



Managing digital transformation in primary schools: The role of principals in iLembe District, KwaZulu-Natal, South Africa

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Abstract

As digital technologies continue to transform education, the role of school leadership in managing this transformation has become increasingly important. However, many school principals are without adequate training, resources, and institutional support to manage this complex change process successfully. This study investigated the role of school principals in leading digital transformation initiatives in primary schools, focusing on six selected schools in the iLembe District, KwaZulu-Natal, South Africa. Employing a qualitative case study design, the research draws on data gathered through semi-structured interviews with six school principals. The study is framed within educational leadership and change management theories to interpret how school leaders respond to the demands of digital integration. Findings indicate that principals play a pivotal role in articulating a digital vision, allocating resources, facilitating staff development, and fostering a technology-friendly school culture. However, these efforts are hindered by systemic challenges, including inadequate infrastructure, limited digital competencies among staff, and policy fragmentation. The article concludes with practical recommendations for policymakers and education departments to enhance leadership capacity and support sustainable digital transformation in under-resourced primary schools.

Keywords: school leadership, digital transformation, primary education, ICT in schools, educational change

Introduction and background

The rapid advancement of digital technologies has significantly transformed the global education landscape. In response to the demands of the 21st century, schools are under increasing pressure to integrate Information and Communication Technologies (ICTs) into teaching, learning, and administration (Orhani et al., 2024). This transformation is particularly crucial at the primary school level, where early digital literacy can lay the foundation for lifelong learning and equitable access to knowledge.

In South Africa, national policies such as the White Paper on e-Education (2004) and the National Development Plan (NDP, 2030) have long called for the comprehensive digitisation of schools.

Despite these policy intentions, implementation remains inconsistent, particularly in rural and under-resourced districts such as iLembe in KwaZulu-Natal. Tołwińska (2021) observes that school principals play a central role in leading and managing this digital shift. Furthermore, Kwatubana (2023) asserts that as key change agents, their leadership decisions, strategic vision, and support mechanisms significantly influence the pace and success of ICT adoption in schools. However, many South African principals face complex challenges, including limited infrastructure, uneven digital skills among educators, inadequate training, and policy-practice gaps (Nhlumayo & Pule, 2025).

While existing literature addresses the importance of digital leadership broadly, this study offers a distinct African and rural perspective on digital transformation by examining how principals in the iLembe District, an area characterised by socio-economic inequality, cultural diversity, and infrastructural limitations, navigate the realities of leading digital change in primary schools. Unlike studies situated in urban or resource-rich contexts, this research foregrounds the contextual agency of rural principals who innovate within constraint, drawing on community partnerships, indigenous knowledge systems, and context-sensitive leadership practices to advance digital learning. By centring on the African rural experience, this study contributes to a more nuanced and contextually grounded understanding of digital transformation, one that challenges global narratives of technological advancement and highlights the resilience, creativity, and adaptability in leadership found within rural South African schools.

This study aims to address this gap by examining the lived experiences and perceptions of school principals in managing digital transformation in selected primary schools within the iLembe District. The iLembe education district, located in KwaZulu-Natal, South Africa, is predominantly rural in nature, encompassing a mix of urban and traditional settlement areas. It is one of twelve education districts in the province, serving approximately 420 schools. The district comprises four local municipalities: KwaDukuza, Mandeni, Maphumulo, and Ndwedwe. Through a qualitative case study approach, the study examines the roles, strategies, challenges, and enabling conditions that shape how school leaders manage digital transformation in their specific contexts. It is against this background that this paper addresses the question: What is the role of school principals in managing digital transformation in primary schools? The findings aim to inform educational leadership practices and policy frameworks that support the integration of digital technologies in a sustainable and inclusive manner in South African primary schools.

