Community-Governed Digital Preservation of Zambezi Indigenous Knowledge: Transitioning Oral Traditions to Sustainable Learning Documentation in Namibia

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ABSTRACT

This study investigates the epistemological, ethical, and technological constraints of transitioning the oral traditions of the Mafwe, Masubia, Mayeyi, and Mashi communities in Namibia's Zambezi region into sustainable digital learning documentation without compromising cultural integrity, localized data sovereignty, or traditional protocols. Positioned at the intersection of decolonial education and heritage preservation, the research employs a qualitative participatory case study design engaging 28 purposively sampled key stakeholders, including Traditional Authority elders, youth cultural stewards, formal educators, institutional ICT officers, and senior traditional leaders. Data collection was executed through semi-structured interviews and document analysis, analyzed through the analytical lens of reflexive thematic analysis. The findings indicate that while oral narratives, proverbs, and rituals function as living epistemic archives, they are vulnerable to rapid intergenerational erosion caused by urban migration, Westernized pedagogical dominance, and severe local infrastructural deficits. To resolve the tension between digital accessibility and cultural expropriation, this paper proposes a formalized Community-Governed Integrated Digital Indigenous Knowledge Documentation Model. This framework operationalizes Indigenous Data Sovereignty through Traditional Authority governance structures that regulate ownership, access permissions, stewardship responsibilities, and intellectual property rights relating to digitized knowledge. It further applies the principle of technauriture by preserving oral narratives, rituals, songs, and storytelling traditions through multimedia documentation that retains their performative and cultural context. While the model offers a theoretically grounded and community-driven framework for digital preservation, future pilot implementation is required to evaluate its practical feasibility, scalability, and long-term sustainability. This research conclude that sustainable digital preservation is achievable only when structural data governance is operationalized under the control of traditional structures rather than external institutional repositories.

Keywords*:* Zambezi Indigenous Knowledge; Digital Learning Documentation; Technauriture; Indigenous Data Sovereignty; Traditional Authorities; Decolonial Pedagogy.

INTRODUCTION

Indigenous knowledge systems (IKS) constitute complex bodies of knowledge, practices, beliefs, values, and social institutions developed through generations of interaction between communities and their environments (Kukutai & Taylor, 2021). Across Africa, indigenous knowledge continues to shape environmental management, traditional medicine, governance, conflict resolution, agricultural production, cultural identity, and education (Chisita & Ngoepe, 2023). Despite its significance, indigenous knowledge remains among the most vulnerable forms of cultural heritage due to its predominantly oral nature and its dependence on intergenerational transmission processes (Lilemba & Matemba, 2014).

In Namibia, indigenous knowledge occupies an important position within national development and cultural preservation agendas. Government policy increasingly recognises indigenous knowledge as a strategic resource for education, cultural identity, sustainable development, and social cohesion (Namibia National Planning Commission, 2025). However, significant challenges remain regarding the systematic preservation,

documentation, and integration of indigenous knowledge into contemporary learning environments (Amunkete, 2020; Uutoni et al., 2025). These challenges are particularly evident in the Zambezi Region, where the Mafwe, Masubia, Mayeyi, and Mashi communities continue to rely heavily on oral traditions as mechanisms for transmitting knowledge across generations.

The vulnerability of oral knowledge systems has been intensified in recent decades. Urbanisation, labour migration, demographic change, technological transformation, and the expansion of Western oriented educational systems have disrupted traditional knowledge transmission pathways (Nakale, 2023; Chisita & Ngoepe, 2023). Elders who traditionally function as custodians of knowledge are ageing, while younger generations increasingly engage with digital technologies and formal educational structures that often marginalise indigenous epistemologies (Dube, 2020). Consequently, many communities face the possibility of irreversible knowledge loss unless effective preservation mechanisms are developed.

