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Primary educators' perceptions of adopting indigenous-themed digital games: insights across career stages

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Abstract

This study explores primary school educators' perceptions of using indigenous-themed digital games in Zimbabwean primary schools, focusing on their views regarding cultural inclusion, pedagogical relevance, and digital adoption. The study employed a concurrent mixed-methods approach involving 120 survey respondents, 40 interviewees, 20 focus group participants, 10 classroom observers and 10 photovoice contributors, purposively selected from urban and rural Zimbabwean primary schools. Findings show that early-career teachers are enthusiastic but lack experience in culturally responsive pedagogy and digital integration. Mid-career teachers value the games' pedagogical benefits but face challenges with curriculum alignment and resources. Senior teachers value cultural preservation but worry about technological demands and alignment with assessment structures. The study provides valuable insights for policymakers, game developers, and teacher training institutions, guiding the design of professional development strategies that support the effective integration of indigenous-themed digital games into primary education. The study recommends tailored training in digital literacy, cultural competence and curriculum integration to support the use of indigenous-themed digital games in the primary schools in the postcolonial era.

Keywords Indigenous knowledge, Digital games, Primary school, Teacher perceptions, Culturally responsive teaching

1 Introduction

Zimbabwe's education system has been shaped by a dual legacy: the enduring structures of colonial-era schooling and ambitious post-independence reforms aimed at creating a more culturally inclusive and technologically forward-looking model. Since independence in 1980, the country has made significant strides in expanding access to education, yet challenges persist in achieving equity, cultural relevance, and pedagogical innovation. Among these efforts is the integration of Indigenous Knowledge Systems (IKS), deeply rooted in the lived experiences and wisdom of ethnic groups such as the Shona, Ndebele and others, into mainstream curricula. These knowledge systems offer

contextually rich content that aligns with local values, histories and ways of knowing. In response to the need to bridge global educational trends with national identity, Zimbabwe's Ministry of Primary and Secondary Education (MoPSE) introduced the Heritage-Based Curriculum, a central component of broader education reforms. This curriculum foregrounds the transmission of cultural knowledge and values alongside 21st-century learning competencies. It supports Zimbabwe Vision 2030, which advocates for a knowledge-driven society that respects cultural diversity while embracing technological innovation [20, 49].

Concurrently, the use of digital games in early childhood and primary education is gaining traction globally. These games have been praised for their ability to foster engagement, collaboration, and deep learning through interactive, story-based environments [19, 34, 42]. However, in postcolonial Southern Africa, and Zimbabwe in particular, the implementation of game-based learning intersects with complex issues of cultural representation, language diversity and educational access. While global educational technologies often reflect Western pedagogical norms and cultural references, local educators must negotiate the integration of such tools in ways that are culturally authentic and locally meaningful. In this context, indigenous-themed digital games emerge as a potentially transformative medium for contextualised learning. These tools not only enable interactive, child-friendly learning but also serve as vehicles for preserving and transmitting cultural heritage in ways that resonate with young learners [18]. The tools allow educators to digitally preserve and transmit cultural stories, practices and values in engaging and child centered ways. Through storytelling, symbolism and localised content, such games foster a sense of identity and cultural pride while simultaneously promoting 21st-century skills.

However, despite their promise, the adoption of these games in Zimbabwean schools remains uneven, influenced by disparities in infrastructure, digital fluency, pedagogical support and cultural sensitivity [5]. This study investigates the perceptions of Zimbabwean primary school educators regarding the adoption of indigenous-themed digital games. It explores how teachers across different career stages perceive the educational value, cultural appropriateness and practical challenges of incorporating these tools into their teaching. Furthermore, it addresses professional development gaps, especially regarding how teachers are prepared to blend digital tools with culturally relevant content [48]. By centering the lived experiences of primary educators, the study generates practical insights for curriculum design, teacher training and digital resource development. The study is both timely and relevant, intersecting with two critical educational imperatives: the global rise of digital game-based learning [7] and the local emphasis on culturally responsive teaching [18]. In examining how these dimensions converge within Zimbabwe's unique socio-educational context, the study contributes valuable insights into the future of inclusive, technology-enhanced learning in the Global South. Ultimately, the study provides a critical perspective on how indigenous knowledge can shape the future of digital learning by highlighting educators' voices in navigating cultural inclusion, pedagogical impact and technological integration. The findings are relevant not only to Zimbabwe but also to other education systems in the Global South that seek to integrate digital innovation without compromising cultural authenticity.

2 Theoretical framework

The integration of indigenous-themed digital games in primary education represents a complex intersection of cultural pedagogy, technology adoption and traditional knowledge systems. This research employs a comprehensive theoretical framework that integrates three key theoretical perspectives to examine primary school educators' perceptions of indigenous-themed digital games in teaching practices, namely Culturally Responsive Teaching Theory [18], Technology Acceptance Model [15] and Indigenous Knowledge Systems Theory [28].

2.1 Culturally responsive teaching theory

Culturally Responsive Teaching Theory, as articulated by Gay [18], provides a crucial foundation for understanding the cultural dimensions of educational technology implementation. At its core, CRT emphasises the imperative of leveraging students' cultural knowledge and experiences to create meaningful learning environments [17]. Ladson Ladson-Billings [27] further emphasises that effective teaching must bridge the gap between academic content and students' cultural realities. The application of CRT in the context of indigenous-themed digital games reveals several critical considerations. First, educators must possess sufficient cultural competence to effectively implement these tools, understanding both the cultural content and its significance [21]. This competence extends beyond mere familiarity with indigenous cultures to encompass what Rychly and Graves [43] described as a deep understanding of how cultural elements can be meaningfully integrated into digital learning experiences. Cultural congruity, another key principle of CRT, becomes particularly relevant when examining how indigenous-themed games align with students' cultural backgrounds and experiences [23]. This alignment is crucial for creating authentic learning experiences that resonate with students' cultural identities while meeting educational objectives. The theory suggests that when educational content reflects students' cultural experiences, engagement and learning outcomes improve significantly [6].

