



Artificial Intelligence and Tshivenda Proverbs: Exploring technological approaches to documentation, interpretation, and language teaching

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ABSTRACT

Tshivenda proverbs are a central element of Venda oral tradition, encapsulating moral values, social norms, and indigenous knowledge. Traditionally transmitted orally, these proverbs face challenges in accessibility, continuity, and intergenerational transmission, particularly among younger speakers and Tshivenda-speaking diaspora communities. Recent developments in Artificial Intelligence (AI) present new opportunities to digitally document, interpret, and teach Tshivenda proverbs, thereby bridging oral traditions and contemporary educational contexts. This study explores the potential of AI to support the preservation, semantic interpretation, and pedagogical use of Tshivenda proverbs, while also examining associated cultural and ethical concerns. Based on digital humanities, computational linguistics, and Indigenous Knowledge Systems (IKS), the study adopted a qualitative exploratory research design. Data were generated through the development of a pilot AI prototype for analysing selected Tshivenda proverb corpora, semi-structured interviews with language educators, and participant feedback on AI-generated interpretations. The findings indicate that AI can improve semantic parsing, contextual explanation, and interactive learning, making the Tshivenda proverbs more accessible and engaging for contemporary learners. However, concerns emerged about the loss of performative and situational meaning, the risk of cultural misinterpretation, and ethical issues related to the ownership and representation of indigenous knowledge. The study concludes that AI can meaningfully support the preservation and teaching of Tshivenda proverbs if guided by culturally grounded, linguistically sensitive, and ethically responsible design principles. The study contributes to scholarship by expanding interdisciplinary knowledge on the intersection of artificial intelligence, indigenous languages, and oral literature.

Keywords: Tshivenda Proverbs, Artificial Intelligence, Indigenous Knowledge Systems, Language Preservation, Digital Humanities.

INTRODUCTION

As stores of cultural knowledge, moral instruction, and social control, proverbs are a crucial component of African oral traditions.¹ Proverbs serve as moral guidelines, teaching aids, and communication tools

¹ Kwesi Yankah, *Speaking for the Chief: Okyeame and the Politics of Akan Royal Oratory* (Indiana University Press, 1995); Ruth Finnegan, *Oral Literature in Africa*, vol. 1 (Open Book Publishers, 2012).

for the Tshivenda-speaking society. They impart wisdom through the use of figurative language and performance that are relevant to the setting.² These proverbs have historically been orally passed down in families, schools, and community meetings, depending on gestures, performance, tone, and situational clues to express their intended meaning.³

Traditional teaching and recordkeeping approaches have drawbacks despite their cultural importance. Accessibility is limited by oral transmission alone, especially for younger generations, urban learners, and members of the diaspora.⁴ Additionally, when proverbs are written or recorded digitally, it can be difficult to preserve linguistic complexity, semantic meaning, and performative context.

Digital technology and artificial intelligence (AI) present new ways to tackle these issues.⁵ The documentation, interpretation, and educational transmission of Tshivenda proverbs can be aided by AI tools such as natural language processing, machine learning, and interactive chatbots. In addition to facilitating intergenerational knowledge transfer and language preservation, these technologies provide semantic analysis, context-aware interpretation, and interactive learning experiences.⁶

However, there are serious issues with contextual accuracy, ethical use, and cultural integrity brought up by AI integration. When digitizing traditional knowledge, Indigenous Knowledge Systems (IKS) frameworks place a strong focus on respect for cultural authority, community ownership, and participatory validation.⁷ To ensure that technological interventions improve rather than distort Tshivenda proverbs, AI applications must be built with care.

This study explores the potential of AI to document, interpret, and teach Tshivenda proverbs, examining both the opportunities for innovation and the challenges of preserving linguistic, cultural, and ethical authenticity. It seeks to contribute to the growing discourse on technology-mediated language preservation and education in African indigenous contexts.