Digital preservation has emerged as a widely advocated response to these challenges. Recent progresses in digital technologies have created opportunities to document oral traditions through audio recordings, video archives, interactive repositories, mobile applications, and multimedia learning environments (Amunkete, 2020; Mbinge et al., 2025). Such technologies offer the potential to preserve endangered knowledge, expand access, facilitate intergenerational learning, and support curriculum development. However, the increasing digitisation of indigenous knowledge also raises important concerns regarding ownership, access, cultural integrity, intellectual property, and community control (Morford & Ansloos, 2021).

Existing digital preservation initiatives frequently approach indigenous knowledge as a technical problem requiring technological solutions. Digital sources and information systems do not automatically address questions concerning who controls indigenous knowledge, who determines access permissions, and how communities maintain authority over digitised cultural resources (Kukutai & Taylor, 2021). These concerns are particularly significant in contexts where indigenous communities have historically experienced extractive research practices and external appropriation of cultural resources (Mhlongo, 2021).

The emergence of Indigenous Data Sovereignty (IDS) offers an important framework for addressing these concerns. Indigenous Data Sovereignty asserts the rights of indigenous peoples to govern the collection, ownership, management, interpretation, dissemination, and future use of data relating to their communities (Kukutai & Taylor, 2021). This study argues that sustainable digital preservation of indigenous knowledge requires governance structures that extend beyond technological infrastructures. Specifically, the article examines how Traditional Authorities can function as operational governance institutions for Indigenous Data Sovereignty within community-based digital preservation initiatives in Namibia's Zambezi Region. It looks at institutional capacity necessary to regulate access, ownership, and stewardship of indigenous knowledge in digital environments.

Problem Statement

Ideally, education should address community aspects of life as seen through the lenses of decolonisation. Development of curriculum should carry along African values and wisdoms, transforming them from mere oral sets information to more structural content that can be accessed through digital means (Nakashima et al., 2022; Chisita & Ngoepe, 2023). Despite Namibia's strong policies, including the Sixth National Development Plan (NDP6), which explicitly calls for the documentation and digitisation of indigenous knowledge systems, the oral traditions of the Zambezi Region remain critically at risk. Rapid urbanisation, ageing knowledge holders, youth migration, and the limited integration of IK into formal education threaten the intergenerational transmission of this knowledge (Uutoni, 2024; Nakale, 2023).

The lack of structured digital learning documentation limits opportunities for younger generations to engage with IK in formats aligned with their increasingly digital lifestyles. This study therefore aimed at understanding how Zambezi indigenous knowledge can be sustainably transitioned from oral traditions to digital learning documentation in Namibia's Zambezi Region. To achieve that, the following objectives were developed: To identify the foundations of Zambezi oral traditions and their current transmission methods for digital learning resources; To understand the challenges and benefits of transitioning Zambezi indigenous knowledge into digital

learning formats; To propose practical strategies for sustainable digital documentation that support formal education.

The article addresses three research questions: What indigenous knowledge systems and transmission mechanisms are currently utilised within the Mafwe, Masubia, Mayeyi, and Mashi communities? What challenges and opportunities are associated with the digital preservation of indigenous knowledge in the Zambezi Region? How can Traditional Authorities contribute to community-governed digital preservation initiatives grounded in Indigenous Data Sovereignty?

By addressing these questions, the study contributes to emerging debates concerning indigenous knowledge preservation, digital development, decolonisation, and data governance in Africa

RELATED LITERATURE

THEORETICAL FRAMEWORK

This inquiry is structured around an integrated theoretical framework that combines Participatory Design (PD) Theory, specifically the localized, culturally adaptive variants outlined by Winschiers-Theophilus et al. (2025), with the globally established principles of Indigenous Data Sovereignty (IDS). Indigenous Data Sovereignty is operationalised through community controlled governance mechanisms administered by Traditional Authorities and Khuta structures. Operational responsibilities include determining which knowledge may be documented, assigning access permissions, classifying materials as public or restricted, approving external research requests, regulating intellectual property rights, and overseeing the long term stewardship of digital repositories. This governance arrangement ensures that ownership and decision-making authority remain with the originating communities throughout the documentation lifecycle. Conventional technology design paradigms usually fail within indigenous contexts because they focus on an extraction model, where external computer scientists extract native content and upload it to external cloud servers, separating the data from its community. By contrast, Participatory Design treats traditional authorities, village elders, and rural youth not as passive informants, but as active co-designers of the technological systems that will store and mediate their heritage. This approach prioritizes the collaborative creation of interfaces and storage architectures that respect local social dynamics and communication styles.

