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Artificial Intelligence and English Dominance in Translanguaging African Indigenous Languages

Patrick Mthethwa

Department of Curriculum and Teaching,

University of Eswatini

pmthethwa@uniswa.sz
ORCID: https://orcid.org/0000-0002-7455-9224

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ABSTRACT (10PT)

With the advancement of technologies, including the development of new artificial intelligence (AI) tools, artificial intelligence in translanguaging is a renewed concept and an aspect of investigation. Artificial intelligence because of its transformative nature has impacted our academic spheres in a way that has never been experienced before. It is continuously developed to undertake most human activities, including thinking and executing assigned human tasks. This paper discusses the leaps associated with artificial intelligence in the translanguaging of Southern African indigenous languages, including looking at the benefits and constraints. The paper argues that while the benefits of using artificial intelligence in translanguaging African indigenous languages may potentially help students in a learning environment, the lack of the natural language processing (NLP) models is a challenge for translanguaging of Southern African indigenous languages such as isiXhosa, isiZulu, siSwati, isiNdebele, and many other African languages. The paper notes that because of the rich multilingual context in Southern Africa, the coding of all the

African languages in the machine translation tools, though possible, is a mammoth task.

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1. Introduction

Translanguaging, as defined by García and Wei (2014), involves the fluid use of multiple languages by bilingual or multilingual speakers, emphasizing the integration of their full linguistic repertoire. Translanguaging entails the ability and process by which multilingual speakers fluidly and strategically use their entire linguistic repertoire, moving between languages without adhering to strict boundaries. 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, Vulić, and Søgaard (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 could be reading an article in English about fixing a car, but in their brain, they also think and make connections about the process in siSwati - they use siSwati to parallel their thoughts and notion of fixing a car expressed in English. In other words, as they read in English they subsequently annotate in their first language to enhance understanding.

This allows the student to understand the overall phenomena of fixing a car. Once the phenomenon is conceptualised through translanguaging, the student can express himself or herself in the target language. Translanguaging therefore allows students to access their full linguistic potential and repertoires.

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.

1.2 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.

1.3 Translanguaging in Education

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 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) argue that the marginalization of indigenous languages in education perpetuates inequality. Their research demonstrates that learners who are educated primarily in English often struggle academically, as they are forced to learn in a language that is not their home language. Translanguaging is positioned as a pedagogical tool that can mitigate these challenges (Schoeman, 2023) & (Motaung, 2024). In South Africa, research in multilingual classrooms shows that when teachers 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); 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. English as a Translanguaging Tool

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. In most countries in Southern Africa, English is both a global lingua franca and a dominant language that has 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 countries in Southern Africa. This means it is used for political and administrative purposes. For instance, in Eswatini, just like in the other Southern countries, government official documents are written in 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 are required to 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 both English and their home languages to better understand academic content. In this sense, English acts as a key resource for accessing global knowledge and academic texts, while translanguaging enables students to use their indigenous languages to enhance

comprehension and cognitive engagement. Teachers engage in a variety of activities that deliberately encourage translanguaging, ranging from providing vocabulary in multiple languages to collaborative translation opportunities. The goal is to get translanguaging as a practice that can be leveraged toward supporting literacy outcomes and engagement, as well as other academic endeavors. 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 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. 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. 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 to non-English medium schools. Furthermore, English has also not lost its power. People who know and speak English very well tend to command power over those who may be 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 power 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 also 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 capital and civilization. The native speakers of English were 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, using their indigenous languages as social identity. Students can form groups in schools, colleges, and universities based on the common language they speak. The indigenous languages are also authoritative in traditional structures and cultural activities. 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.

English in many multilingual settings, especially in education and professional environments, often serves as a language bridge between speakers of different indigenous languages. In Southern Africa, speakers of languages such as isiZulu, Xhosa, Shona, and Tswana coexist. English enables communication between 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 might speak different home languages, teachers often rely on English to mediate instruction and negotiate meaning. However, in a translanguaging classroom, students are encouraged to use their entire linguistic repertoire to negotiate meaning (Heugh (2018) & Makalela, 2015). Therefore, speakers use English alongside their home languages (e.g., switching between English and Sesotho 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 but need to 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 better able to access and demonstrate knowledge, leading to improved educational outcomes. In this context, English acts as 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.

While English can be a useful tool in translanguaging, it also perpetuates language hierarchies in many multilingual language 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. English tends to be used in modern settings while indigenous languages are used in traditional settings. This tends to create a hierarchy of the languages and can lead to tensions within translanguaging practices, as speakers prioritize English to gain social or economic capital, sometimes at the expense of their indigenous languages.