LITERATURE REVIEW

This literature review examines African proverbs as cultural and educational resources, the challenges of their digital documentation, and the implications of Artificial Intelligence for indigenous language preservation and pedagogy. The review is structured to progressively move from cultural foundations to technological and educational considerations, thereby aligning with the study's objectives of exploring how AI can document, interpret, and teach Tshivenda proverbs in culturally sensitive ways.

African Proverbs as Cultural and Educational Resources

African proverbs serve as instructional aids in oral communities and are commonly acknowledged as concise statements of indigenous knowledge, moral philosophy, and social conventions.⁸ Proverbs, which are frequently used as authoritative references in social control and decision-making, convey ideals associated with respect, collective responsibility, ethical behaviour, and dispute resolution in African cultures. They are useful resources for informal education and moral instruction because of their succinctness and use of metaphorical language, which effectively convey complicated concepts.

Proverbs are essential to socialization, education, and cultural continuity in Tshivenda-speaking communities.⁹ Elders have long used proverbs to counsel younger generations, settle conflicts, and uphold proper social conduct. Shared understanding of proverbs' meanings and suitable circumstances

² M. E. R. Mathivha, *Zwivhuya Zwa Vhavenda* (M. E. R. Mathivha Publishers, 2001).

³ Wolfgang Mieder, *Proverbs: A Handbook*, vol. 488 (Greenwood Press Westport, CT, 2004).

⁴ Herman Batibo, *Language Decline and Death in Africa: Causes, Consequences, and Challenges*, vol. 132 (Multilingual Matters, 2005).

⁵ M. Deegan and W. McCarty, *Collaborative Research in the Digital Humanities* (Ashgate, 2012); Roopika Risam, *New Digital Worlds: Postcolonial Digital Humanities in Theory, Praxis, and Pedagogy* (Northwestern University Press, 2018).

⁶ David Crystal, "Language Death" (Cambridge, 2000); M. Terras, "Digital Humanities and the Computational Turn," in *Collaborative Research in the Digital Humanities*, ed. M. Deegan and W. McCarty (Ashgate, 2011), 1–18.

⁷ Linda Tuhiwai Smith, *Decolonizing Methodologies: Research and Indigenous Peoples* (Zed Books Limited, University of Otago Press, 1999).

⁸ Yankah, *Speaking for the Chief: Okyeame and the Politics of Akan Royal Oratory*; Finnegan, *Oral Literature in Africa*.

⁹ Mathivha, *Zwivhuya Zwa Vhavenda*.

indicates cultural competency and group membership, which further fortifies communal ties. Proverbs serve as living cultural practices ingrained in daily conversation and linguistic artifacts.

African proverbs are metaphorical and context-dependent by nature. Shared cultural knowledge, situational context, and performative components including tone, gesture, and audience participation are frequently used in interpretation.¹⁰ This richness enhances their ability to communicate, but it also makes it more difficult to teach and retain proverbs outside of their traditional contexts. The goal of the study was to establish the cultural and pedagogical relevance of Tshivenda proverbs as a basis for any technological intervention, and this debate tackles that goal.

Digital Documentation and the Study of Proverbs

In response to dwindling oral transmission, researchers have looked for ways to record and preserve proverbs, building on their cultural significance. The preservation of African proverbs has been greatly aided by traditional documentation techniques, such as print collections and audio recordings. However, according to Finnegan, these methods frequently portray proverbs as static textual entities that are disconnected from their social and performative contexts.¹¹ In response to dwindling oral transmission, researchers have looked into ways to record and preserve proverbs, building on their cultural significance. The preservation of African proverbs has been greatly aided by traditional documentation techniques, such as print collections and audio recordings. However, according to Finnegan, these methods frequently portray proverbs as static textual entities that are disconnected from their social and performative contexts.¹²

Digital humanities frameworks offer alternative approaches that integrate linguistic data with contextual metadata, multimedia elements, and interactive platforms.¹³ These methods allow for more nuanced representations of proverbs, capturing variations in usage, interpretation, and performance. For Tshivenda proverbs, digital documentation has the potential to improve accessibility for learners, educators, and diaspora communities while supporting long-term preservation.