2.2 Technology acceptance model: Understanding adoption and implementation

The Technology Acceptance Model (TAM), originally developed by Davis [15] and later refined by Venkatesh and Davis [53], provides a structured framework for understanding how educators approach and implement new educational technologies. In the context of indigenous-themed digital games, TAM illuminates the factors that influence teachers' decisions to adopt and integrate these tools into their practice [44]. The model's emphasis on perceived usefulness (PU) and perceived ease of use (PEOU) offers valuable insights into the practical challenges educators face [50]. For indigenous-themed digital games, perceived usefulness encompasses not only educational effectiveness but also cultural authenticity and relevance. The ease of use dimension extends beyond technical usability to include cultural competence requirements and institutional support structures [1]. TAM's behavioural intention construct helps explain what Marangunić and Granić [30] identified as the gap between educators' interest in indigenous-themed games and their actual implementation. This understanding is crucial for identifying and addressing barriers to adoption, whether they be technical, cultural or institutional.

2.3 Indigenous knowledge systems theory: ensuring authentic cultural integration

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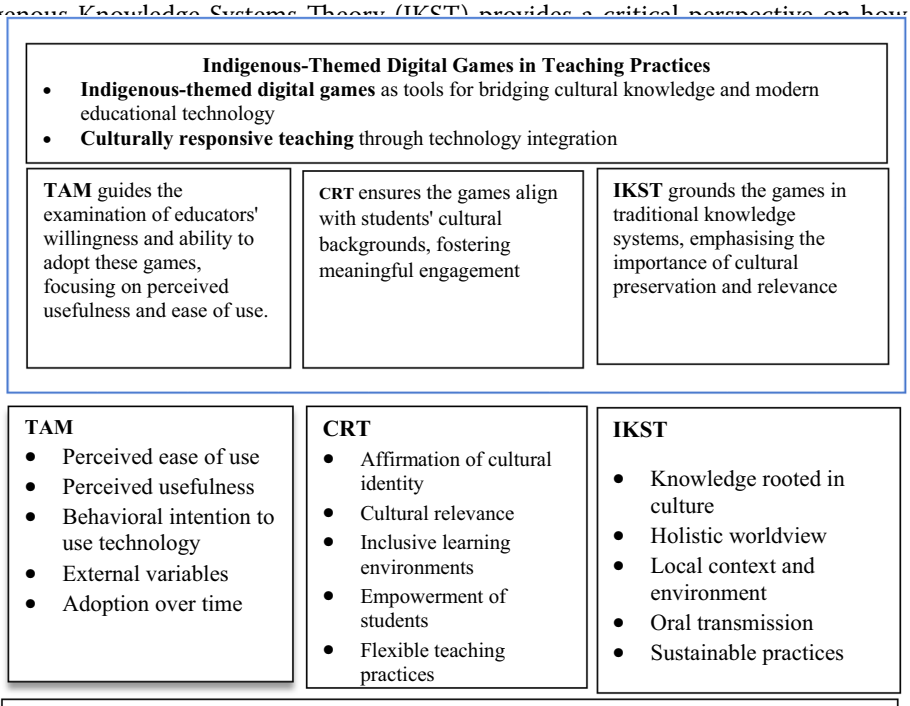

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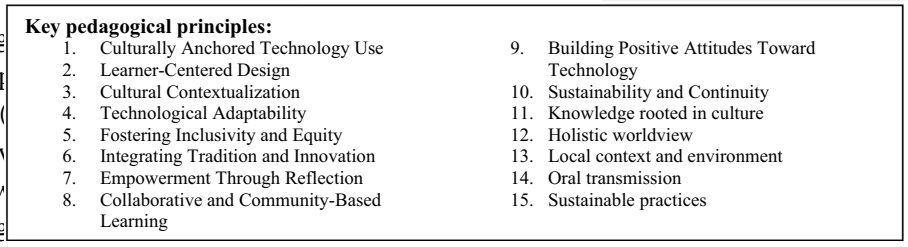

2.5 Box 1: the intersection of the three theories

The intersection of IKST, TAM and CRT provides a robust framework for integrating culturally responsive pedagogy with technology adoption in education. This convergence highlights the importance of aligning digital tools with indigenous cultural values, ensuring they are accessible, meaningful and engaging for learners. By emphasising learner-centered design, cultural contextualisation and technological adaptability, educators can create inclusive learning environments that balance tradition with innovation. The resulting pedagogical principles advocate for the thoughtful integration of indigenous-themed digital games to enhance student engagement, preserve cultural heritage and foster 21st-century skills. This approach not only promotes equity and empowerment but also supports the sustainable transmission of indigenous knowledge to future generations through modern educational technologies. As noted by Castagno and Brayboy [13], successful culturally responsive education requires attention to multiple dimensions:

- Cultural authenticity and responsiveness.
- Technical accessibility and ease of use.
- Community involvement and validation.
- Professional development and support for educators.
- Alignment with traditional knowledge systems.

This theoretical framework serves as a basis for comprehending the challenges and opportunities associated with the use of indigenous-themed digital games in primary education [8]. Successful implementation depends on thorough consideration of cultural elements along with technical and educational aspects, while building strong community involvement and backing. Cajete [12] underscores how implementation strategies should respect indigenous knowledge systems while taking advantage of digital technology benefits through the integration of these theories. The integration of educational innovation through this balanced methodology effectively addresses the goals of preserving cultural heritage while enhancing educational achievements.

3 Literature review

3.1 Global trends in integrating Indigenous knowledge and digital learning

Educational systems worldwide are increasingly striving to balance modern technological innovations with the preservation of indigenous cultural heritage. International organisations such as UNESCO [52] advocate for curriculum decolonisation, emphasising that integrating Indigenous Knowledge Systems (IKS) supports cultural identity and social cohesion. Scholars across regions echo this view, arguing that culturally responsive teaching enhances community connection and educational relevance [14, 45]. Simultaneously, the digital transformation of education, particularly through digital game-based learning (DGBL), has emerged as a powerful pedagogical trend. DGBL enhances student engagement, fosters critical thinking and builds digital literacy [16, 24]. Global research indicates that when tailored to local contexts, digital platforms can promote culturally grounded and inclusive learning [4]. However, challenges persist. Infrastructural gaps, limited teacher training and risks of cultural misrepresentation can undermine the effective integration of IKS in digital formats [32, 41]. To succeed, digital education initiatives must be locally adapted and culturally authentic, ensuring that indigenous content is not merely symbolic but deeply embedded in pedagogy [40, 51].

