focused on an intimate engagement with Indonesian identity. She made it clear that AI is an imperfect bridge but can be a very powerful tool in terms of increasing learner agency and in terms of navigating Indonesian cultural identity without any external supervision.

Suwito: The balance between technological enhancement and the irreplaceable value of human connection in language learning

Suwito's story was all about the tension between the utility of AI and its failure to capture the Indonesian flavour. It was a story about the usefulness of AI and its inability to pick up on the Indonesian idiosyncrasies. It was a story about the lack of human speech that results from the absence of the interpersonal, which is the very thing that AI is trying to remove through its technological precision. The finding was that the participants' distress at high temperatures was manifest in their Indonesian speech.

I used AI tools as a supplementary resource **(professional)** to complement my formal Indonesian classes **[physical]**. The AI systems helped me refine my vocabulary and grasp the intricacies of the grammar [Materials]. Moreover, my emotional experience was tinged with frustration **[Moral] [Mental],** as I encountered occasional errors in the system's pronunciation feedback **[Verbal]**. The inability of the AI to perfectly mimic Indonesian rhythm and tonal subtleties was a source of minor emotional distress. However, I appreciated how the system facilitated my deeper engagement with Indonesian culture through **[Relational]** interactive content **[**Behavioral] such as traditional Indonesian stories **[Sociocultural]**. My experience was a reminder of the AI's potential, although imperfect, to contribute **[Political]** to cultural understanding **[Existential].**

The professional geography parameter indicated that AI-mediated language learning could be of benefit to Indonesians in terms of language learning via task-based resources. It enabled the participant to bridge the physical geography parameter in the material process in order to achieve mastery of the Indonesian structure. It facilitated the linking of the physical geography parameter to formal classroom tasks and to autonomous learning. The moral geography parameter was, however, tied to his difficulty with the AI output. The verbal process was also complicated by the issue of the rhythm of the Indonesian pronunciation

feedback. The sociocultural geography parameter mediated via AI and traditional Indonesian stories remained an issue in terms of oral communication. This underlines the value of AI-mediated language learning which is very effective in terms of improving the mechanics of the language; it is not, however, sufficient in terms of achieving genuine resonance with intercultural competence.

Fatima: The intersection of convenience and cultural depth in AI-driven language learning

Fatima's story was all about autonomous learning in terms of technological enhancement, which was in stark contrast to a complete absence of emotional content and Indonesian digital cultural feeling. It was clear that AI-mediated language learning could assist with the logistical side of learning, but it simply didn't provide any support for the affective dimension of communication in an interpersonal context.

I felt empowered **[Moral]** by the AI's adaptive learning features **[Physical] [Material]**, which allowed me to practice Indonesian at any time. I enjoyed the flexibility and independence the tool offered **[Relational]**, but I also noticed that the AI sometimes struggled with cultural sensitivity **[Sociocultural]**. The system's translations occasionally missed key emotional undertones **[Verbal]**, which made me feel disconnected [**Mental]** from the nuances of Indonesian interpersonal communication. My emotional geography shifted between an appreciation for AI's convenience and a desire for a more human-centered approach **[Political] [Existential]** to learning that could bridge linguistic and cultural gaps **[Behavioral]**.

The participants were clearly encouraged in the physical geography dimension (the material process) as AI-mediated language learning provides them with full access to its services as per the material process. It gave them the flexibility that they associated with a rigid academic timetable. It also provided a positive experience in the professional geography dimension, giving them a sense of control and autonomy in their Indonesian language learning. The sociocultural geography dimension was the one that highlighted the complexity of the Indonesian social nuance. There was also a sense of disconnection from the technological constraints. The AI's capacity to pick up on the emotional undercurrents of language as part of the verbal parameter is a key example of the limitations of AI in the context of transactional language learning only and in the context of Indonesian cultural communication. The political dimension was the one that fostered a desire for a more human-centered approach. The findings from the seven cases in total point to three key tensions that define the AI-based Indonesian language learning experience. The first is the tension between technological convenience and cultural authenticity, with the flexibility that participants such as Siti and Fatima are able to enjoy in their learning being in direct conflict with the inauthentic cultural representations that are so often present. The second is the tension between emotional engagement and digital detachment, with participants' emotional geography shifting from one of wonder at the technological possibilities to one of emotional dissonance as they come to realise that the AI is simply not capable of replicating the warmth of human interaction. The third is the gap between linguistic progress and sociocultural

depth, with the transitivity analysis showing that whilst the AI is extremely effective in terms of the material process (i.e. the linguistic progress), it is a poor substitute for the depth of sociocultural understanding that can only be achieved through direct human contact. In short, the cross-case findings from the seven participants identify these three tensions as being at the heart of the AI-based Indonesian language learning experience.

DISCUSSION

The findings point to a fairly complicated discussion around intercultural resonance and the benefits of technology. They support the Indonesian *unggah-ungguh* that AI is a key tool for linguistic accuracy and an effective conduit for the affective dimensions of learning Indonesian. Some of the participants did indicate that AI could be used to improve learning outcomes via individualized pathways (Xu 2024) which is precisely what Fatima and Siti have said. The study was however firmly rooted in the paradigm of autonomous learning which is frequently subsumed under the umbrella of technological dissonance. Wang et al. (2024) highlight the importance of intercultural communication in the Indonesian HE context, with Suwito and Mukidi identifying a very significant gap: AI is currently not capable of bridging the affect and prosodic nuance of the language. Tubdaji and Huang (2024) speak of digital services and a humanized cultural mode. Waginah also had a rather rosy view of AI as a better cultural bridge. Broadly speaking seven of the international students are subjectively connected to the affective experience. They should not therefore be described in terms of universal outcomes but rather as academic contributions to AI developers who will then be in a position to design AI that is more human and empathetic in its approach.