From a sociolinguistic perspective, English is seen as a valuable linguistic resource within the multilingual repertoires of speakers. Translanguaging allows speakers to draw on English for specific communicative functions, such as accessing formal registers, participating in global conversations, or engaging with digital content. This flexibility

aligns with the post-structuralist view of language, which rejects rigid boundaries between languages and emphasizes the fluidity of language use in real-world contexts. The use of languages in real-life contexts equips speakers with knowledge of the world and how they can interact with it.

In practice, many Southern African speakers use English strategically within translanguaging, incorporating it alongside their indigenous languages to negotiate meaning, express complex ideas, or perform specific social identities. For example, in urban areas like Johannesburg or Cape Town, speakers often mix English with local languages like Zulu or Xhosa to reflect their multilingual identities. Kamwangamalu (2016) discusses how this hybrid use of English in everyday communication showcases the dynamic nature of translanguaging, where English is not seen as a replacement for indigenous languages but rather as one part of a broader communicative toolkit that complements rather than divides the languages.

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 both 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.

Translanguaging in Southern Africa reflects the flexible use of multiple languages, including indigenous languages and English, as speakers move seamlessly between languages to communicate, learn, and construct meaning. English's role in cross-cultural communication within translanguaging practices is significant, as it often acts as a neutral language in interactions between speakers of different indigenous languages. In diverse settings like workplaces, government offices, and healthcare facilities, English serves as a common language that facilitates communication between individuals from different linguistic backgrounds.

In such contexts, translanguaging practices allow speakers to incorporate their indigenous languages into conversations while relying on English for broader understanding. Kamwangamalu (2012) emphasizes that translanguaging with English in cross-cultural communication can promote social inclusion and collaboration, as it enables speakers to draw on their full linguistic repertoire to bridge gaps and create shared meaning. The role of English in translanguaging in Southern Africa is significant due to the region's multilingual reality and the historical and socio-political dominance of English.

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 like isiZulu or Setswana, siSwati, reflecting the region's historical multilingualism. For instance, in South African townships or rural areas, conversations often involve a fluid mix of English and indigenous languages, with English being used for certain technical or formal terms while indigenous languages are used for more intimate or cultural expressions. This practice maintains linguistic diversity while acknowledging the importance of English in modern communication.

3. Challenges of English Dominance

The prominence of English in Southern Africa can also be problematic in the context of translanguaging. English's historical status as a colonial language and its continued dominance in formal settings may marginalize indigenous languages, creating language hierarchies where English is privileged over local languages. Alexander (2010) critiques the continued dominance of English in Southern Africa, arguing that while translanguaging practices can empower multilingual speakers, they can also reinforce existing inequalities if English is disproportionately favored. In some cases, speakers may feel pressured to use English more frequently in their translanguaging practices to align with societal expectations, marginalizing their indigenous languages. Thus, translanguaging involving English must be carefully navigated to avoid reinforcing colonial language hierarchies.

This dominance can lead to the erosion of indigenous languages in younger generations and formal domains like business, government, and media. Heugh (2018) and Alexander (2010) argue that while English can facilitate communication and access to global resources, it must be balanced with efforts to promote and preserve indigenous languages. Translanguaging practices can play a crucial role in decolonizing language practices by giving equal value to indigenous languages and integrating them with English in meaningful ways. Ndhlovu (2015) discusses how these translanguaging practices challenge the dominance of colonial languages, particularly among young people who use mixed language varieties like Tsotsitaal or Sheng (a mixed language that blends local African languages with English and Afrikaans elements).

4. Translanguaging and Translation

Translanguaging extends beyond translation to something where students gain an understanding of how language functions and works. Although translation activities are a way to engage in translanguaging, it’s not word-for-word translation. It’s about a student using the words and thoughts they have in their home language to make sense of English or vice versa, and then being able to respond in English or an indigenous language (Hibbert 2024). Translanguaging requires students to think about language components such as the

placement of adjectives, what cognates are in various languages, and more in multiple languages at once. In a multilingual society like in Southern Africa, students would look for a better word to use from the multiple languages they know. For instance, if the word "important" has a better cognate in isiXhosa than siSwati, students would prefer to explain the word in isiXhosa than siSwati.

Teachers don't have to know the students' home languages to help students engage in translanguaging. It does require teachers to be comfortable being learners themselves as students teach them what they know about their language/s. Teachers sometimes fear that students engage in off-task behavior when using languages the teachers don't understand; however, despite that, teachers should ensure students get back on track. For instance, a student may need to write an essay in English. They can instead start with building images that convey a storyline. Students in this process may use their indigenous languages to discuss the structure including the draft of an essay before they write it in English. In that process, translanguaging is helpful to enforce creativity.