Emerging strategies include digitising traditional games and community-led content development, which not only preserve indigenous heritage but also make learning more meaningful for digital-native learners [33, 37]. These trends point to the necessity of investing in teacher capacity-building, content co-creation and culturally relevant instructional design to bridge the gap between technology and tradition in global education. An important emerging global trend is the intersection of artificial intelligence (AI) and game-based learning. AI-powered educational games can personalise learning experiences, adapt to individual student needs and simulate culturally specific scenarios for deeper engagement [22]. AI also facilitates real-time feedback, enhances accessibility and provides analytics that help educators tailor instruction, making it a transformative tool for integrating indigenous themes in pedagogy [55].

3.2 Teacher perceptions and experiences in digital game-based learning

A crucial element in this digital transformation is the role of teachers. Research by Allsop and Jessel [2] provides a comparative account of teachers' experiences and reflections on using digital games in primary classrooms in England and Italy. Their study revealed that:

- Evolving roles: Teachers acknowledge that the introduction of digital games is transforming their roles, from traditional instructors to facilitators and guides. They

report that effective DGBL requires them to adopt new pedagogical and classroom management strategies, emphasising the need for ongoing professional development.

- **Curricular challenges:** While some curricula offer flexibility for integrating digital games, many teachers feel that a more radical curricular reform is necessary. The study highlights that the design of learning environments, based on underlying educational theories and strategies, critically influences how digital games are used in practice.
- **Context sensitivity:** Differences in country-specific curricula and educational practices underscore the importance of flexible, context-sensitive models for DGBL. Teachers in both England and Italy stress that successful integration is contingent on adapting digital tools to meet local educational needs and cultural contexts.
- **Practical implications:** The findings suggest that robust teacher training, focusing not only on technical skills but also on pedagogical approaches, is essential. Practical guidelines and structured frameworks are needed to help teachers harness the motivational and cognitive benefits of digital games without compromising traditional learning objectives.

These insights dovetail with broader international research, reinforcing that the successful integration of digital games into education hinges on a nuanced interplay between curriculum design, teacher preparedness and contextual adaptation [32, 41]. At the intersection of indigenous knowledge and digital learning, many scholars have called for strategic initiatives that combine cultural sensitivity with technological innovation. International research has highlighted best practices such as involving indigenous communities in the development of educational games, ensuring that digital content is contextually grounded and aligning game-based learning with curricular objectives [4]. In Zimbabwe, recent initiatives have begun to explore these integrative approaches, though there remains a significant gap in the production of indigenous-themed digital content that adequately reflects local cultural contexts (Mugari [25, 36]. These findings underscore the importance of developing indigenous digital resources that not only enhance educational outcomes but also foster a deeper appreciation for Zimbabwe's rich cultural heritage.

3.3 Bridging global and local perspectives

The literature points to a multifaceted strategy for integrating digital game-based learning by synthesising global trends with regional and classroom-specific findings. In postcolonial contexts like Zimbabwe, efforts to incorporate indigenous knowledge are complemented by the growing recognition of DGBL's potential. However, as Allsop and Jessel [2] illustrate, teachers remain at the forefront of this transformation. Their experiences suggest that digital games can enhance engagement and support culturally relevant learning. However, a critical gap in teacher training and curricular flexibility must be addressed for these innovations to be fully effective.

The literature highlights the evolving relationship between technological innovation and cultural preservation, emphasising that these two dimensions can be mutually reinforcing rather than conflicting. Studies at both global and regional levels stress the importance of integrated approaches that foster teacher development and curricular reform to support meaningful digital learning experiences. For example, Allsop and Jessel [2] provide valuable empirical insights into the challenges and opportunities

of game-based learning, offering a foundation for policymakers and educators striving to create inclusive, culturally responsive and technologically advanced educational environments. Moreover, the literature underscores the complex interplay between the global push for digital innovation and localised efforts to preserve indigenous knowledge. While international and regional research presents strong evidence of the benefits of incorporating cultural content into digital learning tools, Zimbabwe's specific challenges highlight the necessity for context-sensitive solutions. Addressing these challenges demands robust policies, infrastructure investment and most importantly, the meaningful involvement of educators and indigenous communities in developing digital learning resources. By adopting collaborative and culturally informed strategies, Zimbabwe and other postcolonial nations can harness digital technologies to create educational environments that seamlessly blend modern innovation with deep-rooted local traditions.

4 Methodology

4.1 Research design

This study explores primary school educators' perceptions of incorporating indigenous-themed digital games into their teaching practices. The study adopted a concurrent mixed-methods design, integrating both quantitative and qualitative approaches to gain comprehensive insights into primary educators' perceptions of indigenous-themed digital games. This methodology, in line with Marton [31]'s framework facilitates a detailed investigation into the various ways in which educators perceive and interact with digital games centered on indigenous themes. It acknowledges that their experiences are situated on a spectrum of comprehension and application.

4.2 Study setting and participants demographics

Geographically, the study covered all ten of Zimbabwe's provinces, documenting a wide range of learning environments. It encompassed rural areas in Mashonaland, Matabeleland and Masvingo and peri-urban areas like Chitungwiza and urban centers like Harare and Bulawayo. Furthermore, Binga and other remote locations were represented. This thorough geographic coverage ensured that the research represented diverse educational experiences and contexts across the nation. The study involved 200 participants, with an equal distribution of urban and rural teachers to ensure fair representation. The participants were further stratified by career stage (early-career, mid-career and senior educators), allowing for comparative analysis of how context (urban vs. rural) and teaching experience influenced their perceptions. This design enabled us to explore how infrastructure disparities and cultural proximity affected views on game adoption, cultural integration and curriculum alignment. Data were collected from 120 survey respondents, 40 individual interviewees, 20 focus group participants, 10 classroom observers, and 10 photovoice contributors. Table 1 below summarises the distribution of participants by data collection method, geographic location (urban vs. rural), and career stage.

Participants were purposively selected based on their availability, willingness to participate and teaching experience across different career stages.