The findings illustrate the way in which AI-based language learning tools interact with the development of linguistic competence and intercultural competence among international students in Indonesia. The study employed a transitivity and emotional geography approach to demonstrate how students were able to negotiate the challenges and benefits of the AI framework. The AI tools were clearly a useful adjunct to the learning process through self-directed exercises and interactive modules. The AI tools were also clearly seen to have their limitations in terms of their ability to capture the sociocultural and emotional boundaries of human interaction.

These findings are consistent with the work of Aijun (2024) and Xia et al. (2024) who have both acknowledged the use of AI in language learning but have also pointed to its shortcomings in terms of cultural representation. De La Vall and Araya (2023) go on to state that AI is often ill-equipped to deal with the subtleties of human communication, which again underlines the fact that it cannot in any way replace human learning and human interaction. AI-mediated learning was clearly effective in supporting language development and in engendering a deep sense of cultural resonance in the field of linguistics. That said, it is still reliant on the complex nature of human to human contact which AI is currently unable to replicate.

AI and automation are ultimately going to be based on human-controlled inputs that are inherently biased so they're not in themselves 'bad'. Indeed the participants may be used as a way of reducing the need for biased human decisions (both explicit and implicit bias) (Brunner & Tao, 2024). The findings from the emotional geography and transitivity analyses show that the participants' language is inextricably linked to their agency, their emotional labour and their identity negotiation. The material parameters in the participants' accounts of their interactions with the AI were consistently around 'navigating' and 'struggling' with the AI interface, which is a clear indicator of identity negotiation, emotional labour and agency. This is consistent with the view that intercultural adaptation is an active process in which students are maintaining their agency as they work to adapt to an unfamiliar technological environment. The use of relational parameters (e.g. 'feeling excluded', 'being misunderstood') when the AI fails to pick up on the politeness of the user is a clear indication of a moral gap.

In terms of practical impact the study points to a human-AI hybrid model as the way forward. AI developers should be looking at filtering their models to those that incorporate complex culturally sensitive feedback systems which can take into account the emotional dimension of real world situations (Pandey & Rai, 2024). For teachers and educators the focus should be on moving away from using AI as a teacher and towards using it as a tool to facilitate the development of skills. The emphasis should be on human mediated role play and reflection in order to bridge the gap in cultural identity. AI mediated learning will of course give students greater freedom and autonomy and thus support more holistic forms of human interaction and intercultural competence. The flip side of this is that the availability of GenAI tools is growing at a rate which far outstrips the development of institutional policies and procedures to deal with the associated academic integrity issues. This is precisely why the research is needed (Banister et al., 2024). GenAI in general is clearly having a positive impact on research, pedagogy and practice in education (Ittefaq, 2025).

Further to this, the findings have implications for the wider role of AI in education. Of course AI can provide access, efficiency and personalisation, but it can't in any way replicate the depth of human interaction that is required for cultural and emotional understanding (Tubadji & Huang, 2024). There is a need for a balanced approach in which AI is an enabler rather than a replacement for the human teacher. Future work should look at hybrid models that combine AI learning with immersive, human-centred pedagogy to maximise the development of linguistic competence and intercultural competence. Human feedback and real world interaction should be incorporated into AI learning platforms to improve students' emotional and social understanding. There is a pressing need to prioritise human mediated language learning, role play and reflection in order to close the cultural identity gap. The point is that technology should be facilitated not replaced. This would mean that international students could negotiate the identity parameter in the host culture. The platforms would support student learning autonomy via AI.

CONCLUSION

To close that gap, Indonesia's higher education institutions need to move from a functional adoption of AI to a human and culture centric approach. The host institutions need to be culturally sensitive and provide emotional support to minimise the sense of technological dissonance that international students will experience. In line with pedagogical innovation, the language programs should be in a position to mediate and integrate AI as a critical reflective tool rather than as a source of authority on cultural norms. The host institution should be in a position to encourage international students to use AI to facilitate authentic physical cultural immersion. The host university can in fact create a more inclusive and human mediated sense of cultural resonance in the digital age through intercultural communication.

This study provided an important opportunity to advance the understanding of both the potential and the limitations of AI-mediated language learning. The tools do provide instant access to linguistic resources, cultural content, and a degree of personalization. The study points to the dual nature of AI-mediated language learning in language education. The tools can provide a very personal learning experience that is very much in the realm of real-life interaction. They can improve your grammar and your pronunciation, but they cannot in any way replicate the intercultural nuances that are essential to achieving fluency in a language. To put it simply, the study shows that acquiring Indonesian is predicated on an understanding of the emotional and sociocultural norms and practices of the culture. Indonesian higher education institutions would be well advised to adopt a hybrid teaching model that combines AI with engagement in intercultural competence. It would have been better if the research had examined the integration of emotional feedback and the extent to which the sociocultural dimension of the host university could be enhanced. In the end, human interaction in the form of intercultural engagement is simply irreplaceable in the digital age.

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In the preparation of this manuscript, we utilized artificial intelligence (AI) tools for content creation with the following capacity:

- ☐ *None*
- ☐ ***Some sections, with minimal or no editing***
- ☐ *Some sections, with extensive editing*
- ☐ *Entire work, with minimal or no editing*
- ☐ *Entire work, with extensive editing*

During the preparation of this manuscript, the authors used artificial intelligence (AI) tools specifically to improve the language, grammar, and readability of the Introduction and Discussion sections. The use of these tools complied with ethical standards and guidelines for academic integrity. The final content has been thoroughly reviewed and edited by the authors to ensure accuracy, relevance, and full adherence to academic standards; the authors remain fully responsible for the paper's originality and scientific content.

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