

 Research Article

# Navigating Multilingual Communication in the Digital Age: The Role of Artificial Intelligence in Translanguaging

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## Abstract

Advancements in technology, including the development of Artificial Intelligence (AI) tools, have renewed interest in translanguaging, with a particular focus on AI's role in this context. AI is continuously and steadily developed to perform human tasks, such as thinking and responding to prompts. As a result, the transformative nature of AI has significantly impacted the education sector in ways never experienced before. This study explored how AI natural language processing (NLP) models and AI-powered tools lay a foundation for the translanguaging of Nguni languages. The study explored how the language translation tool, language learning tool, content creation tool, speech recognition tool, sentiment analysis tool, and educational tool are integral to the translanguaging discourse of the Nguni languages: isiNdebele, isiXhosa, isiZulu, and Siswati. The study was classroom-based action research in a certain South African University. Fifteen (15) participants in the study were a cohort in a postgraduate class. Data were collected using face-to-face interviews and analyzed using Thematic Content Analysis (TCA). The findings revealed that the convergence of AI and translanguaging offers benefits to learners, and that some AI-powered tools support translanguaging of the Nguni languages, although there are inequalities within the Nguni languages, with some being more dominant than others. The study also noted that the complexities embedded in the typologies of the Nguni languages in terms of suprasegmental notations and diction pose an enormous challenge in using AI for translanguaging. These findings have implications for the development of AI-powered tools appropriate for addressing the linguistic dichotomies among the Nguni languages.

**Keywords:** Translanguaging, Artificial Intelligence, AI-Powered Tools, Bantu Languages, Nguni Languages

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## 1. INTRODUCTION

Translanguaging is a multilingual practice that challenges traditional language boundaries, while artificial intelligence (AI) is the field of computer science focused on creating systems that can perform tasks requiring human-like intelligence. Together, they represent two powerful frameworks for understanding communication and technology in today's interconnected world. García and Wei (2014) underscore that translanguaging involves the fluid use of multiple languages by bilingual or multilingual speakers, emphasizing the integration of their full linguistic repertoire. It borders on the ability and process by which multilingual speakers fluidly and strategically use their entire linguistic repertoire, moving between languages without adhering to strict boundaries. While the use of AI is advancing the translanguaging of languages across the globe, Godwin-Jones (2025) notes that AI systems have less robust support for minority languages, especially for indigenous languages.

In Southern Africa, where Bantu languages, Khoisan languages, and colonial languages like English and Afrikaans coexist, translanguaging reflects the dynamic nature of communication in both formal and informal settings. Artificial intelligence, particularly through NLP tools, is increasingly applied to multilingual communication. Ruder et al. (2019) argue that AI models designed for multilingual contexts can support translanguaging by enabling more seamless interaction between languages. In Southern Africa,

this has implications for bridging communication barriers between speakers of different indigenous languages and colonial languages, as well as enhancing educational outcomes by allowing for the integration of indigenous languages into the digital space.

In translanguaging, speakers can think in multiple languages simultaneously and use their home language as a vehicle to learn academic English (García & Wei, 2014). For instance, a student can read an article in English about fixing a car, while also thinking in their brain and making connections about the process in siSwati—they use siSwati to parallel their thoughts and ideas of fixing a car expressed in English. In other words, as they read in English, they annotate in their first language to enhance understanding. This approach allows the student to grasp the overall phenomenon of fixing a car. Once the phenomenon is conceptualized through translanguaging, the student can express themselves in the local language. Translanguaging, therefore, enables students to access their full linguistic potential and repertoires, including understanding how concepts in their local languages can be successfully expressed.

Translanguaging has emerged as a dynamic concept in the study of multilingualism, especially in contexts such as Southern Africa, where linguistic diversity is both a historical and contemporary feature (Santorelli et al., 2023). Language is a key marker of identity in Southern Africa, and translanguaging practices are intertwined with the way individuals and communities navigate their multilingual identities. Kamwangamalu (2016) explores how translanguaging reflects the hybrid identities of urban Southern African youth, especially in cosmopolitan areas like Johannesburg, where multiple languages coexist.