Despite these benefits, academics warn that cultural continuity cannot be guaranteed by digitization alone. Digital repositories have the potential to oversimplify or distort proverb meanings if they are not contextualized carefully.¹⁴ This section supports the investigation of AI-based solutions by supporting the study's goal of analyzing current digital proverb preservation strategies and pointing out their shortcomings.

Artificial Intelligence, Language Technologies, and Indigenous Knowledge

Recent research has looked to artificial intelligence as a way to improve linguistic analysis and educational engagement in response to the shortcomings of traditional digital documentation. AI systems can now analyze metaphor, semantic structure, and contextual variation due to developments in machine learning and natural language processing. This makes them especially applicable to languages with a high proverbial content.¹⁵ Beyond static digital archives, AI-driven solutions can facilitate automated analysis, adaptive learning, and interactive interpretation.

However, there are serious ethical and epistemological issues in applying AI to IKS. Indigenous knowledge may not fit traditional data-driven AI models since it is socially held, culturally located, and managed by community standards.¹⁶ Researchers caution that if AI systems are designed without significant community involvement and cultural validation, they run the risk of cultural misunderstanding or epistemic marginalization.

This section directly addresses the study's objective of exploring the potential and challenges of using AI to interpret and analyse Tshivenda proverbs. It situates AI within broader debates on

¹⁰ Mieder, *Proverbs: A Handbook*.

¹¹ Finnegan, *Oral Literature in Africa*.

¹² Finnegan, *Oral Literature in Africa*.

¹³ Deegan and McCarty, *Collab. Res. Digit. Humanit.*

¹⁴ Risam, *New Digital Worlds: Postcolonial Digital Humanities in Theory, Praxis, and Pedagogy*.

¹⁵ Crystal, "Language Death"; Terras, "Digital Humanities and the Computational Turn."

¹⁶ Marie Battiste, "Indigenous Knowledge and the Politics of Education" (Canadian Scholars' Press, 2002); Smith, *Decolonizing Methodologies: Research and Indigenous Peoples*.

indigenous knowledge preservation, highlighting the need for culturally grounded and ethically responsible technological design.

Pedagogical Implications of Technology-Mediated Proverb Learning

The use of proverbs in education is still a crucial issue, even after documentation and interpretation. African educational approaches have historically relied on proverbs to foster experiential learning, critical thinking, and moral reasoning.¹⁷ Deeper cognitive and cultural knowledge is fostered by their interpretive nature, which motivates students to actively interact with language and context.

Technology-mediated learning environments provide opportunities to extend these pedagogical functions into formal and informal educational settings. Multimodal materials, such as audio narration, contextual explanations, and interactive prompts, can be included on digital platforms to enhance comprehension and encourage student participation. These settings are further improved by artificial intelligence, allowing dialogic engagement, responsive feedback, and personalized learning pathways.

Nevertheless, scholars emphasise that pedagogical use of AI must preserve the interpretive openness and cultural grounding of proverb learning. Over-standardisation of meanings may undermine the dialogic and situational nature of proverbs. This section aligns with the study's objective of evaluating how AI can be used pedagogically to teach Tshivenda proverbs while maintaining their cultural and educational integrity.

METHODOLOGY

The studied literature emphasizes the cultural importance of Tshivenda proverbs, the shortcomings of traditional digital recordkeeping, and the new possibilities of artificial intelligence for teaching and preserving indigenous languages. However, it also highlights important issues with cultural interpretation, contextual integrity, and ethical responsibility when integrating technology into IKS. In light of these revelations, the current work used a technique intended to investigate AI applications for Tshivenda proverbs while maintaining sensitivity to linguistic, cultural, and ethical factors noted in earlier research.