Table 1 Participant distribution summary

Data Collection Method	Number of Participants	Urban Participants	Rural Participants	Career Stages Represented
Survey Respondents	120	60	60	Early, Mid, Senior
Individual Interviewees	40	20	20	Early, Mid, Senior
Focus Group Participants	20	10	10	Early, Mid, Senior
Classroom Observers	10	5	5	Early, Mid, Senior
Photovoice Contributors	10	5	5	Early, Mid, Senior

4.3 Data collection procedure

Data were collected over three months using diverse instruments to ensure depth and triangulation. A self-developed, pilot-tested questionnaire was administered to 120 participants (teachers and school heads) in both print and online formats, covering five themes: digital readiness, cultural awareness, pedagogical use, perceived barriers and professional development needs. In addition, 40 semi-structured interviews explored participants' experiences and attitudes toward indigenous-themed games. Four focus groups (5 participants each) facilitated dialogical reflections on cultural pedagogy. All the interviews were recorded with participant permission and transcribed verbatim for the purpose of thematic analysis. Ten classroom observations, guided by a structured protocol, documented real-time integration of digital games, focusing on teacher confidence, student engagement and cultural responsiveness. Photovoice involved 10 teachers who submitted annotated images capturing culturally relevant teaching experiences. Supplementary data from 10 participants' instructional documents, including schemes of work, lesson plans, curriculum guides and syllabuses, were analysed for indigenous content integration and digital tool usage. All qualitative data were transcribed for thematic analysis.

Ethical approval was obtained from the Ministry of Primary and Secondary Education and Midlands State University Research Ethics Committee. Informed consent was secured from all participants prior to data collection and participants were assured of confidentiality, anonymity, and their right to withdraw at any point.

4.4 Data analysis

Data analysis followed a concurrent mixed-methods strategy to synthesise insights from both quantitative and qualitative sources. Quantitative data from 120 Likert-scale surveys were analysed using descriptive statistics (frequencies, means and percentages) to explore patterns across key constructs such as digital readiness, cultural awareness and pedagogical integration. Responses were disaggregated by teaching experience and school setting (urban/rural) to identify differences across career stages and contexts. SPSS was used for statistical processing, allowing for visualisation and comparative interpretation. Qualitative data drawn from 40 interviews, 4 focus groups, 10 classroom observations, 10 photovoice submissions and 10 instructional document sets were analysed thematically using NVivo. Coding followed Braun and Clarke's six-phase approach, enabling the identification of themes related to cultural relevance, implementation challenges and instructional strategies [11]. Data integration employed a convergent parallel design, allowing for cross-validation and deeper contextual interpretation of findings. Triangulation across data sources enhanced validity, while peer debriefing and audit trails ensured analytic rigour.

5 Findings

5.1 Factors influencing educators' decisions to adopt or reject indigenous-themed digital games

Understanding the factors that influence educators' decisions to adopt or avoid indigenous-themed digital games provides valuable insights into the cultural, technical and pedagogical barriers affecting classroom innovation. This study examined these perceptions by analysing data from a Likert-scale survey completed by 120 teachers. The quantitative findings were enriched by qualitative insights from 40 in-depth interviews, 20 focus group participants, 10 classroom observations, and 10 photovoice contributors, offering a comprehensive and layered understanding of the dynamics shaping adoption decisions.

As shown in Table 2, a variety of factors, such as perceived educational value, technological infrastructure, cultural relevance, ease of integration, support for professional development, time constraints and administrative support, influence educators' willingness to accept or reject digital games with indigenous themes. However, the influence of these factors varies depending on the years of experience of the educators.

5.1.1 Early career educators (0–5 years)

This group was enthusiastic and placed a high value on indigenous themed games. However, despite their enthusiasm, they lamented lack of support and relevant tools: *"We are eager to use digital games but sometimes lack the right guidance or tools."*(Group A) Furthermore, participants in a focus group highlighted time constraints and heavy workloads: *"With the heavy workload, it's difficult to experiment with new tools unless there's dedicated time and support."* (Group B). Support for professional development (95.0%) and technology infrastructure (90.0%) are highly preferred by younger educators. This illustrates their need for introductory materials to boost their self-assurance when incorporating new technologies. One early-career teacher shared in an interview: *"I feel unprepared without the right training and access to technology, even though I am excited to use digital tools in my teaching."*(Educator D) Their dependence on institutional support is further indicated by the significance of administrative support (92.5%).

5.1.2 Mid-career educators (6–10 years)

This group demonstrated a balanced perspective, weighing the value of the innovation against curriculum demands. Their journey, from becoming familiar with digital tools to actively incorporating them into teaching, reflects a meaningful shift in practice. One participant highlighted that: *"I try to use these games during revision, especially when the content fits our syllabus."* However, the educators in this stage still place high importance

Table 2 Factors influencing educators' decisions to adopt or reject indigenous-themed digital games

Factor	0–5 years	6–10 years	11–15 years	16–20 years	21 + years
Perceived educational value	92.5%	87.5%	82.5%	77.5%	72.5%
Technological infrastructure	90.0%	80.0%	77.5%	70.0%	62.5%
Cultural relevance	85.0%	87.5%	90.0%	92.5%	95.0%
Ease of integration into the curriculum	75.0%	80.0%	82.5%	85.0%	87.5%
Professional development support	95.0%	90.0%	85.0%	80.0%	75.0%
Time constraints	87.5%	85.0%	82.5%	80.0%	77.5%
Administrative support	92.5	87.5%	82.5%	77.5%	72.5%

on professional development (90.0%), but they also place more emphasis on practical application, with 80.0% concurring that curriculum integration is essential. *"At first, I needed training, but now I want resources that fit seamlessly into my lessons,"* one educator said.

While technological infrastructure is still crucial (80.0%), cultural significance starts to matter more (87.5%). One educator in this category emphasised: *"When the content is culturally relevant, students are more engaged."* They identify with the process of learning.