In communities such as townships and peri-urban areas, speakers often engage in fluid language practices that defy conventional language boundaries, reflecting their complex identities shaped by migration, urbanization, and globalization (Maseko et al., 2021). Rudwick (2019) elaborates on how translanguaging facilitates social inclusion, particularly among speakers from different ethnic or linguistic backgrounds. In South Africa's diverse urban settings, translanguaging fosters social cohesion by enabling speakers to communicate across different language groups without adhering to strict linguistic hierarchies.

### 1.1. Theoretical Framework of Translanguaging

Translanguaging is often situated within the framework of post-structuralist approaches to language, which challenge traditional, static views of linguistic competence. García and Wei's (2014) foundational work on translanguaging highlights its transformative role in classrooms, allowing students to draw on their full linguistic repertoire to make meaning. In the Southern African context, this theoretical perspective is important given the colonial history of language policies, where indigenous languages were marginalized in favour of colonial languages like English and Afrikaans.

Makalela (2015) applies the concept of translanguaging to the African multilingual context, coining the term "Ubuntu translanguaging" to reflect a philosophy of interconnectedness and communal knowledge construction. According to Makalela, Southern Africa's historical multilingualism, characterized by the fluid use of multiple Bantu and other indigenous languages, resonates with the core ideas of translanguaging. This approach disrupts rigid language boundaries and reflects indigenous communication patterns that have long been present in Southern Africa.

## 2. REVIEW OF RELATED LITERATURE

### 2.1. Translanguaging in Southern Africa

The educational implications of translanguaging in Southern Africa have gained significant attention, particularly as scholars and practitioners challenge the dominance of monolingual instructional practices. Education systems in countries like Eswatini, South Africa, Zimbabwe, and Namibia have historically prioritized English (and to a lesser extent, Afrikaans), often at the expense of indigenous languages.

Heugh (2018), Probyn (2016, 2019), and Prinsloo (2019) posit that the marginalization of indigenous languages in education perpetuates inequality. Their research demonstrates that learners educated primarily in English often struggle academically, as they are forced to learn in a language that is not their home language. Translanguaging is a pedagogical tool that can mitigate these challenges (Schoeman, 2023) & (Motaung, 2024). In South Africa, research in multilingual classrooms shows that when Participants and

students fluidly shift between languages, learning is enhanced (e.g., switching between isiZulu, Sesotho, and English).

In their studies on primary and secondary education, Madiba (2014), Mbirimi (2021), and Yafele (2021) emphasize how translanguaging helps learners access content knowledge more effectively. For instance, Madiba (2014) reveals that in mathematics classrooms, students often employ their home languages to grasp complex concepts before translating their understanding into English. This process enhances cognitive engagement and comprehension, countering the perception that English-only instruction leads to better outcomes.

## 2.2. Nguni Languages

The Nguni languages are a group of Bantu languages spoken primarily in Southern Africa, including South Africa, Zimbabwe, and Eswatini. They are named after the Nguni people, who historically inhabited regions stretching from the Great Fish River in the Eastern Cape to Kosi Bay near Mozambique. During the 19th century, the Nguni-speaking communities underwent significant changes due to warfare and migration initiated by Shaka Zulu. This led to the dispersal of Nguni-speaking groups across Southern and Central Africa, influencing the formation of new states such as the Ndebele state in Zimbabwe and the Ngoni states in Tanzania, Zambia, and Malawi. One of the most distinctive features of Nguni languages is their use of click sounds, which were adopted through interactions with Khoisan-speaking peoples (Owby, 1981).

**Table 1.** Population Speaking Nguni Languages

| Country               | Language             | Language Speakers | Language Family | Language Popularity                                      |
|-----------------------|----------------------|-------------------|-----------------|--|
| Eswatini/South Africa | Swati (siSwati)      | +1.2 Million      | Nguni           | Largely spoken in Eswatini and South Africa (Mpumalanga) |
| South Africa          | isiZulu              | +12 Million       | Nguni           | Mainly spoken in KwaZulu-Natal                           |
| South Africa          | isiXhosa             | + 8 Million       | Nguni           | Widely spoken in the Eastern and Western Cape            |
| Zimbabwe/South Africa | Ndebele (isiNdebele) | +6 Million        | Bantu           | Largely Spoken in Zimbabwe and South Africa              |

The Nguni languages are spoken by approximately 28 million people across Southern Africa. As noted, these people are spread out in various countries in Southern Africa, such as South Africa, Zimbabwe, and Eswatini. Translanguaging in Nguni languages using artificial intelligence is still evolving. Researchers are working on developing AI-powered language tools to support South Africa's four Nguni languages—siNdebele, siXhosa, siZulu, and siSwati. These efforts include creating morphological analysers, part-of-speech taggers, and lemmatisers to improve machine translation and other language technologies. Additionally, AI is being integrated into translanguaging language learning to enhance communication and digital literacy. AI tools can act as cognitive prostheses, expanding human capabilities in education and supporting multimodal meaning-making.