Problem Statement

Despite national and provincial initiatives aimed at promoting the integration of digital technologies in South African schools, many primary schools, particularly in rural districts such as iLembe, continue to experience substantial challenges in implementing sustainable digital transformation. While policies like the White Paper on e-Education (2004) and the Department of Basic Education's Action Plan to 2024 underscore the importance of digital learning, a persistent gap exists between policy intentions and practical realities at the school level. School principals, as instructional leaders and managers are expected to play a strategic role in driving digital innovation within their institutions. However, Razak et al. (2023) note that many lack the necessary training, resources, and systemic support to manage this complex change process effectively. Moreover, the contextual factors such as infrastructure deficits, limited professional development in digital leadership, and socio-economic constraints further hinder their ability to lead meaningful transformation (Karousiou, 2025). Although previous studies have examined ICT integration and e-learning strategies in South African schools, there is limited empirical research that specifically explores how school principals in rural and under-resourced settings perceive and manage the

digital transformation agenda. Without this understanding, leadership development programmes and policy interventions risk overlooking school leaders' contextual challenges and agency in such environments. This study addresses this critical gap by investigating how school principals in selected primary schools in the iLembe District experience, understand, and manage the process of digital transformation, and what implications this has for educational leadership and policy in similar contexts.

Research question

This paper responded to the following question:

How do school principals manage digital transformation in primary schools in the iLembe District?

Literature Review

Barriers to digital transformation in primary schools

Barriers to digital transformation in primary schools are multifaceted and often interlinked, requiring a systemic response from educational leaders and policymakers. Jhonshon et al. (2024) assert that principals play a pivotal role in navigating these barriers by fostering collaborative cultures, advocating for resources, and leading capacity development initiatives. While digital transformation holds the potential to revolutionise teaching and learning, several barriers hinder its successful implementation, particularly in primary school contexts. These barriers are multidimensional, involving infrastructural, pedagogical, financial, policy-related, and socio-cultural challenges. Understanding these obstacles is crucial for educational leaders, particularly school principals, who are responsible for managing change within increasingly complex environments. One of the barriers to digital transformation includes infrastructure challenges. In their study on barriers to the digital transformation of infrastructure sectors, Manny et al. (2021) argue that one of the most persistent barriers to digital transformation in schools is inadequate infrastructure. In many South African primary schools, particularly in rural and under-resourced areas like those in the iLembe District, challenges such as unreliable electricity supply, lack of internet connectivity, and insufficient access to digital devices impede effective ICT integration (Department of Basic Education [DBE], 2023; Khoza & Biyela, 2022). Nkula and Krauss (2020) posit that these infrastructural gaps limit both teaching opportunities and learners' digital exposure, reinforcing existing educational inequalities.

Teachers are central to the success of digital transformation; however, Omodan and Mashingaidze (2021) argue that many educators lack the requisite digital literacy and confidence to effectively integrate technology into their pedagogical practices. Moreover, Hodges et al. (2020) further state that resistance to change remains a significant issue, often rooted in fear of the unknown, increased workload, or lack of pedagogical clarity on how technology enhances learning. Without adequate training and support, teachers may continue to rely on traditional methods, undermining digital initiatives.

Another barrier to digital transformation in primary schools includes budgetary limitations that significantly affect the procurement and maintenance of digital tools in schools (Santiago et al., 2025). For example, in their study on funding disparities and digital inequality in South African schools, Moloï and Mashiloane (2022) indicate that public schools, particularly in rural provinces such as Limpopo and KwaZulu-Natal, often operate with restricted funding, which limits their ability to invest in ICT infrastructure, software licences, and ongoing teacher training. The result

is a fragmented implementation of digital strategies, often dependent on donor funding or inconsistent government provisioning.

Effective digital transformation requires visionary leadership and coherent policy implementation. However, Mhlanga and Moloi (2020) posit that school principals often lack sufficient autonomy or training in ICT leadership, which affects their ability to plan strategically and mobilise resources. Additionally, although national policies such as the DBE's e-Education White Paper (2004) advocate for ICT integration, a significant implementation gap persists due to a lack of coordination, poor monitoring, and inadequate contextual adaptation (DBE, 2023; Mgqwashu, 2021).