5.1.3 Experienced educators (11–15 years)

One of the main factors for this group is cultural relevance (90.0%). Teachers with more than ten years of experience are becoming more aware of the necessity of matching digital tools to the cultural backgrounds of their students. *"Traditional games are part of our identity,"* one educator said during a photovoice session. Students can better relate their education to their heritage when they digitise it. As educators concentrate more on the usefulness of incorporating these tools into their instruction, the significance of technological infrastructure declines (by 77.5%). A teacher comments, *"By this stage, we know what works in the classroom,"* indicating that ease of integration (82.5%) ranks higher. The difficulty lies in integrating new tools into our current workflow.

5.1.4 Veteran educators (16–20 and 21 + years)

These educators were characterised by a cautious approach to integration. A common sentiment was expressed by one participant who noted, *"I rely on what I know has worked. I would need a workshop or demonstration before using these tools."* While most participants acknowledged the importance of ease of integration into the curriculum (87.5%) and cultural relevance (95.0%), many also expressed reservations. *"Technology is important, but it loses meaning if it doesn't align with our culture,"* explained one experienced teacher. *"We require instruments that are true to ourselves" (Educator I).* This perspective reflects a shift from viewing technology purely as a technical tool toward a more thoughtful consideration of its cultural and pedagogical fit. Interestingly, this group placed less emphasis on external factors such as administrative support (72.5%) and technology infrastructure (62.5%), suggesting a growing sense of self-reliance. As one senior teacher remarked, *"At this point, I rely more on my own experience and less on what the administration provides."* (Educator J). This further underscores a trend among seasoned educators to prioritise pedagogical alignment and cultural authenticity over institutional or infrastructural support.

To complement the survey data, qualitative methods, including classroom observations, photovoice and document analysis, were employed to gain deeper insights into educators' engagement with indigenous-themed digital games. Table 3 below summarises key findings from each data source, highlighting variations in adoption patterns, contextual barriers and cultural considerations across teaching experience levels and school settings.

The findings indicate that educators' decisions to adopt or reject indigenous-themed digital games are shaped by a nuanced interplay of factors across the stages. Early-career teachers appeared more willing to experiment with games, often adapting tools with limited guidance. Conversely, more experienced teachers expressed caution, citing

Table 3 Summary of qualitative findings on educators' engagement with indigenous-themed digital games

Source	Key findings
Classroom observations	Observations revealed that early-career teachers showed greater willingness to adopt digital games, often improvising with minimal resources. In contrast, senior educators tended to avoid unfamiliar technologies, citing curriculum rigidity and lack of support.
Photovoice	Participants captured images reflecting infrastructural limitations (e.g., outdated or absent devices, no internet). Reflections highlighted concerns about game relevance and lack of culturally grounded content.
Document analysis	Lesson plans and curricula from some teachers included scripted traditional activities, suggesting that some educators still prioritize rote learning or paper-based resources over digital interventions. Others annotated attempts to integrate local stories digitally, reflecting openness to change.

Table 4 Strategies for navigating cultural sensitivities ($n = 200$)

Strategy	Importance (Avg)	Frequency of use (Avg)	High importance (4–5)	High frequency (4–5)
Consultation with indigenous community members	4.7	3.6	92%	58%
Professional development in cultural competence	4.5	4	88%	76%
Integration of indigenous perspectives in lesson planning	4.4	3.5	86%	52%
Ongoing dialogue with students about cultural representation	4.3	3.7	84%	62%
Collaboration with indigenous collaborators	4.6	3.2	90%	45%
Regular reflection on personal biases and assumptions	4.2	3.8	82%	68%
Use of culturally vetted supplementary materials	4.3	3.4	85%	50%

alignment with formal curricula and lack of support. Photovoice data reinforced these trends, with participants visually documenting technology gaps and articulating fears of misrepresentation. Document analysis confirmed a tendency among some educators to rely on traditional content delivery unless explicitly guided otherwise. Time constraints are still a major obstacle, even though priorities vary throughout career stages. All groups of teachers reported having trouble juggling their workload with the use of new digital tools.

5.2 Strategies for handling cultural sensitivities during the use of indigenous-themed digital games

Given the sensitivity of representing indigenous knowledge in digital formats, teachers often take deliberate steps to ensure respectful and pedagogically appropriate integration. This theme explores the culturally responsive strategies used by educators as evidenced across multiple data sources. To address this issue, the participants were organised into five groups, each consisting of 40 individuals, all of whom had experience in the integration of indigenous-themed digital games in classroom teaching from various provinces in the country. These educators were requested to evaluate the significance and prevalence of various strategies for addressing cultural sensitivities, using a rating scale from 1 to 5, where 1 indicates the lowest importance and 5 signifies the highest. The findings of the survey are presented in Table 4.

All the strategies have high importance ratings (above 4.0), according to the data, but they are used less frequently. The two areas with the biggest disparities between

frequency and importance, *"Collaboration with Indigenous Educators"* and *"Consultation with Indigenous community members,"* indicate serious implementation difficulties.

The survey pool was used for in-depth interviews. They are referred to as Groups A through D for privacy reasons. These interviews revealed four key themes: classroom dynamics, personal development, institutional support and community involvement. The following, however, stood out more from the responses and were noteworthy because the educators continuously underlined the value and difficulties of community involvement:

> *"It takes time and sincere effort to establish trust with the Indigenous community. Building enduring relationships is more important than a one-time consultation. This is important, but frequently the most difficult part. (Group D)*
> *Numerous educators emphasised the importance of lifelong learning, saying that "developing cultural competence is a continuous process." Regular workshops, along with introspection and independent study, have proven crucial in assisting me in handling delicate situations more skillfully. (Group A)*

The establishment of a classroom environment that is both inclusive and respectful emerged as a prominent theme:

> *"I've learned to create a classroom culture where discussing cultural differences is normalised, was a recurrent theme regarding the creation of an inclusive and respectful learning environment. We lay out precise rules for civil discourse, and I urge students to express their opinions and challenge preconceptions." (Group R).*

The significance of institutional support became a new theme from interviews with the educators. For example, one educator highlighted that:

> *The administration of the school's support makes a big difference. Implementing tactics like inviting indigenous guest speakers or going to community events is made simpler when there is an institutional commitment to cultural sensitivity. (Educator J)*

The qualitative information gives the quantitative results depth and context:

Although they are rated as extremely important (4.7 and 4.6, respectively), Group D highlights that the difficulties in establishing and sustaining community relationships account for the lower frequency of use (3.6 and 3.2). The emphasis on continual personal development and cultural competency workshops that were mentioned in the interviews, including Group A, is consistent with the comparatively high frequency of use (4.0). Group C's focus on fostering a classroom culture that normalises conversations about cultural differences supports the survey's 4.3 average rating on the value of continuous communication with students.