## 2.3. Role of English in Translanguaging

English plays a complex and significant role in translanguaging practices, particularly in multilingual contexts such as Southern Africa, where colonial legacies, globalization, and language policies have made English a dominant language (Probyn, 2021). In most countries in Southern Africa, English is a global lingua franca and a dominant language with a unique function within translanguaging practices. Its role can be viewed from several perspectives. English plays a critical role in educational contexts, where it is often the primary medium of instruction. Apart from being a medium of instruction, it is an official language in most Southern African countries. This means it is used for political and administrative purposes. For instance, in Eswatini, like in other Southern countries, government official documents are written in

English, emphasizing the status of English. Furthermore, the education systems in countries like South Africa, Eswatini, Lesotho, Botswana, Zimbabwe, and Namibia tend to prioritize English in formal schooling. As a result, students learn in English, despite their fluency in their different first languages.

Translanguaging is increasingly used in classrooms to support students by allowing them to leverage English and their home languages to understand academic content better. In this sense, English is a key resource for accessing global knowledge, while translanguaging enables students to use their indigenous languages to enhance comprehension and cognitive engagement. Participants engage in many activities that deliberately encourage translanguaging, ranging from providing vocabulary in multiple languages to collaborative translation opportunities. The goal is to enforce translanguaging as a practice that can be leveraged toward supporting literacy outcomes and engagement, as well as other academic endeavors (Makalela, 2017; Probyn, 2019). For example, two students could be assigned to solve a word problem, and one might be stuck on a word in English. The two students can then use an equivalent word in their home language to make sense of what the word problem is asking of them. In group activities, students can be prompted to share with the rest of the class how something taught in English would make sense in siSwati or isiXhosa by highlighting similar and different grammatical structures between the two languages. This dual-language approach helps students to bridge the gap between their everyday linguistic experiences and the formal demands of the education system.

In many postcolonial Southern African countries, English is associated with social mobility, economic opportunities, and access to power (Tseng & Hinrichs, 2021). Fluency in English is often viewed as a pathway to success, whether in the workplace, higher education, or international settings. As a result, many people view proficiency in English as an essential component for upward social mobility (Makalela, 2017). This is a result of believing that someone fluent in English has a high intelligence quotient (IQ) and is therefore capable of performing well in the workplace. His/her communication ability becomes a promise for good leadership. It is for that reason that most African parents encourage their children to learn English as early as kindergarten. As a result, in most countries in Southern Africa, English-medium schools are preferred over non-English schools. Furthermore, English has also not lost its powerful effect. People who know and speak English well tend to command power over those struggling with the language. The power is still associated with the native speakers of the language, who assumed power when they arrived in most African countries. The language still carries the powerful traits.

Furthermore, in translanguaging practices, English often carries prestige and symbolic capital. Speakers might strategically use English to negotiate social status or gain access to certain resources while maintaining ties to their indigenous languages. The prestige is a result of the association of the language with its native speakers. Since English is a colonial language, its speakers were associated with the capital and civilization. Native speakers of English were closely associated with the means of production and prosperity of economies. Therefore, English assumed a symbolic commodity posture. It is a language that positions and leverages one to access resources.

Furthermore, the indigenous languages are unifying. People speaking the same language tend to connect by using their indigenous language as a social identity. Students can form groups in schools, colleges, and universities based on the common languages they speak. The indigenous languages are also authoritative in traditional structures and cultural activities, where traditional superiority is associated with the knowledge of the indigenous languages. Since language and culture are interwoven, traditional leaders with a good command of the indigenous language are viewed as knowledgeable in their cultures. These dual language roles reflect the tensions between embracing English for its utility and maintaining indigenous languages for cultural identity and heritage. In many multilingual settings, especially in education and professional environments, English often serves as a language bridge between speakers of different indigenous languages.