Lastly, digital transformation efforts must also consider broader socio-economic conditions that affect both learners and teachers. In disadvantaged communities, as Ndlovu and Khoza (2023) observe, learners often lack access to devices or connectivity at home, which limits the continuity of learning beyond school hours. Furthermore, linguistic, cultural, and contextual diversity in South Africa adds another layer of complexity, as digital content and platforms may not always align with the lived realities of learners and teachers (Ngcobo & Mhlongo, 2022).

The role of School Management Teams (SMTs) in digital transformation

In the context of digital transformation in education, School Management Teams (SMTs) play a critical role as agents of implementation, coordination, and support. Comprising the school principal, deputy principal, and departmental heads (Nhlumayo, 2024), SMTs are strategically positioned to guide and manage the transition toward technology-enhanced instruction and digital school environments. Nhlumayo (2024) further adds that their leadership roles extend beyond administrative duties to include strategic decision-making, capacity building, and stakeholder mobilisation, particularly in the Foundation and primary school phases. One of the roles of SMTs in digital transformation is to be strategic leaders of ICT integration in their schools. SMTs play a strategic role in planning and overseeing ICT integration by setting vision, allocating resources, and establishing digital learning goals (Ngcobo & Mthiyane, 2021). In their study on the challenges and possibilities of leadership and ICT integration in primary schools, Mkhize and Ramnarain (2020) claim that the SMTs' ability to align technology adoption with curriculum delivery and school improvement plans is essential for ensuring that digital initiatives are not isolated events, but part of a broader educational transformation. In the South African context, SMTs must adapt these strategies to the realities of their local environments, especially in rural and semi-urban schools where digital access remains uneven.

Supporting Teacher Development and Capacity Building

One of the most significant contributions of SMTs to digital transformation is facilitating continuous professional development (CPD) for teachers. According to Moyo and Chinaza (2022), SMTs act as instructional leaders by identifying training needs, organising ICT workshops, and mentoring staff to integrate technology into pedagogy. Their leadership is crucial in addressing teacher apprehension and fostering digital confidence, particularly among Foundation Phase educators who may not be well-versed in using digital tools for early learning (Khoza & Mkhize, 2023). Supporting teacher development and capacity building is central to advancing digital transformation in primary schools. Teachers require not only technical training but also ongoing professional development that integrates digital tools into pedagogy in meaningful ways. Research highlights that without equipping teachers with adequate skills and confidence, digital initiatives risk becoming superficial or underutilized (Omodan & Mashingaidze, 2021). Capacity building

should therefore move beyond one-off workshops to include continuous mentorship, peer collaboration, and reflective practices that foster innovation in the classroom (Eickelmann & Gerick, 2020). Moreover, aligning teacher development with school-wide digital strategies ensures sustainability and coherence in implementation (Kozma, 2020). Ultimately, empowering teachers through robust professional development is critical to bridging the gap between policy aspirations and classroom realities in digital transformation.

Promoting a Collaborative and Innovative School Culture

Digital transformation requires a shift in school culture, one that is collaborative, experimental, and innovation-oriented. SMTs play a central role in cultivating this environment by fostering teamwork, peer learning, and the sharing of best practices (Maposa & Mahlomaholo, 2021). Chikoko and Maree (2020) further indicate that they also play a mediating role in resolving conflicts and aligning differing teacher perceptions about the value and relevance of ICT in the classroom. When SMTs model digital leadership themselves, they foster trust and encourage wider staff buy-in. School principals, in particular, play a pivotal role in promoting a collaborative and innovative school culture that supports digital transformation in primary schools. As instructional leaders, Hallinger (2018) states that principals set the vision for integrating technology into teaching and learning and create the conditions for teachers to embrace change. By fostering collaboration through professional learning communities, principals encourage knowledge sharing, peer mentoring, and joint problem-solving, which are critical components for sustaining digital initiatives (Harris & Jones, 2020). Furthermore, Leithwood et al. (2020) argue that principals who model openness to innovation inspire teachers to experiment with new pedagogical approaches and technologies without fear of failure. In contexts where digital transformation is uneven, such as in many primary schools in the Global South, principals' leadership in building trust, providing resources, and cultivating a culture of continuous learning becomes essential (Omodan & Mashingaidze, 2021). Ultimately, the principal's leadership in nurturing collaboration and innovation is not only about managing technology but also about shaping a resilient school culture capable of thriving in the digital age.