Research Design

The study uses a qualitative exploratory research design and is informed by IKS frameworks, digital humanities, and computational linguistics. Given the study's goal of examining a new and understudied field, that is, the use of AI in the recording, interpretation, and instruction of Tshivenda proverbs, this design is appropriate. Proverbs' figurative and context-dependent nature, as noted in the literature, calls for an interpretive method that can capture complex meanings rather than only measuring linguistic traits. The exploratory design allows for flexible engagement with both technological tools and human perspectives, aligning with scholarship that emphasises contextual understanding and participatory validation in indigenous knowledge research.¹⁸

Data Sources and Corpus Selection

The study used a purposefully chosen corpus of Tshivenda proverbs from published collections and community-validated sources, informed by their figurative and context-dependent nature. Commonly used proverbs with obvious cultural significance and educational value were given preference in the selection criteria. Using this method ensured that the data represented genuine language use and culturally entrenched meanings. Concerns expressed in the literature about decontextualization and misrepresentation in digital proverb archives are addressed by employing a curated corpus.¹⁹ Contextual remarks were included with the proverbs whenever available to facilitate an in-depth AI analysis.

¹⁷ Yankah, *Speaking for the Chief: Okyeame and the Politics of Akan Royal Oratory*.

¹⁸ Battiste, "Indigenous Knowledge and the Politics of Education"; Smith, *Decolonizing Methodologies: Research and Indigenous Peoples*.

¹⁹ Finnegan, *Oral Literature in Africa*; Risam, *New Digital Worlds: Postcolonial Digital Humanities in Theory, Praxis, and Pedagogy*.

AI Prototype Development and Analytical Procedures

To address the limitations associated with static forms of digital documentation, the study developed a pilot AI prototype designed to analyse and generate interpretive explanations of selected Tshivenda proverbs. The prototype functioned as an exploratory language-processing tool aimed at identifying semantic relationships, contextual indicators, and metaphorical patterns within the proverb corpus. Its development was informed by principles of computational linguistics and natural language processing (NLP), particularly approaches concerned with figurative language interpretation and contextual meaning-making. Recent scholarship in AI and NLP further supports the use of computational approaches in the preservation of indigenous and low-resource languages by demonstrating how machine learning systems, semantic modelling, and large language models can help with linguistic documentation, contextual interpretation, and digital accessibility.²⁰ Recent studies also emphasise that AI systems designed for indigenous languages must prioritise cultural sensitivity, community participation, and contextual awareness rather than relying solely on data-driven automation.²¹

The proposed prototype was conceptualised as a web-based interactive system capable of receiving Tshivenda proverb inputs and generating explanatory outputs through automated text analysis. The system architecture included a proverb database, a semantic analysis module, and an interpretation interface that allowed users to interact with generated meanings and contextual explanations. Recent developments in multilingual NLP and indigenous language technologies suggest that interactive and community-oriented AI systems are increasingly effective in supporting under-resourced languages through adaptive semantic analysis and culturally informed digital interfaces.²²

The prototype relied on basic NLP techniques, including keyword extraction, semantic association, and pattern recognition, to process proverb texts and generate preliminary interpretive outputs. Contextual keywords within each proverb were analysed in relation to broader thematic categories, such as morality, social behaviour, responsibility, wisdom, and communal relations. The system also identified recurring metaphorical structures commonly found in Tshivenda oral expressions to assist in producing context-sensitive explanations. The analytical process involved tokenising proverb texts into smaller linguistic units, identifying recurring lexical items, and mapping them against pre-established thematic categories derived from the proverb corpus. A rule-based semantic framework was proposed to assist the system in recognising culturally significant concepts, symbolic references, and recurring moral themes commonly associated with Tshivenda oral traditions. Recent NLP scholarship highlights that semantic pipelines, contextual embeddings, and culturally adaptive translation systems can improve the interpretation of indigenous linguistic material while reducing risks associated with literal or culturally detached machine interpretation.²³

Rather than presenting AI-generated interpretations as fixed or definitive meanings, the system was intentionally designed to provide interpretive suggestions intended to stimulate reflection, discussion, and further cultural engagement. This approach acknowledges the contextual and performative nature of Tshivenda proverbs, whose meanings often depend on social setting, speaker intention, tone, and audience interpretation. In this sense, the AI prototype was positioned as a supportive educational and analytical tool rather than a replacement for indigenous cultural knowledge