To capture the performative essence of Zambezi oral cultures, this study utilizes the conceptual framework of technauriture (Masenya, 2024). Technauriture refers to the systematic capture, preservation, and transmission of Indigenous oral knowledge through multimedia technologies that retain performance-based elements such as voice, tone, gesture, rhythm, storytelling context, song, and ceremonial enactment. Within this study, technauriture is implemented through the recording of oral narratives, ritual performances, traditional songs, proverbs, and community histories using audio, video, and multilingual digital documentation formats. The approach seeks to preserve not only informational content but also the cultural context through which knowledge is traditionally transmitted. Technauriture formalizes the deliberate blending of oral performance (techne) with modern digital mediums (auriture), ensuring that the vocal articulations and aspects of storytelling are not trampled into Western typographic formats. Crucially, this performative documentation must be governed by Indigenous Data Sovereignty frameworks, as operationalised through the Global Indigenous Data Alliance (GIDA) CARE Principles. This would offer collective benefit, authority to control, responsibility, and ethics. Within this study, the four traditional structures of the Zambezi Region; the Mafwe, Masubia, Mayeyi, and Mashi Traditional Authorities are established as the primary institutional stewards of the data ecosystem. This framework mandates that any digital repository must reflect the jurisdictional protocols of the local Khuta thereby legally and operationally preventing digital colonialism and unauthorised commercial exploitation.

Digital Preservation of Indigenous Knowledge

Digital preservation refers to the processes through which digital technologies are employed to document, store, manage, preserve, and disseminate knowledge resources over time (Amunkete, 2020). Within indigenous contexts, digital preservation initiatives have expanded significantly during the past two decades. Technologies such as digital archives, online repositories, mobile applications, virtual museums, multimedia storytelling

platforms, and community databases have been utilised to preserve endangered cultural heritage (Mbinge et al., 2025).

The educational potential of digital preservation has received considerable attention. Digital platforms can support multilingual learning, facilitate intergenerational knowledge transfer, enhance cultural identity, and expand access to learning resources (Amunkete, 2020; Adebiyi et al., 2025). Multimedia technologies are particularly valuable because they preserve not only textual content but also oral performances, gestures, sounds, and contextual elements that are essential to indigenous knowledge transmission (Winschiers-Theophilus et al., 2025).

Nevertheless, scholars caution against viewing digital technologies as neutral tools. Digital preservation initiatives frequently reproduce unequal power relations when external actors control documentation processes, determine classification systems, or regulate access to indigenous knowledge (Mhlongo, 2021). Consequently, the success of preservation initiatives depends not only on technological effectiveness but also on governance arrangements that ensure community participation and control.

Indigenous Data Sovereignty and Community Governance

Indigenous Data Sovereignty has emerged as one of the most influential frameworks addressing indigenous rights in digital environments (Kukutai & Taylor, 2021). The framework challenges conventional data governance approaches by asserting that indigenous peoples possess collective rights over data relating to their communities, territories, resources, and cultural heritage.

Although Indigenous Data Sovereignty has gained substantial attention internationally, its application within African contexts remains limited. Existing studies focus predominantly on legal rights, policy frameworks, and ethical guidelines rather than examining how indigenous governance institutions operationalise sovereignty in practice (Morford & Ansloos, 2021). Consequently, there remains insufficient understanding of how African customary governance systems can support community-controlled digital preservation.

Three significant gaps emerge from literature. Firstly, digital preservation research continues to privilege technological solutions while paying insufficient attention to indigenous governance structures. Secondly, Indigenous Data Sovereignty scholarship remains heavily concentrated within colonial contexts, with limited empirical evidence from Zambezi communities. Thirdly, few studies have examined how Traditional Authorities can function as governance institutions responsible for regulating access, ownership, and stewardship of digitally preserved indigenous knowledge in Zambezi region.