This new theme from the qualitative data suggests that institutional support can help facilitate the implementation of culturally sensitive practices. It also helps to explain some of the variation in the frequency of use across different strategies. The use of digital games with indigenous themes in the classroom requires a thorough understanding of cultural sensitivity. The study's conclusions shed light on strategies for addressing these sensitivities by highlighting areas of achievement, challenges, and the importance of institutional support.

Educators showed a deep understanding of cultural sensitivity and its essential role in effectively integrating indigenous-themed digital games into instruction, adopting a thoughtful and inclusive approach. All the strategies were rated above 4.0, indicating that most people agreed with their significance. Nonetheless, there were significant differences between the perceived value and the frequency of use, particularly concerning collaboration with indigenous educators and community engagement.

Table 5 presents qualitative insights from classroom observations, photovoice submissions, and document analysis that illustrate how educators navigate cultural sensitivities when integrating indigenous-themed digital games into their teaching.

The data indicate that teachers do not adopt indigenous-themed digital games blindly; rather, they exercise discretion and cultural judgment. They adopt pragmatic, respectful strategies, including community involvement, peer dialogue and selective integration to navigate cultural sensitivities. As illustrated in Table 5, classroom observations showed that educators often paired digital tools with traditional artefacts or limited use to specific contexts, such as heritage week. Photovoice contributions depicted scenes of blended learning environments where local objects and stories complemented the digital content. Document analysis further revealed reflective practices, with educators consulting community elders and annotating lesson plans with cautionary notes. These practices underscore teachers' role as cultural mediators and point to the need for participatory co-design in the development of future educational technologies.

The successful implementation of culturally sensitive practices has been found to require ongoing professional and personal development. Educators must continuously enhance their cultural competency to effectively address potential biases and adapt to changing contexts. Maintaining relationships with indigenous communities and promoting polite conversation in the classroom is also essential to creating an inclusive learning environment. Support and institutional resources are crucial to overcoming these challenges. Teachers must be provided with the necessary training and opportunities to collaborate with indigenous communities. By focusing on cultural sensitivity, educational institutions can help ensure that digital games with indigenous themes are successfully and respectfully adopted.

5.3 Professional development needs for educators implementing indigenous-themed digital games

Successful integration of culturally relevant digital games depends not only on availability but also on the pedagogical confidence and technical skills of educators. This theme presents insights into professional development gaps as expressed through multiple qualitative data streams. Teachers were asked to rate their perceived need for different

Table 5 Culturally responsive strategies employed by educators when using indigenous-themed digital games

Source	Key findings
Classroom observations	Teachers selectively used certain games during cultural days or language classes, avoiding controversial symbols. They sought peer feedback when unsure about appropriateness.
Photovoice	Visuals depicted the use of community artefacts, posters, and chalkboard drawings to complement the games, reinforcing respectful cultural framing. Reflections showed concern about misrepresentation of certain customs in some digital tools.
Document analysis	Some reflective journals detailed teachers' consultations with elders or cultural experts before deploying digital games. Lesson plans often included disclaimers or context-setting segments for games that included spiritual or clan-based content.

forms of professional development on a scale of 1 to 5, with 1 representing the least professional development and 5 representing the most. This was done to determine the educators' professional development needs. The survey's results are displayed in Table 6.

According to the findings, primary school teachers who incorporate digital games with indigenous themes have a high need for professional development in many areas. *"Addressing misconceptions and stereotypes,"* the need with the highest rating, was deemed a high priority by 93% of educators (rated 4 or 5 on the scale). *"Cultural competence training"* (90%) and *"Indigenous history and cultural contexts"* (88%) came in close succession. The fact that 73% of respondents rated *"Assessment methods for cultural learning"* the least prioritised area as having a high need, highlights how widely acknowledged the difficulties in successfully integrating these games into instruction.

These findings imply that educators recognise the importance of cultural awareness when utilising digital games with indigenous themes. Their focus on clearing up misunderstandings and promoting cultural competency shows that they understand how sensitive it is to teach indigenous material. During a focus group discussion, one educator said,

> *"We need to be sure we're not reinforcing stereotypes but rather giving students a true and respectful understanding of indigenous cultures."*

Another educator said, *"Without proper training, we risk misrepresenting the very cultures we aim to celebrate."* (Group B).

Teachers' worries about handling potentially delicate conversations with young students are further highlighted by the high need for professional development in facilitating cultural discussions (87%). This is consistent with the primary school setting, where teachers have a significant influence on how pupils view cultural diversity. During a photovoice session, one educator shared this difficulty:

> *I find it challenging to respond to challenging questions that students pose regarding indigenous history. I want to steer these conversations in a direction that promotes understanding rather than conflict.*

Additionally, 85% of respondents expressed a strong interest in community engagement tactics, indicating that teachers value connecting classroom instruction with the perspectives of indigenous communities. In a focus group discussion, one participant highlighted,

Table 6 Professional development needs of primary school educators ($n = 200$)

Professional Development Area	Average Need (1–5)	High Need (4–5)	Low Need (1–2)
Cultural competence training	4.7	90%	2%
Technical skills for digital game implementation	4.3	82%	6%
Indigenous history and cultural contexts	4.6	88%	3%
Strategies for community engagement	4.4	85%	5%
Curriculum integration techniques	4.1	76%	8%
Facilitation of cultural discussions	4.5	87%	4%
Assessment methods for cultural learning	4	73%	10%
Addressing misconceptions and stereotypes	4.8	93%	1%

Table 7 Professional development needs identified for implementing indigenous-themed digital games

Source	Key findings
Classroom observations	Some educators attempted game integration but struggled with navigation, troubleshooting, and classroom management during use.
Photovoice	Reflections called for practical workshops, not just theory. Teachers expressed a need for help in co-developing culturally relevant digital content and evaluating educational game quality.
Document analysis	Journals revealed that few teachers had prior formal exposure to digital pedagogy. Even when confident in culture-based instruction, many lacked the skills to digitize that knowledge.