²⁰ Melissa Gasparotto, "Fostering Linguistic Justice in Digital Spaces: Using Indigenous Methods in the Study of NLP," *Emerging Media* 3, no. 1 (2025): 13–22; Claudio Pinhanez et al., "Harnessing the Power of Artificial Intelligence to Vitalize Endangered Indigenous Languages: Technologies and Experiences," *ArXiv Preprint ArXiv:2407.12620*, 2024; Burgert Senekal and Susan Brokensha, "The Potential of Artificial Intelligence (AI) for Decolonising Education in South Africa through the Development of Indigenous Languages," *South African Journal of African Languages* 43, no. 3 (2023): 208–15.

²¹ Uma Pradhan and Joyeeta Dey, "Language, Artificial Education, and Future-Making in Indigenous Language Education," *Learning, Media and Technology* 50, no. 2 (2025): 235–48; Steven Bird, "Must NLP Be Extractive?," in *Proceedings of the 62nd Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)*, 2024, 14915–29.

²² Vincent Koc, "Generative AI and Large Language Models in Language Preservation: Opportunities and Challenges," *ArXiv Preprint ArXiv:2501.11496*, 2025; Uchechukwu Ajuzieogu, "Multimodal Generative AI for African Language Preservation: A Framework for Language Documentation and Revitalization" (2022), <https://doi.org/10.13140/RG.2.2.23144.99842>.

²³ Luis Vitor Zerkowski and Nina S T Hirata, "Uncovering Latent Connections in Indigenous Heritage: Semantic Pipelines for Cultural Preservation in Brazil," *ArXiv Preprint ArXiv:2508.10911*, 2025; Mahfuz Ahmed Anik et al., "Preserving Cultural Identity with Context-Aware Translation Through Multi-Agent AI Systems," in *Proceedings of the 1st Workshop on Language Models for Underserved Communities (LM4UC 2025)* (Stroudsburg, PA, USA: Association for Computational Linguistics, 2025), 51–60, <https://doi.org/10.18653/v1/2025.lm4uc-1.7>.

or human interpretive authority. Users who interact with the prototype would therefore be presented with multiple possible interpretations, contextual prompts, and thematic explanations rather than a single authoritative definition. The system was further designed to encourage user participation by allowing educators, students, and community members to compare AI-generated outputs with culturally grounded interpretations provided by holders of human knowledge. Recent studies on AI-assisted indigenous language revitalisation argue similarly that collaborative and community-centred AI frameworks are essential to ensure trust, interpretive flexibility, and ethical language preservation practices.²⁴

Therefore, the design of the prototype aligns with Indigenous Knowledge Systems frameworks and existing scholarship cautioning against the standardisation or decontextualisation of oral traditions through digital technologies. By foregrounding interpretive openness and cultural sensitivity, the system sought to complement traditional modes of proverb teaching while expanding accessibility for contemporary learners and digital users. In addition, the prototype was envisioned as a scalable digital preservation tool that could eventually incorporate multimedia features such as audio recordings, pronunciation guides, contextual storytelling, and elder commentary in order to preserve both the linguistic and performative dimensions of Tshivenda proverbs. Contemporary research in multimodal AI and indigenous language preservation further demonstrates that combining text, audio, narrative context, and community-generated data can significantly improve the cultural authenticity and educational value of digital language preservation systems.²⁵

Participant Selection and Data Collection

Using purposive sampling, the study included fifteen (15) participants, including five (5) language teachers and ten (10) Tshivenda speakers, drawing on the relevant pedagogical and ethical issues. The Tshivenda speakers from Limpopo Province, Vhembe District, Dzwirani Village comprised two (2) students, three (3) linguists, and five (5) community elders with experience in the use and interpretation of traditional proverbs. The participants included teachers who teach indigenous languages and people who know how to use traditional proverbs. Semi-structured interviews and interactive sessions in which participants interacted with AI-generated proverb interpretations were used to gather data. Semi-structured interviews allowed participants to consider the AI outputs' accuracy, cultural suitability, and educational value while allowing for the emergence of unexpected discoveries.