In Southern Africa, speakers of languages such as siZulu, siXhosa, siShona, and siSwati coexist, and English enables communication between all the ethnic groups. Heugh (2018) and Makalela (2015) argue that in such contexts, translanguaging often involves strategically incorporating English to facilitate communication across linguistic and cultural boundaries. In classroom settings, where students speak different home languages, Participants often rely on English to mediate instruction and negotiate meaning. In a translanguaging classroom, students are encouraged to use their entire linguistic repertoire to negotiate meaning (Heugh, 2018; Makalela, 2015). In such cases, speakers use English alongside their home languages

(e.g., switching between English and SiSwati or Zulu) to engage fully with content. This dynamic use of English as part of a broader language practice helps to create more inclusive educational environments, enabling students to access knowledge even when instruction is in English.

Madiba (2014) highlights that translanguaging allows learners to grasp complex academic concepts in their home languages before translating their understanding into English. This is particularly valuable in subjects like Mathematics and Science, where students might find it easier to discuss and explore ideas in their home language, and later express their knowledge in English. Probyn (2015) supports the view that when students are encouraged to use both their home language and English, they are able to access and demonstrate knowledge, leading to improved educational outcomes. In such contexts, English is a gateway to global knowledge and resources. Translanguaging practices enable students to move between English and their indigenous languages, creating a more fluid and integrated learning experience that reflects their linguistic realities.

As noted earlier in this paper, while English is a useful tool for translanguaging, it also perpetuates language hierarchies in many multilingual contexts. In Southern Africa, English is often associated with a higher status in formal educational contexts, while indigenous languages may be viewed as having lower status in formal settings. This tends to create a hierarchy of languages, leading to tensions within translanguaging practices, as speakers prioritize English to gain social or economic capital, sometimes at the expense of their indigenous languages (Tseng & Hinrichs, 2021)

In digital communication, English often plays a central role in translanguaging practices, particularly on social media, where users fluidly switch between languages to engage with diverse audiences. Ndhlovu (2015) highlights that Southern African youth, especially in urban areas, frequently mix English with indigenous languages in digital interactions. This translanguaging reflects their multilingual identities and allows them to participate in local and global conversations. AI-powered tools like Google Translate, Duolingo, and multilingual chatbots also facilitate translanguaging by enabling users to navigate between English and indigenous languages. However, as Heugh (2021) notes, these technologies tend to favor English, which can limit their ability to fully support translanguaging in indigenous languages due to the lack of data for many African languages.

Although English is a dominant language, translanguaging offers a way for speakers to maintain their linguistic diversity by blending English with indigenous languages. This is particularly important in informal communication, cultural expression, and identity formation. In Southern Africa, individuals frequently switch between English and indigenous languages, reflecting the region's historical multilingualism. This practice maintains linguistic diversity while acknowledging the importance of English in modern communication.

## 2.4. Benefits of Translanguaging

There are benefits of translanguaging not only in Southern Africa but across the globe. Some of the benefits are as follows:

*Cognitive Benefits:* Engaging in translanguaging can enhance cognitive flexibility and problem-solving skills, as it encourages learners to think across languages.

*Cultural Identity:* It acknowledges the role of language in cultural identity, allowing individuals to retain ties to their heritage while also navigating dominant languages.

*Dynamic Language Use:* It recognizes that bilinguals often switch between languages in natural conversation, using whichever language best expresses their thoughts.

*Improved Learning Outcomes:* In educational settings, translanguaging can support comprehension and participation, especially for learners who may struggle with standard practices focusing on monolingual approaches.

*Enhanced Communication:* It allows bilingual individuals to express themselves more fully by using all the languages they know, leading to clearer and more effective communication.

*Engagement and Motivation:* Using a mix of languages can make learning more engaging and relatable for students, increasing their motivation and participation.

*Improved Understanding:* Translanguaging can aid comprehension, especially for learners who may find certain concepts easier to understand in one language over another.

*Cognitive Flexibility:* Regularly switching between languages can enhance cognitive flexibility, problem-solving skills, and critical thinking.

*Support for Language Development:* Translanguaging can facilitate better language development by allowing learners to connect vocabulary and grammar across languages, which can lead to improved literacy skills.

*Inclusive Learning Environment:* It creates a more inclusive atmosphere in classrooms and communities, validating diverse linguistic backgrounds and experiences.

*Social Connections:* Translanguaging promotes interactions among speakers of different languages, fostering social connections and collaboration.