This study addresses these gaps by investigating community-governed digital preservation in Namibia's Zambezi Region and by conceptualising Traditional Authorities as operational governance structures for Indigenous Data Sovereignty.

METHODOLOGY

This investigation utilized a qualitative participatory case study design, a methodology uniquely suited for exploring complex, bounded social phenomena through deep collaboration with community members. The target population was bounded within the Zambezi Region of northeastern Namibia, targeting the intellectual holders of the Mafwe, Masubia, Mayeyi, and Mashi traditional polities. To ensure a comprehensive, generational representation of the population, a sample of 28 participants was curated via purposive and snowball sampling strategies. The sample was rigorously segmented across five distinct stakeholder categories: 8 Traditional Authority Elders (holding specialized lineages of ecological and governance history), 6 Youth Cultural Stewards (active in local development associations), 6 Formal Regional Educators (specializing in localized language teaching and science curricula), 4 Institutional ICT Officers (operating within regional directorates), and 4 Senior Indunas (chief administrative councilors within the respective Khutas).

While the sample of 28 participants enabled in-depth qualitative data saturation engagement across key stakeholders, the study does not claim statistical representativeness. Rather, participant selection was guided by

information case principles consistent with qualitative participatory inquiry. Though, the limited sample size may not fully capture the diversity of perspectives across all sub-groups within the Mafwe, Masubia, Mayeyi, and Mashi communities, the four TA establishments in the Zambezi region are well represented.

Data collection was carried out over an extended field engagement using two primary methods: semi-structured interviews executed in localized languages (Silozi, Sifwe, Sisubia, and Siyeyi) and systematic document analysis of current regional education policies, national ICT frameworks under NDP6, and historical orthographic records. The interviews were recorded with explicit communal consent, translated, and transcribed verbatim. The amount of qualitative data was subjected to reflexive thematic analysis utilizing the six-phase framework established by Braun and Clarke (2022). Inductive codes were generated from the ground up, which were then grouped into overarching thematic structures corresponding directly to the research objectives. Methodological trustworthiness was maintained through extensive data triangulation (matching interview transcripts against field observation notes and official policy documents), continuous member checking of preliminary thematic structures with an independent community advisory council, and the maintenance of a transparent reflexive journal detailing the researchers' positionality. Ethical principles of informed consent, confidentiality, cultural sensitivity, and voluntary participation guided the study. Particular attention was given to issues of Indigenous Data Sovereignty, cultural ownership, and community rights regarding knowledge documentation. Traditional Authority approval was obtained before engaging with participants, and culturally sensitive knowledge was excluded from public reporting where disclosure could violate community protocols.

RESULTS AND ANALYSIS

The reflexive thematic analysis generated a highly structured matrix of themes that maps the empirical realities of oral transmission, digitization challenges, and strategic recommendations.

Table 1 outlines the thematic architecture along with code frequencies observed across.

THEMES	**FREQUENCIES**
The core elements of the Zambezi oral traditions, and how are they currently transmitted within the community	
Theme 1: Storytelling and proverbs as moral/practical wisdom	**16**
Theme 2: Initiation and ritual as embodied pedagogy	**14**
Theme 3: Traditional Authorities as living archives and gatekeepers	**10**
Theme 4: Environmental and livelihood knowledge in daily practices	**9**
The key challenges and benefits associated with moving Zambezi indigenous knowledge into digital learning formats	
Theme 1: Digital divide and infrastructural barriers	**25**
Theme 2: Fear of cultural appropriation and loss of sovereignty	**11**
Theme 3: Fragility of elder memory and demographic shifts	**13**
Theme 4: Intergenerational access, pride and economic opportunity	**8**
Practical strategies and frameworks can support a sustainable, community-based transition to digital learning documentation	
Theme 1: Non-negotiable TA leadership and data sovereignty	**12**

Theme 2: Integrated low-tech/high-tech solutions	**8**
Theme 3: Capacity building and local digital stewards	**9**
Theme 4: Policy alignment with NDP6 and curriculum integration	**19**

Source: Researcher, (2026)

The findings are presented thematically below, organised according to the three research objectives. Verbatim quotes are used to foreground participants' voices.