Data Analysis

Interview data and participant feedback were analysed using thematic analysis, focusing on recurring themes related to semantic accuracy, cultural representation, pedagogical value, and ethical concerns. This approach is consistent with qualitative methods commonly used in digital humanities and indigenous knowledge research, where meaning and interpretation are central analytical concerns. Themes identified in the data were then examined in relation to the study's objectives and the conceptual issues raised in the literature review, ensuring coherence between theoretical grounding and empirical findings.

Ethical Considerations

According to the frameworks of Indigenous Knowledge Systems emphasised in the literature, ethical considerations were integral to the design of the research.²⁶ Participants were informed of the objectives of the study and their consent was obtained prior to data collection. The study acknowledges communal ownership of indigenous knowledge and positions AI outputs as exploratory rather than definitive representations of Tshivenda proverbs. Special care was taken to avoid cultural appropriation,

²⁴ Gasparotto, "Fostering Linguistic Justice in Digital Spaces: Using Indigenous Methods in the Study of NLP"; Pinhanez et al., "Harnessing the Power of Artificial Intelligence to Vitalize Endangered Indigenous Languages: Technologies and Experiences."

²⁵ Ajuzieogu, "Multimodal Generative AI for African Language Preservation: A Framework for Language Documentation and Revitalization"; Bishnu Maya Joshi, Shambhu Prasad Khatiwada, and Rajendra Kumar Pokhrel, "Influence of Socioeconomic Factors on Access to Digital Resources for Education," *Rupantaran: A Multidisciplinary Journal* 8, no. 01 (2024): 17–33.

²⁶ Battiste, "Indigenous Knowledge and the Politics of Education."

misrepresentation, or the extraction of knowledge without contextual respect. These measures directly respond to ethical concerns surrounding AI and indigenous knowledge identified in the literature.

PRESENTATION OF FINDINGS AND DISCUSSION

The results of semi-structured interviews and participant interactions with the AI prototype, intended to analyze and understand Tshivenda proverbs, are presented and discussed in this section. The analysis is interpreted and arranged thematically according to the objectives of the study. The section illustrates how artificial intelligence simultaneously facilitates and hinders the preservation and educational application of indigenous oral traditions by fusing factual data with academic viewpoints.

AI-Supported Semantic Interpretation of Tshivenda Proverbs

Findings show that the AI prototype could produce comprehensible and semantically interpretable Tshivenda proverbs. Participants agreed that, especially for users who had no prior experience with proverb usage, the method was successful in identifying key moral teachings and thematic implications. One educator observed:

“The system explains the proverb in a way that a learner can immediately understand the lesson, even if they have never heard it before.”

This finding supports literature on natural language processing and digital humanities, which suggests that AI can assist in semantic parsing and metaphor recognition in figurative language.²⁷ As discussed, AI’s computational capacity enables it to function as an entry point into complex linguistic material.

However, the participants did point out that AI interpretations frequently generalized meanings and failed to catch subtleties unique to a given situation. Scholarly claims that proverb meanings are essentially mutable and influenced by situational use are reflected in this restriction.²⁸ Therefore, the results corroborate the study’s stance of AI as a supporting interpretative tool by indicating that it works best when used for introductory semantic scaffolding as opposed to authoritative interpretation.

Pedagogical Accessibility and Learner Engagement

Participants consistently emphasised the pedagogical value of AI-supported proverb learning, particularly in relation to learner engagement and accessibility. Educators highlighted those digital and interactive formats resonated strongly with younger learners and those learning Tshivenda outside traditional communal contexts.

One participant noted:

“Learners today are digital. When the proverb comes with explanation and interaction, they become more interested than when it is just written on the board.”