## 2.5. Artificial Intelligence and Translanguaging

Artificial intelligence has played a huge role in the translanguaging of Southern African indigenous languages. Applications such as multilingual chatbots, voice assistants, and language learning apps have facilitated translanguaging in educational, social, and cross-cultural communication contexts. Tzirides (2024) observes how AI-powered translation apps and voice assistants support multilingual communication in diverse social settings, such as hospitals, public service centers, and workplaces. These AI tools allow speakers of different languages to communicate more easily by providing on-the-fly translations between languages like isiXhosa, Afrikaans, and English.

While these technologies are useful, there are highlight on limitations highlighted, such as inaccuracies in real-time translation, especially when handling complex grammatical structures or cultural nuances present in Southern African languages. Devasena (2024) discusses the use of AI-enhanced language learning apps such as Duolingo and Babbel, which incorporate adaptive learning algorithms to teach indigenous African languages. These apps use AI to track users' learning progress and adapt lessons accordingly, supporting the acquisition of multiple languages for users in multilingual environments. This adaptive approach supports translanguaging practices by allowing users to draw on their existing language knowledge to learn new languages. This benefits students as they acquire the target language and internalize content. Below are some of the benefits of artificial intelligence in translanguaging.

*Language Translation:* AI-powered translation tools help individuals communicate across languages by providing real-time translations. These tools allow users to navigate conversations in multiple languages, supporting translanguaging efforts.

*Language Learning:* AI applications in language learning can adapt to a learner's proficiency in various languages, promoting translanguaging by suggesting vocabulary or grammar structures from both languages relevant to the context.

*Content Creation:* AI can assist in creating multilingual content that incorporates multiple languages, allowing for the integration of cultural references and idiomatic expressions that enhance understanding.

*Chatbots and Virtual Assistants:* AI-driven chatbots can engage users in their preferred languages, supporting translanguaging by seamlessly switching between languages as needed in conversations.

*Sentiment Analysis:* AI can analyze sentiments expressed across different languages in social media and other platforms, helping researchers understand trends in multilingual communication.

*Educational Tools:* AI can provide personalized learning experiences that facilitate translanguaging, offering resources that respect and utilize the learner's full linguistic repertoire.

*Speech Recognition:* AI-enabled speech recognition systems can better accommodate bilingual speakers by recognizing and processing code-switching in speech, making communication smoother.

*Assessment:* AI can help assess language proficiency across multiple languages, allowing educators to evaluate students' abilities in a translanguaging context rather than relying on traditional, language-segmented assessments.

## 2.6. Artificial Intelligence and Translanguaging

The integration of artificial intelligence (AI) into language practices has gained attention in multilingual regions such as Southern Africa, where translanguaging is a common communicative strategy. AI technologies, including machine translation, natural language processing (NLP), and speech recognition, enhance translanguaging practices in education, communication, and cross-cultural interaction. Mabuza (2020) explores the development of AI language models for the Zulu language, focusing on building NLP tools that can support translanguaging practices. By improving speech recognition and translation capabilities for Zulu, AI can be used to create more inclusive learning environments where students and Participants can move between languages without the barriers imposed by monolingual technologies. Similar work has been done for Sesotho and Xitsonga, but progress remains slow due to the lack of investment in indigenous language technology.

## 2.7. Artificial Intelligence Models

- a. *Rule-Based Models* – This is the earliest model, which relied on predefined linguistic rules and dictionaries. It laid the foundation for modern NLP.
- b. *Statistical Models* – These models analyze large amounts of text data and use probability-based methods to determine meaning. Examples include Hidden Markov Models (HMMs) and Conditional Random Fields (CRFs).
- c. *Neural Network-Based Models* – These are learning models that mimic human brain functions to process language. They are usually used for sequential data, but struggle with long-term dependencies.
- d. *Transformer Models* – Modern NLP models like BERT, GPT, and T5, which use attention mechanisms to process entire sentences simultaneously rather than sequentially. These models are highly effective for translation, text generation, and question answering.
- e. *Hybrid Models* – These models combine statistical and neural methods to improve accuracy and efficiency in NLP applications like speech recognition and automated summarization.