Objective 1: Foundations of Zambezi Oral Traditions and Transmission Channels

The empirical findings illuminate that oral traditions within the Zambezi region are not merely informal folklore but function as structured and performance dependent educational systems. Theme 1.1 emphasizes that storytelling and proverbs serve as primary frameworks for moral and practical wisdom. Participants routinely conceptualized these oral structures as our university.

A secondary school educator (P10) illustrated this pedagogical integration:

"When I teach the river ecosystem in Grade 10, I start with the Mafwe proverb about the crocodile and the fisherman. The learners remember it forever because it carries respect, not just facts."

This highlights that indigenous pedagogy embeds scientific data within relational ethics, a stark contrast to the decontextualized delivery of Western curriculum designs.

Theme 1.2 isolates initiations and rituals as forms of embodied pedagogy, where knowledge is transmitted through somatic rhythm, active participation, and communal performance. Senior Induna P20 (Mayeyi Authority) observed:

"*In the Batsara ceremony you don't just watch, you feel the rhythm in your bones. That is how the knowledge stays with you."*

This reality exposes the failure of basic textual digitizations; written text strips the kinetic and spiritual dimensions from the performance. To counter this, youth participants (P16) expressed profound anxiety over the current fragile, unrecorded state of transmission:

"*We hear the stories at night around the fire, but when the old people are gone, who will remember the full meaning?"*

This underlines the urgent need for a technauriture approach that utilizes multi-modal video and high-fidelity audio to preserve the performative context, while maintaining strict compliance with safety boundaries to protect restricted components.

Objective 2: Structural Challenges and Strategic Benefits of Digitization

The transition to digital documentation is constrained by systemic rural realities. Theme 2.1 emerged as the most prominent barrier, with 25 separate references highlighting the digital divide and infrastructural deficits. Rural regions within the Zambezi strip suffer from severe grid instability, nonexistent connectivity, and under resourced schools. As an institutional ICT officer (P28) noted:

"Most schools in rural areas have no reliable electricity or internet. Offline solutions are the best."

Consequently, any framework reliant on constant cloud connectivity or expensive data streams is structurally unviable for these communities. This technological barrier is further compounded by deep ethical anxieties regarding historical exploitation.

Theme 2.2 documents a widespread fear of cultural appropriation and digital extraction. Elders expressed deep concerns that uploading sacred botanical or governance data onto public web platforms would lead to digital biopiracy or cultural misrepresentation. An academic officer (P25) summarized this concern:

"*Without community control, digitisation becomes digital colonialism."*

Conversely, Theme 2.4 highlights major benefits, noting that when digitization is managed appropriately, it fosters intergenerational pride and economic opportunity. Participants noted that access to high fidelity cultural assets on mobile interfaces transforms local perceptions. As an educator (P8) noted:

"*If my learners can watch Lusata on their phones in Silozi, they will feel proud instead of ashamed of being 'rural'."*

Furthermore, structural documentation provides clear pathways for integrating indigenous ecological knowledge into school curricula, eco-tourism frameworks, and localized sustainable resource management programs.

Objective 3: Practical Strategies for Sustainable, Community-Led Architectures

When asked to articulate actionable solutions, stakeholders provided a coherent set of strategies centered on local self-determination and hybrid engineering. Theme 3.1 reinforces that absolute Traditional Authority leadership is a non-negotiable prerequisite.

A senior Induna (P13) stated clearly*: "No outsider should decide what we record or who sees it. The khuta must hold the key."*

This perspective reframes the archiving process: the local administrative Khuta must act as the primary operational review board, deciding access permissions and managing the distinction between public folklore and sacred knowledge.