Regardless of the home language, most students benefit from translanguaging because few use academic English at home. For instance, in Southern Africa, students hardly use academic English in their home environments. Because the environments are linguistically rich, students switch between indigenous languages to communicate. Exposure to indigenous languages like isiXhosa, siSwati, isiNdebele, and many more allows them to engage in translanguaging much more easily. More opportunities students have to use a language, whether English or not, yields a deeper understanding of the language cognates associated with language learning.

It is therefore essential to note that translanguaging in Southern Africa reflects the region's rich linguistic diversity and offers an innovative approach to language teaching, learning, and identity formation (Omidire 2022). While it has shown great promise in promoting multilingualism and educational equity, significant challenges remain in terms of policy, resource allocation, and societal attitudes toward indigenous languages.

4.1 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.

Dominant Southern African Indigenous Languages

Table 1: Main Southern Africa 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	Shona	+10 Million	Bantu	Spoken by the largest ethnic group in Zimbabwe and some parts of Mozambique.
Zimbabwe/South Africa	Ndebele (isiNdebele)	+6 Million	Bantu	Largely Spoken in Zimbabwe and South Africa
Lesotho	Sotho (Sesotho)	+6 Million	Bantu (Sotho-Tswana)	One of the official languages in Lesotho
Botswana	Tswana (Setswana)	+4Million	Bantu (Sotho-Tswana)	Official language spoken in Botswana
South Africa	Venda (Tshivenda)	+1 Million	Bantu	Spoken in the Northern part of South Africa
South Africa/ Mozambique	Tsonga (Xitsonga)	+3 Million	Bantu (Tswa-Ronga)	Spoken mainly in Limpopo Mpumalanga and Southern Mozambique
Namibia/ Botswana	Herero	+250 thousand	Bantu	Mainly spoken by people from Namibia
Namibia/ Botswana/ South Africa/ Angola	Khoisan	+250 thousand	Bantu	Click language widely spoken in Southern Africa

Quite several languages are spoken in Southern Africa. Table 1 depicts the country, the language/s spoken, the approximate number of speakers for that language, the language family, and the popularity of the language. Bantu languages refer to a large, complex linguistic grouping of peoples in Africa. Nguni languages refer to a group of Bantu languages spoken in Southeastern Africa, primarily in the coastal belt from Zululand to Ciskei in South Africa. These Nguni languages are also spoken in Eswatini and Zimbabwe but in different varieties. The common feature of the Nguni languages is that they are intelligible. For instance, someone speaking Zulu understands someone speaking siSwati or Ndebele, even though there could be minor differences in the diction.

4.2 Challenges of Implementing Translanguaging

Despite its potential benefits, implementing translanguaging as a formal educational or social practice in Southern Africa faces significant challenges. Political and ideological resistance to the use of indigenous languages, particularly in education, remains strong. For instance, post-apartheid South Africa's language policies, while officially promoting multilingualism, often still privilege English as the language of upward mobility. The same case applies to Eswatini and Zimbabwe. Alexander (2010) critiques the persistence of colonial language hierarchies, arguing that there is a discrepancy between policy and practice. Even in regions where indigenous languages are granted official status, there is often a lack of resources such as textbooks, teacher training, and curriculum development in these languages. This under-resourcing makes it difficult for translanguaging to be fully embraced as a pedagogical strategy (Charamba, 2023; Mwaniki 2016). In addition, institutional biases in favor of monolingualism persist in education systems and workplaces, where proficiency in English is often associated with competence and professionalism. In education for instance there is still a strong belief that English should be used for communication despite that both the teacher and students may be speaking the same indigenous language, allowing possibilities of communicating and teaching in an indigenous language. This limits the broader application of translanguaging in educational interactions. Translanguaging is not only an educational tool but also a critical aspect of everyday communication in Southern Africa's multilingual societies.

5. Artificial Intelligence in 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, 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.

6. Integration of AI in Translanguaging Bantu Languages

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 teachers 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.

6.1 Natural Language Processing (NLP)

Advances in AI have led to the development of NLP tools for processing Bantu languages. This includes tasks like text recognition, sentiment analysis, translation, and speech recognition. Challenges remain due to limited digitized resources, leading often to less robust NLP models for Bantu languages compared to global languages like English, Russian, Portuguese, Mandarin, and other large corpora languages.