## 3. METHODOLOGY

The study was a classroom-based case study that constituted a cohort of fifteen (15) participants who were teachers doing postgraduate studies at a certain university in Southern Africa. There were ten (10) females and five (5) males. Most of the participants were experienced teachers who had taught for more than ten years. Before this study, the participants had undertaken a class project on artificial intelligence and Translanguaging. The project was one of the requirements for partial fulfillment of their degrees. Previously, they had all graduated with undergraduate degrees in different language fields. After the completion of the project, they were asked if they could participate in this study, to which they all agreed. They were all consenting adults whose ages ranged between 30 and 45 years. The current study partially drew knowledge from the project they had completed, which was in artificial intelligence and translanguaging.

### 3.1. Research Questions

The following qualitative research questions guided the study;

1. How would using artificial intelligence for translanguaging enhance communication and digital literacy?
2. What artificial intelligence-powered tools would benefit learners' translanguaging of Nguni languages?

### 3.2. Data Collection and Instruments

An interview protocol was developed by the author. Three researchers validated the instruments after minor changes in some of the questions. Overall, there were twenty questions in the protocol. Some of the questions addressed the knowledge of AI, others addressed translanguaging, and some addressed the combination of both. The participants have earlier agreed that a group face-to-face interview would suffice for this study. Protocol interview questions were validated for their rigor and trustworthiness by using an interrater concordance achieved through the engagement of three researchers. Because during the day there is usually a lot of noise in the block used by the cohort, it was agreed that the interview should take place in a conference room in the evening, when there would be less distraction. The interview took about an hour, and data saturation was achieved.

### 3.3. Data Analysis

Data were coded and analyzed using Thematic Content Analysis (TCA). Content analysis, on the other hand, is a more structured approach that can be quantitative or qualitative, often used to categorize and quantify data to identify recurring patterns. Thematic analysis involves searching across a dataset to identify, analyze, and report repeated patterns, focusing on the underlying meanings and concepts rather than just surface-level content (Terry & Hayfield, 2021). Each of the data analysis methods was useful since they helped in identifying recurring patterns while focusing on the underlying meaning.

## 4. FINDINGS AND DISCUSSION

The first research question sought to establish whether using artificial intelligence for translanguaging enhances communication and digital literacy. The participants revealed that artificial intelligence enhances communication and digital literacy. Their argument was based on the fact that dealing with multiple languages supported by technology improves the linguistic inventory of a learner and also impacts the learners' digital literacy by allowing the learners to interact in both the linguistic and digital world. One of the participants explained:

*There is no doubt that artificial intelligence enhances communication and digital literacy. Computers have impacted our lives tremendously, let alone artificial intelligence. The combination of language and technology affects both communication and digital literacy. Learners acquire new vocabulary, which could be presented in print or digital form. Therefore, artificial intelligence is important in translanguaging [Participant 2].*

This vignette shows a strong belief that the participant believes AI would not only improve communication, but it would also improve vocabulary acquisition, including digital literacy.

While the advantages of using AI in translanguaging were noted, the participants also highlighted some challenges in the Nguni languages in relation to translanguaging. First, not all Nguni languages are coded in dictionaries, causing data scarcity. Eiselen (2016) notes that the data scarcity problem is particularly acute for many indigenous languages in Southern Africa, which lack large corpora of digital text and speech data. This scarcity limits the effectiveness of AI tools such as machine translation and speech recognition systems, as they struggle to process and accurately interpret these languages. However, efforts such as the South African Centre for Digital Language Resources (SADiLaR) are attempting to build datasets for underrepresented languages, thereby improving AI tools' capacity for translanguaging.

Also, the Nguni languages are agglutinative and use too many affixes in a lexicon, each affix dealing with a linguistic aspect of tense, plurality, mood, and other cultural imperatives. That is, even though the Nguni languages are characterized by the subject, verb, and object (SVO) parameter, they differ significantly in the expression of cultural norms. For instance, in other Nguni languages like Siswati, many words can refer to the same notion. For example, die is used to refer to animate things; a cat dies, a donkey dies, but when it is a human, it becomes "passes away". A human being is said to have passed away when dead. These euphemistic expressions vary across the Nguni languages and express a very strong cultural sentiment. Lack of choosing the appropriate word upsets the situation. Similarly, AI would need to capture euphemistic undertones of all the Nguni languages.