To overcome infrastructural barriers, Theme 3.2 calls for the implementation of integrated low-tech/high- tech hybrid solutions. Rather than designing for an idealised high bandwidth environment, an ICT officer (P28) suggested practical alternatives:

"I think Offline platforms like Moodle or Kiwix plus selective cloud backup can be options to consider."

These technologies allow high density multi-media assets to be distributed locally over offline mesh networks, SD cards, and local solar powered servers.

Furthermore, Theme 3.4 highlights that this technological framework must align directly with the national development mandates of NDP6 to drive structural curriculum reform. Education officers (P7, P2) emphasized that local orthographies (Sifwe, Sisubia, Siyeyi) must be integrated into digital instructional platforms to allow formal testing and systematic learning within the state school system, rather than treating indigenous knowledge as an unevaluated extracurricular activity.

Community-Governed Intergrated Digital Ik Documentation Model

To synthesize the empirical findings into an actionable framework, this study introduces the Community-Governed Integrated Digital Indigenous Knowledge Documentation Model (Figure 1). This model provides a concrete architectural response to the challenges of cultural erosion, technological deficits, and digital exploitation identified by stakeholders in the Zambezi Region.

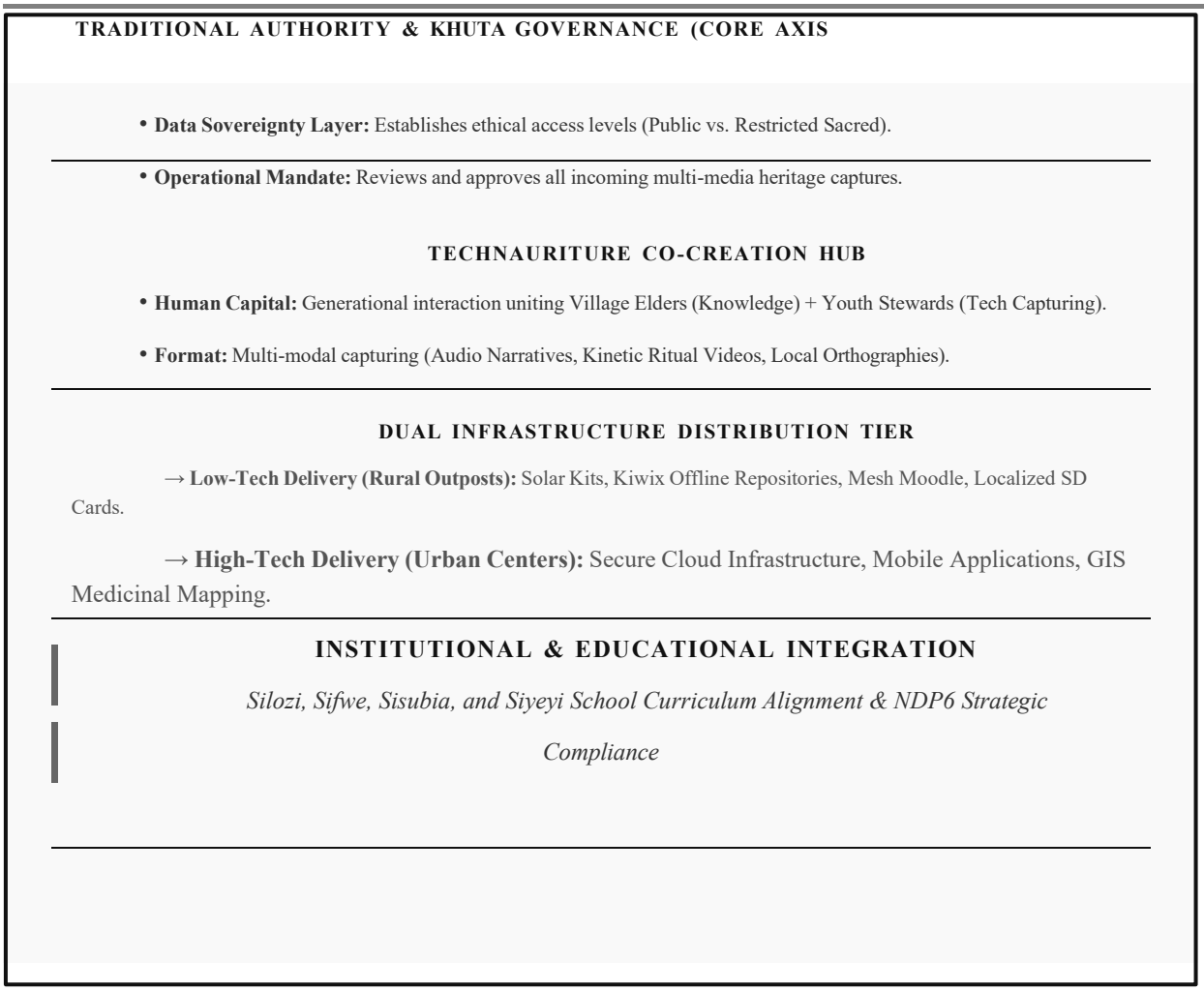

Figure 1: Structural Workflow and Governance Blueprint for the Proposed Repository Infrastructure.

Successful implementation of the model requires funding and minimum infrastructure standards, including solar powered backup energy system, secure storage devices, recording equipment, and offline learning platforms such as Moodle and Kiwix. These requirements were identified by participants as essential for ensuring reliable access in remote areas characterised by intermittent electricity supply and limited internet connectivity.

To ensure long term preservation, digital assets should be managed according to internationally recognised digital preservation principles. These include the use of open archival formats, metadata documentation standards, integrity verification procedures, backup systems, and scheduled migration of files to updated storage platforms. Such measures reduce the risk of data loss over time. Regarding cultural appropriation and unauthorized access, cybersecurity mechanisms should form an integral component of the framework. Safeguards include multi-level authentication procedures, encryption of sensitive cultural records, audit logging of repository activities, and periodic security assessments.