This finding aligns with arguments that technology-mediated learning environments can revitalise indigenous language education by aligning traditional content with contemporary learning preferences. The interactive nature of the AI prototype mirrors, to some extent, traditional proverb teaching practices that encourage inquiry and reflection rather than direct instruction.²⁹

Nevertheless, participants stressed that AI should complement rather than replace educator-led instruction. This reinforces constructivist pedagogical perspectives and underscores the continued importance of guided interpretation in proverb learning.

Contextual and Performative Dimensions of Meaning

A major theme emerging from the data relates to concerns about the loss of performative and situational meaning when proverbs are mediated through AI. The participants repeatedly emphasised that the interpretation of proverbs is highly dependent on social context, tone, gesture, and audience.

²⁷ Crystal, “Language Death”; Terras, “Digital Humanities and the Computational Turn.”

²⁸ Mieder, *Proverbs: A Handbook*; Finnegan, *Oral Literature in Africa*.

²⁹ Yankah, *Speaking for the Chief: Okyeame and the Politics of Akan Royal Oratory*.

As one participant explained:

“A proverb spoken at a family meeting is different from the same proverb spoken to a child. The machine does not see that situation.”

This finding strongly supports the literature, which identifies African proverbs as performative cultural practices rather than static linguistic expressions.³⁰ The study confirms that while AI can preserve textual content and provide interpretive guidance, it cannot fully capture embodied and situational dimensions of meaning.

Rather than undermining the value of AI, this limitation highlights the need for hybrid approaches that combine technological tools with cultural instruction and contextual explanation.

Cultural Authority, Ethical Ownership, and Trust in AI Systems

Ethical concerns about cultural authority and ownership emerged as a significant theme. Participants expressed unease with AI systems that present interpretations as definitive, noting that proverbs are traditionally mediated by elders and community knowledge holders.

One participant stated:

“Proverbs belong to the community. A computer should not speak as if it knows more than the elders.”

This concern aligns closely with Indigenous Knowledge Systems scholarship emphasising communal ownership and culturally situated authority, as discussed in the literature review.³¹ The findings suggest that trust in AI systems depends on their transparency, cultural positioning, and acknowledgement of human interpretive authority. Participants advocated for AI designs that foreground community involvement and explicitly present interpretations as provisional and dialogic. This reinforces the ethical imperative for participatory AI development in indigenous contexts.

Reframing AI as a Complementary Tool for Preservation and Teaching

Across all thematic areas, participants consistently framed AI as a complementary rather than a substitutive tool. AI was considered useful for increasing access, supporting learning, and preserving linguistic material, but insufficient as a standalone medium for cultural transmission. One educator summarised this perspective:

“AI can help us keep the proverbs alive, but it must work with the people, not instead of them.”

This finding synthesises insights from the literature review, which argues for integrating digital innovation with Indigenous Knowledge Systems rather than allowing technology to dominate cultural processes. The study contributes empirical support for a hybrid cultural preservation model in which AI enhances, but does not replace, traditional modes of knowledge transmission.

Synthesis of Findings in Relation to Study Objectives

Taken together, the findings demonstrate that AI can meaningfully support the documentation, interpretation, and pedagogical use of Tshivenda proverbs, thereby addressing the study’s objectives. At the same time, the results confirm scholarly concerns about contextual loss, ethical authority, and cultural misrepresentation. By empirically validating both opportunities and constraints, this study extends existing literature on digital humanities and preservation of indigenous languages. It offers a culturally grounded perspective on how AI technologies can be responsibly integrated into African oral traditions, balancing innovation with respect for cultural continuity.

³⁰ Mathivha, Zwivhuya Zwa Vhavenda; Mieder, *Proverbs: A Handbook*.

³¹ Battiste, “Indigenous Knowledge and the Politics of Education”; Smith, *Decolonizing Methodologies: Research and Indigenous Peoples*.

RECOMMENDATIONS

Based on the findings and conclusions of the study, the following recommendations are proposed.