The participants also noted that AI tools often fail to account for the cultural specificity of languages. There would be a need for cultural and linguistic sensitivity. That is, AI systems need to be culturally sensitive and reflect the linguistic and cultural realities of multilingual speakers, considering the complexities of translanguaging. AI provides basic translations and often misses the idiomatic expressions, contextual meaning, and cultural references that are integral to indigenous languages. This leads to miscommunication or the perpetuation of inaccurate representations of indigenous linguistic practices. Data scarcity is another challenge; Bantu languages typically suffer from a lack of digitized content, which restricts the development and robustness of AI applications.

The participants also noted the existing inequalities between dominant and less dominant languages. Heugh (2021) argues that AI technologies tend to privilege dominant languages, reinforcing existing inequalities in language use. These inequalities, as noted by Jeon et al (2025), present pedagogical challenges. Most AI language models are derived from high-resource languages such as English, which creates a disparity in the quality and availability of AI tools for low-resource languages like the Nguni languages.

The second research question investigated artificial intelligence-powered tools most likely to benefit learners' translanguaging of Nguni languages. The purpose of this research question was to establish participants' views regarding areas of maximum benefit to learners when using artificial intelligence-powered tools. It should be noted that part of this research question was based on the participants' project, which was briefly introduced at the beginning of the methodology section. Part of the project was to elicit artificial intelligence-powered tools. The tools participants elicited were as follows: Language Translation tools; Language Learning tools; Content Creation tools; Chatbots and Virtual Assistants tools, and Speech Recognition tools.

Most participants viewed the language translation, content creation, speech recognition, and chatbots as the most beneficial tools for translanguaging of the Nguni languages. They noted that the language translation tool helps individuals communicate across languages by providing real-time translations. These tools allow users to navigate conversations in multiple languages, supporting translanguaging efforts. The participants observed that this tool is beneficial because it helps individuals in real time. That is, the tool provides synchronous feedback, which is highly beneficial to learners.

Regarding Language Learning, the participants noted that AI applications in language learning can adapt to a learner's proficiency in various languages, promoting translanguaging by suggesting vocabulary or grammar structures from both languages relevant to the context. Since this tool focuses on vocabulary and grammar, the participants recognized it as an ideal tool for enriching vocabulary acquisition, which is crucial for effective communication.

The content creation tool was another AI tool that participants regarded as useful because it assists in creating multilingual content that incorporates multiple languages, allowing for the integration of cultural references and idiomatic expressions that enhance understanding. Most participants emphasized the importance of this tool because of its integration with culture, something the participants had earlier raised as a setback for using AI for translanguaging.

Lastly, the participant noted that chatbots and virtual assistants are useful because they engage users in their preferred languages, supporting translanguaging by seamlessly switching between languages as needed in conversations. However, they noted that the dominance of other languages over others may compromise learners' choice regarding preferred languages. Some learners' preferred languages may be less dominant and lack coding, including virtual assistants. One participant observed;

*While the virtual assistants look great in assisting learners, I am particularly concerned with the dominance of other languages over others. The less visible languages may not have been coded and, therefore, would have no virtual assistance. Learners preferring those languages may not benefit as much as those whose languages would have assistants. [Participant 11]*

From this vignette, it is noted that inequalities in the Nguni languages may be set back when using virtual assistants in translanguaging.

Overall, the use of AI in the translanguaging of Nguni languages presents both opportunities and challenges. There are possibilities of improving AI alongside the NLP models because both have the potential to achieve a long-sought educational goal in translanguaging. However, as noted by Jeon et al

(2025), the representation and coding of minority languages are ideal for advancing this exercise, including preserving these languages. Future research can focus on ways of improving AI in addressing the Nguni languages, linguistic inequalities, and the disparities in the suprasegmental features of the languages.

## 5. CONCLUSION

It can be concluded that the convergence of AI and translanguaging of the Nguni languages has positive effects on communication and digital literacy. Learners benefit from vocabulary acquisition. Furthermore, some AI-powered synchronous tools benefit learners when they engage with AI in real time. On the other hand, while AI technologies hold promise for enhancing multilingual communication and education, significant gaps exist in both the NLP models and the development of AI-powered tools appropriate for the translanguaging of the Nguni languages.

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**Research Ethics.** The study followed all ethical procedures. Participants were consenting adults, and they all agreed to participate in the study.

**Data Availability Statement.** Data used in the study can be made available in case there is a need.

**Conflicts of Interest.** There is no conflict of interest in this paper.

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**AI Usage.** Grammarly was used for language refinement.

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