The operational mechanics of this model rely on four core pillars. First, Traditional Authority & Khuta Governance acts as the foundational control mechanism, positioning local leaders as senior data stewards. This operationalizes the GIDA CARE principles, giving the Khuta direct control over access permissions and intellectual property rights. This architecture directly addresses local fears of cultural expropriation by ensuring that sacred ecological data or royal records cannot be harvested without explicit community authorization.

Second, the Technauriture Co-Creation Hub bridges the intergenerational divide by pairing elderly knowledge holders with literate, technologically proficient local youth. Under this framework, youth function as localized digital archivists, recording oral narratives, multi-lingual proverbs, and kinetic ritual contexts using high fidelity multi-media equipment. This process keeps the knowledge relational and active, transforming documentation into an educational experience for the youth involved.

Third, the Dual Infrastructure Distribution Tier resolves the rural digital divide through a decentralized architecture. In high-bandwidth urban zones, the model utilizes secure cloud databases, mobile apps, and Geographic Information Systems (GIS) for ecological mapping. In rural areas with limited infrastructure, the system switches to an offline-first distribution model. Cultural materials are compiled into lightweight Kiwix archives and Offline Moodle packages, which are then deployed via local solar-powered servers and offline mesh networks directly to village schools, requiring no external internet access.

Fourth, Institutional & Educational Integration moves the documented content into formal systems. By aligning with the national development mandates of NDP6, the model translates unstructured multimedia recordings into structured, graded instructional content. Working with regional education directorates, these materials are linked to regional science and language syllabi in Silozi, Sifwe, Sisubia, and Siyeyi, ensuring that localized heritage is actively taught and evaluated within the formal school system.

DISCUSSION

The empirical findings of this research confirm that preserving oral cultures within the Zambezi Region requires moving beyond conventional, extractive archiving practices toward community-controlled models. The study demonstrates that oral traditions are highly contextual and performance dependent, which aligns with Lilemba and Matemba's (2014) foundational work on Mafwe epistemologies. Because knowledge is deeply linked to linguistic tone and bodily performance, simple textual translations distort its core meaning. Therefore, implementing technauriture, as co-designed frameworks, is essential to preserve the multisensory and performative elements of heritage, supporting the participatory design methodologies developed by Winschiers-Theophilus et al. (2025).