> *"We must establish closer ties with the elders and cultural leaders in the area. The games would become more genuine and significant if they were incorporated into the educational process (Group A).*

The significance of cooperative strategies that incorporate indigenous voices into educational experiences is highlighted by this finding.

Although curriculum integration (76%) and technical skills training (82%) are still considered essential, their ratings are marginally lower, suggesting that teachers may feel a little more secure in these areas. There are still unanswered questions about how to incorporate these games into organised learning activities. One educator noted, *"I understand technology, but it's still challenging to incorporate these games into my lessons in a way that meets curriculum goals."* (Educator C).

The assessment methods' comparatively low ranking (73%) points to more significant challenges in gauging cultural learning outcomes in elementary school. Better tools are needed to evaluate students' comprehension of cultural concepts, though, as nearly three-quarters of educators still consider this to be a high-priority area. One participant asked, *"It's easy to test math or reading skills, but how do we measure whether a child has truly gained respect for a culture?"* (Educator D).

The table 7 below summarises key findings from classroom observations, photovoice and document analysis, highlighting educators' professional development needs in the effective use of indigenous-themed digital games. The data reveals gaps in digital pedagogy, practical implementation skills and the ability to create or assess culturally grounded digital content, underscoring the need for hands-on training and collaborative content development.

The results demonstrate the complexity of professional development required to assist teachers in successfully integrating digital games with indigenous themes. The most urgent gaps are in the areas of historical accuracy, cultural sensitivity, and encouraging inclusive dialogue, even though technical training is still crucial. This raises the possibility that current professional development opportunities are not giving teachers the tools they need to handle this challenging task. In addition to providing targeted support in all identified areas, future initiatives should therefore place a high priority on cultural competence and stereotype-busting techniques. Considering the primary school setting, these programs ought to concentrate on developmentally appropriate cultural education techniques, guaranteeing that young students interact with indigenous-themed material in a meaningful and considerate way. *"It's not just about using the games; it's about using them well,"* said a seasoned educator, encapsulating the necessity. That calls for awareness, tact and constant learning.

As illustrated in Table 7, educators across all career stages expressed a strong desire for more structured, context-specific training. Observations revealed that even motivated teachers struggled with navigating digital tools, especially in real-time classroom settings. Photovoice participants documented scenes of frustration, but also of creativity, underscoring a willingness to learn if given the right support. Reflective journals and planning documents highlighted a lack of exposure to instructional design principles and digital content evaluation. These findings call for professional development programmes that are practical, modular, and inclusive of cultural pedagogies, moving beyond generic ICT workshops to foster deep pedagogical transformation.

6 Discussion

The research findings provide significant insights into the determinants influencing primary school teachers' choices regarding the implementation of indigenous-themed digital games. These determinants include cultural sensitivities, the necessity for professional development, and the evolution of these factors throughout different stages of a teaching career. Such insights lay the groundwork for formulating targeted strategies aimed at improving the integration of culturally pertinent digital resources within educational settings. For educators in the early stages of their careers (0–5 years), the necessity for professional development emerged as the predominant factor, with 95% of respondents highlighting its significance. This finding emphasises the importance of foundational training to foster confidence in the utilization of educational technologies. Furthermore, 90% of early-career educators identified technological infrastructure as essential. However, as educators accumulate experience, their dependence on such infrastructure tends to decrease. This observation is consistent with the findings of Mugari [36], which indicates that seasoned educators develop pedagogical approaches to effectively manage technological constraints.

The perceptions of educators regarding cultural relevance also evolve over time. Although cultural alignment was appreciated across all levels of experience, it was particularly emphasized (95%) by teachers with over 21 years of experience. This indicates that as educators enhance their expertise, they become increasingly aware of the significance of cultural integration in promoting student engagement. Likewise, the ease of integrating curriculum became more critical with experience, as 87.5% of veteran teachers prioritised this aspect. Aloizou et al. [3] highlight that effective curriculum integration is vital for the successful adoption of game-based learning tools, corroborating the trends identified in this study. Despite these differences, a common challenge was identified: time constraints. Educators at every career stage reported difficulties in incorporating new tools due to limited instructional time. This observation aligns with Kumar [26], who recognised time limitations as a significant obstacle to technology adoption in developing nations.

A crucial element of the research focused on the strategies employed by educators to navigate cultural sensitivities in the integration of indigenous-themed digital games. Teachers at various stages of their careers strongly advocated for collaboration with indigenous educators and community engagement as vital approaches. Nonetheless, challenges in implementation persist, as maintaining meaningful partnerships with communities necessitates a long-term commitment. Ndlovu [39] similarly, underscored the intricacies involved in establishing trust between educators and indigenous

communities, highlighting the necessity for ongoing interaction. Furthermore, educators recognised the significance of personal development through workshops, independent research and reflective teaching methodologies. This aligns with the findings of Smith and Johnson [46], who argued that professional development in culturally relevant pedagogy is essential for cultivating inclusive educational settings. Additionally, fostering a classroom environment that promotes diverse viewpoints and respectful discourse emerged as a common priority. Davis [16] emphasises the role of culturally responsive teaching in enhancing student engagement and mutual respect, which resonates with the conclusions of this study.

An important issue emerging across all career stages was the challenge of aligning indigenous-themed digital games with the national curriculum. Many educators reported difficulties in mapping these games to existing syllabi, particularly where lesson plans and assessment structures are rigidly defined. This was especially pronounced among experienced teachers who expressed concern that even culturally meaningful games might not 'fit' within formal instructional objectives. This misalignment reflects a systemic gap where the curriculum does not yet sufficiently accommodate locally developed digital tools or culturally responsive content. It suggests that curriculum developers need to provide explicit guidelines or flexible modules that allow for the integration of indigenous-themed games into core subjects such as Social Studies, Languages, and Environmental Science. Building on this, the study recommends a collaborative approach where educators, curriculum experts, and indigenous knowledge holders co-develop game content and curricular linkages. For instance, project-based learning modules or cultural immersion units could serve as integrative spaces for these digital tools. Such initiatives would not only support pedagogical innovation but also promote heritage education, aligning with Zimbabwe's Vision 2030 and the goals of the Heritage-Based Curriculum.