Culturally Grounded AI Design: AI systems developed for indigenous language preservation should incorporate Indigenous Knowledge Systems principles from the outset. This includes community participation in data selection, interpretation validation, and content governance. Elders and language experts should be involved as cultural authorities to ensure that AI-generated outputs respect contextual meaning and cultural norms.

Integration of Multimodal and Contextual Features: To address the loss of performative meaning, future AI applications should integrate multimodal elements such as audio narration, situational examples, and cultural annotations. These features can help approximate aspects of traditional oral performance.

Pedagogical Integration in Indigenous Language Education: Educators should be encouraged to integrate AI-supported proverb tools into formal and informal learning environments as supplementary resources. Such tools should be used to stimulate discussion, reflection, and interpretive dialogue rather than to present fixed meanings. Teacher training programmes may also include guidance on ethical and sound pedagogical use of AI in indigenous language instruction.

Ethical Governance and Knowledge Ownership: Clear ethical guidelines should govern the digitisation and AI-mediated use of Tshivenda proverbs. These guidelines should acknowledge communal ownership of indigenous knowledge, ensure transparency in AI interpretation processes, and prevent commercial exploitation without community consent.

CONCLUSION

This study explored the potential of AI in the documentation, interpretation, and teaching of Tshivenda proverbs within contemporary educational and digital contexts. Grounded in digital humanities, computational linguistics, and IKS, the study sought to examine how AI technologies can support the preservation of Tshivenda oral traditions while remaining sensitive to cultural, linguistic, and ethical considerations. The research was motivated by growing concerns about the decline in oral transmission among younger generations, urban communities, and Tshivenda-speaking diaspora populations, as well as the increasing relevance of digital technologies in language preservation and education.

The findings demonstrate that AI can play a meaningful role in improving access to Tshivenda proverbs through semantic interpretation, contextual explanation, and interactive learning support. Participants recognised the educational value of AI-assisted proverb learning, particularly for learners with limited exposure to traditional oral teaching environments. In this sense, the study confirms that AI technologies have the ability to contribute to indigenous language revitalisation and intergenerational knowledge transmission by making cultural content more accessible and engaging in contemporary learning spaces.

At the same time, the study revealed important limitations and concerns associated with the technological mediation of indigenous oral traditions. Participants consistently emphasised that Tshivenda proverbs derive much of their meaning from performance, social context, tone, gesture, and communal interaction. AI systems, while effective in processing textual and semantic information, cannot fully reproduce these embodied and situational dimensions of meaning. Furthermore, concerns about cultural authority, ethical ownership, and the risk of misrepresentation highlight the importance of ensuring that indigenous communities remain central in the development and governance of AI-based cultural tools.

The study therefore argues that AI should not be viewed as a replacement for traditional forms of knowledge transmission or for the interpretive authority of elders and cultural custodians. Instead, AI should function as a complementary and supportive tool that works alongside community-based teaching practices, educators, and indigenous knowledge holders. When designed in ways that are

culturally grounded, participatory and ethically responsible, AI technologies can strengthen efforts to preserve and teach Tshivenda proverbs without affecting their cultural integrity.

Ultimately, this study contributes to broader debates on the relationship between technology and indigenous knowledge preservation by demonstrating that innovation and cultural continuity need not exist in opposition. The preservation of Tshivenda proverbs in the digital age requires approaches that balance technological advancement with respect for communal ownership, contextual meaning, and cultural authenticity. The final position of this study is that Artificial Intelligence can serve as a valuable resource for the sustainability and transmission of indigenous oral traditions, provided that human cultural knowledge remains at the centre of interpretation, validation, and educational practice.

Recommendations for Future Research

Future studies may expand this research by developing more advanced AI systems capable of handling contextual variation and metaphorical complexity. Comparative studies in different African languages could further illuminate shared and language-specific challenges in AI-mediated proverb interpretation. Longitudinal research that examines learner outcomes in AI-supported indigenous language education would also contribute valuable empirical evidence.

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