Furthermore, the high frequency of codes related to infrastructural deficits (Theme 2.1) emphasizes that Western, cloud centric educational solutions are unviable in rural Sub-Saharan contexts. This finding supports Uutoni, Raju, and Kalusopa's (2025) assessment of digital preservation preparedness in Namibia, which highlighted that central institutions are often unequipped to handle rural digital inclusion. By proposing a hybrid, *offline-first* technical infrastructure, this model provides a practical solution to the rural digital divide, building on local *e-learning* strategies explored by Amunkete (2020).

The most critical contribution of this model is the integration of traditional authority structures into digital systems. While conventional digital archiving often prioritizes open access, this study demonstrates that within indigenous contexts, open access without localized regulation can lead to digital colonialism and biopiracy. Aligning repository design with the GIDA CARE principles allows the system to respect local social protocols. This framework bridges the gap between development goals under NDP6 and local governance under the Traditional Authorities Act (Traditional Act, 2000), offering a scalable model for decolonizing education across Southern Africa.

Although the Community-Governed Integrated Digital Indigenous Knowledge Documentation Model was developed directly from empirical findings and stakeholder recommendations, the present study did not include a pilot implementation phase. Consequently, the operational feasibility, user acceptance, scalability, and long-term sustainability of the model remain areas requiring further investigation. Future research should undertake community-based pilot projects within selected Khutas to evaluate system functionality, governance effectiveness, user participation, educational integration outcomes, and long term preservation.

CONCLUSION AND RECOMMENDATIONS

This study demonstrates that transitioning the oral traditions of the Mafwe, Masubia, Mayeyi, and Mashi communities into digital formats is highly viable if grounded in community governance, Indigenous Data Sovereignty, and hybrid technology design. By moving beyond simple text digitization toward a holistic model of digital learning documentation, this framework preserves the performative and ethical dimensions of Zambezi knowledge. The proposed model provides a practical path for safeguarding this living heritage while advancing educational decolonisation and national development in Namibia.

To support the implementation of this model, the following strategic actions are recommended:

1. **Establishment of a Zambezi Indigenous Knowledge Digital Hub:** A unified, regional digital repository should be co-developed by the four Traditional Authorities in formal partnership with the Ministry of Education, Arts and Culture, UNAM, and NUST. This hub should prioritize offline, multi-lingual mobile architectures using a technauriture approach.

2. **Formation of Localized Khuta Cultural Documentation Committees:** Each traditional authority should form a specialized committee composed of elders and youth stewards to oversee recording initiatives, manage intellectual property rights, and enforce cultural access protocols.

3. **Curricular Integration of Localized Knowledge Assets:** The National Institute for Educational Development (NIED) should systematically integrate approved digital heritage materials into regional primary and secondary school syllabi, ensuring formal support for local languages (Sifwe, Sisubia, Siyeyi, and Silozi).

4. **Development of Local Technical Capacity:** Public institutions and development partners should invest in training rural youth as certified digital archivists and network technicians, ensuring that technical management remains within the community.

5. **Sustainable Financing and Institutional Partnerships:** Long-term sustainability of digital preservation involving partnership with Traditional Authorities, the Ministry of Education, Innovation, Youth, Sport, Arts and Culture, NUST, UNAM, UNESCO, and cultural heritage, in support infrastructure acquisition, repository maintenance, cybersecurity, technical training, and periodic system upgrades.

6. **Pilot Testing and Evaluation of the Proposed Model:** The proposed Community-Governed Integrated Digital Indigenous Knowledge Documentation Model should be piloted within selected Mafwe, Masubia, Mayeyi, and Mashi communities. The pilot should assess technical usability, educational effectiveness, and long term sustainability.

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