The research indicates that the professional development requirements of educators change as they advance in their careers. Teachers in the early stages of their careers demonstrated a significant need for training in cultural competence and the management of stereotypes, with 93% ranking this as a primary concern. Moyo and Chen [35] similarly observed that educators often seek organised training to effectively address cultural issues. In contrast, veteran educators with over 21 years of experience reported a reduced necessity for training in technical skills (82%) and curriculum integration techniques (76%), reflecting a higher level of confidence in these domains. Nevertheless, they expressed a strong desire for support in facilitating cultural discussions (87%) and engaging with indigenous communities (85%). This indicates that while seasoned teachers are adept at utilising technology, they are looking for further assistance in addressing cultural intricacies within their instructional practices. Moreover, institutional support was identified as a vital element across all levels of experience. Educators highlighted that administrative support facilitated initiatives such as hosting indigenous guest speakers and participating in community events, which aligns with Patel [41]'s conclusions regarding the importance of institutional backing in promoting culturally inclusive education.

7 Implications

The results of the study highlight the changing professional development requirements of educators at various stages of their careers, emphasising the significance of cultural competence, professional advancement and community involvement in the effective incorporation of indigenous-themed digital games. For those in the early stages of their careers, the emphasis lies on offering technological and logistical assistance, as they are in the process of developing essential skills to utilise new educational technologies. This demographic necessitates specialised training in digital literacy and strategies to overcome technical challenges, ensuring they are adequately prepared to incorporate technology into their instructional methods. Conversely, seasoned educators focus on the cultural relevance and smooth integration of digital resources within their curricula. As these individuals accumulate experience, they cultivate a more profound appreciation for the necessity of embedding culturally appropriate materials and ensuring that technology complements established pedagogical practices. This evolution reflects their increasing recognition of the importance of cultural sensitivity in their teaching methodologies, prioritising the creation of inclusive and respectful educational environments. The persistent disparity between the acknowledged significance of culturally sensitive practices and their actual execution further highlights systemic and structural obstacles. These challenges include time limitations, which persist as a considerable issue across all career stages and insufficient institutional backing, particularly for novice educators. Such impediments obstruct the effective incorporation of indigenous-themed digital games and indicate that a strong institutional commitment is essential for fostering culturally relevant teaching practices.

The research highlights the necessity for professional development initiatives that are responsive to the changing priorities of educators across various stages of their careers. Teachers in the early phases of their careers require comprehensive training that encompasses both the technical and cultural dimensions of integrating digital games, whereas experienced educators gain the most from advanced training in cultural competence and strategies for community involvement. Customising professional development to meet these evolving requirements will facilitate the effective use of indigenous-themed digital games, thereby promoting cultural awareness and enhancing student engagement. As educators accumulate experience, their attention transitions from addressing technological hurdles to focusing on cultural and pedagogical issues. Meeting these changing demands through organised training, institutional backing and ongoing community partnerships will significantly improve the meaningful incorporation of indigenous-themed digital games in primary education. Professional development that adapts to these dynamics will enable educators to cultivate learning environments that are both culturally enriching and pedagogically sound.

The findings hold significant policy implications. The integration of indigenous-themed digital games aligns with Zimbabwe's postcolonial educational vision, as embodied in the Heritage-Based Curriculum and Vision 2030. This also resonate with global policy frameworks such as UNESCO's recommendations on inclusive and culturally responsive education. However, realising this vision requires deliberate policy support through curriculum reform that legitimises the inclusion of indigenous knowledge and game-based methods. It also calls for substantial investment in teacher training, with a focus on both digital pedagogy and cultural competence. Furthermore, strengthened

institutional frameworks are essential to facilitate meaningful and sustained partnerships between schools and indigenous communities.

8 Conclusion

The research indicates that the effective integration of indigenous-themed digital games into educational settings necessitates an analysis of the evolving requirements of educators at different stages of their careers. For novice teachers, the provision of professional development opportunities and a solid technological framework are crucial for successful implementation. As educators advance in their professional journeys, the emphasis transitions to improving cultural competence and ensuring that digital resources are aligned with curricular goals. Furthermore, the research underscores a significant disparity between the value educators attribute to cultural sensitivity and their capacity to enact these principles within their classrooms. Bridging this gap demands substantial institutional backing, continuous collaboration with the community and customized professional development initiatives that cater to the specific needs of educators across various career phases. Such holistic support is vital for promoting culturally responsive teaching practices and facilitating the effective incorporation of indigenous-themed digital games into educational experiences.

9 Recommendations

The study offers the following recommendations:

1. Design career-stage-specific professional development programs, focusing on technological skills for early-career teachers and cultural competence for experienced educators.
2. Provide administrative backing for culturally responsive pedagogy, including access to indigenous community networks and workshops on cultural sensitivity.
3. Foster long-term partnerships with indigenous communities to provide authentic cultural resources and support for educators.
4. Integrate cultural competence training into pre-service teacher education programs to prepare educators to address cultural misconceptions effectively.
5. Equip teachers with strategies to create inclusive, culturally sensitive classrooms, ensuring that all students feel represented and respected.
6. Increase awareness about the importance of integrating indigenous-themed digital games through advocacy efforts, workshops and conferences, targeting educators, policymakers and school administrators.

Through the implementation of these suggestions, educational institutions and policymakers can enhance their support for educators in utilising indigenous-themed digital games, thereby fostering inclusive, engaging and culturally relevant learning environments.

While this study presents a detailed cross-sectional analysis, we acknowledge its limitations in capturing temporal change. As such, we recommend future longitudinal studies that track the evolution of educators' perceptions and practices as they receive training, engage communities and experiment with new tools. Longitudinal data would offer valuable insights into the sustainability and long-term effectiveness of indigenous-themed digital game integration in primary education. In addition to longitudinal

studies, we propose school-based action research and participatory design projects as valuable future directions. These approaches would empower educators to take an active role in the iterative refinement of indigenous-themed digital tools, fostering sustained engagement, context-specific innovation and deeper integration of culturally relevant pedagogies into everyday teaching practices.

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Informed consent
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The authors declare no competing interests.

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