6.2 Machine Translation

AI-powered translation tools are being developed for Bantu languages, promoting access to information across language barriers. However, the accuracy and contextual relevance of translations can be improved by incorporating translanguaging practices. Translanguaging can enhance machine translation by enabling the system to draw on cues from multiple languages, potentially leading to better contextual understanding.

6.3 Educational Technology

AI supports translanguaging in educational settings. For instance, educational platforms that adapt to the user's linguistic background provide better learning experiences for bilingual or multilingual students. Incorporating translanguaging strategies in AI educational tools facilitates deeper understanding and communication, particularly for younger learners. For instance, most students use Grammarly to ensure they are more accurate in the use of their language, and having the correct grammatical structure makes it easier for them to implement translanguaging.

7. Challenges and Limitations of AI in Translanguaging

While AI has the potential to enhance translanguaging practices in Southern Africa, several key challenges remain. Heugh (2021) argues that AI technologies tend to privilege dominant languages, reinforcing existing inequalities in language use. This issue is particularly pronounced in Southern Africa, where colonial languages like English and Afrikaans still dominate, both in technology and in education systems. Another challenge in using AI for translanguaging in Southern Africa lies in the limited development of NLP models for indigenous African languages. 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 Xitsonga, Tswana, and Khoisan languages.

Eiselen (2016) also 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 like 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.

Moreover, AI tools often fail to account for the cultural specificity of languages. Liu (2021) points out that while AI can provide basic translations, it often misses the idiomatic expressions, contextual meaning, and cultural references that are integral to indigenous languages. This can lead 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.

However, even if there was streaming data for Bantu languages, there would be a need for cultural and linguistic sensitivity. AI systems need to be culturally sensitive and reflect the linguistic and cultural realities of multilingual speakers, considering the complexities of translanguaging. For instance, Siswati uses euphemisms and metaphors which all account to the social and cultural norms of the Swazi people. Any AI system should accommodate these linguistic characteristics.

Infrastructure and accessibility challenges are also prevalent in Southern Africa. There is a need for improved digital infrastructure and accessibility in Southern Africa to fully leverage AI technologies, especially in rural and underserved communities. Another major limitation is the lack of local expertise and infrastructure needed to develop AI systems tailored to Southern African languages. Many AI projects rely on international

corporations and technologies, which may not be adequately equipped to handle the complexities of the region's linguistic diversity.

8. Research Gaps

While research on translanguaging in Southern Africa has expanded, several gaps remain. First, more empirical studies are needed to understand how translanguaging operates in rural areas, where multilingualism may function differently compared to urban settings. The focus has predominantly been on urban, middle-class contexts, overlooking the rural populations where indigenous languages are often more dominant. Second, research on translanguaging in early childhood education is sparse. Makalela (2018) suggests that introducing translanguaging practices from a young age could significantly improve language acquisition and cognitive development, but this area remains underexplored.

Furthermore, there is a need for more longitudinal studies that track the impact of translanguaging on academic outcomes over time. Short-term studies have shown positive effects, but understanding the long-term benefits of translanguaging in education could provide stronger evidence for its widespread implementation. Future research on AI in translanguaging in Southern Africa needs to focus on the development of localized AI tools that cater to indigenous languages. Investment in data collection for underrepresented languages and collaboration between linguists, technologists, and local communities is essential to building effective AI systems that support the translanguaging of the Southern African indigenous languages.

Also, research should explore the ethical implications of AI in translanguaging, particularly in terms of how AI technologies may reinforce or disrupt language hierarchies, ensuring that AI supports equitable language practices and does not marginalize indigenous languages further. Furthermore, more empirical studies are needed to understand how AI-enhanced translanguaging practices affect learning outcomes and social integration in multilingual communities. Longitudinal studies tracking the impact of AI on language acquisition and translanguaging in both educational and none educational settings could provide valuable insights for educators and policymakers.

9. Conclusion

The use of AI in translanguaging practices in Southern Africa presents both opportunities and challenges. While AI technologies hold promise for enhancing multilingual communication and education, significant gaps in the development and application of AI for indigenous languages must be addressed. As AI continues to evolve, these technologies must be designed to support rather than undermine the rich linguistic diversity in Southern Africa. The intersection of AI and translanguaging in Bantu languages has the potential to enhance communication, education, and cultural preservation. While there are significant

challenges to address, collaborative efforts between technologists, linguists, and local communities can lead to a more inclusive and equitable future for Bantu languages in the digital age. As AI continues to evolve, it will be essential to ensure that it serves the needs and interests of the diverse linguistic communities in Southern Africa.

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