SMTs are often tasked with sourcing, managing, and maintaining digital infrastructure in schools. This includes coordinating budgets for ICT procurement, ensuring internet connectivity, and monitoring the use and functionality of devices (DBE, 2023). However, in many public schools, especially in under-resourced areas, SMTs operate under significant financial constraints. Masinga and Gumede (2022) note that SMTs must be resourceful, forming partnerships with local stakeholders and NGOs to secure devices and digital content where government provision is limited.

Lastly, the successful implementation of national and provincial ICT policies depends heavily on SMTs' ability to interpret, localise, and operationalise policy directives. While the DBE's White Paper on e-Education (2004) and subsequent policies outline goals for digital inclusion, the decentralised nature of South Africa's school system places the burden of implementation on school-level actors (Mgqwashu, 2021). SMTs must therefore bridge the gap between top-down policy mandates and bottom-up school realities, ensuring compliance while advocating for flexibility and contextual relevance.

Best practices in managing digital change in primary schools

The integration of digital technologies in primary education presents both significant opportunities and complex challenges. As digital transformation becomes an imperative rather than an option,

research highlights a growing consensus around certain best practices that promote effective change management in schools. Mabaso and Ngwenya (2022) indicate that these practices reflect not only global trends but also the contextual realities of South African schools, where disparities in infrastructure, capacity, and leadership are particularly pronounced.

- ***Visionary and Distributed Leadership***

Successful digital change efforts are often rooted in clear, strategic visioning led by school principals and supported through collaborative leadership structures such as School Management Teams (SMTs). Visionary leadership provides direction and sets priorities, while distributed leadership ensures that responsibilities are shared across the school, increasing buy-in and ownership (Fullan & Quinn, 2020; Chikoko & Maree, 2021). In the South African context, Moyo and Makusha (2023) note that this includes engaging departmental heads and senior teachers in decision-making processes related to the implementation of ICT.

- ***Professional Development and Teacher Empowerment***

One of the most consistently cited best practices is sustained, context-responsive professional development. Khoza and Mthembu (2021) argue that teachers need ongoing support, mentoring, and training to build their digital competence and confidence. Furthermore, Nhlumayo (2020) notes that collaborative, reflective, and classroom-based programmes, rather than one-off workshops, are more effective. To foster continuous knowledge sharing, Ngubane and Ndlovu (2022) suggest that successful schools often establish peer learning groups or ICT champions among staff.

- ***Integrating ICT with Pedagogical Goals***

Digital change is most effective when it aligns with curriculum and pedagogical goals rather than functioning as an isolated technical intervention. Research shows that technology integration should support learner-centred, active learning methodologies (Molefe et al., 2020). In primary schools, this means using tools that enhance phonics instruction, early numeracy, interactive storytelling, and multimedia learning. One of the key findings from Pan and Wang's (2025) quantitative study on the transformation of technology-challenged teachers into empowered digital citizens was that selecting tools appropriate for the developmental stage of learners and the school's resource context was identified as one of the best practices.

- ***Infrastructure Readiness and Resource Mobilisation***

Access to digital infrastructure remains a critical factor. Best-practice schools proactively assess their readiness by auditing their available devices, connectivity, and technical support, and strategically mobilise resources through partnerships or funding proposals (DBE, 2023). It is recommended that leadership teams frequently collaborate with NGOs, private sector donors, and provincial departments to address infrastructure gaps. Importantly, schools that plan for sustainability (e.g., maintaining regular maintenance schedules and budgeting for updates) exhibit better long-term outcomes (Mhlongo & Gumede, 2023).

- ***Change Management Strategies and Communication***

According to Burnes (2019), change management theories, such as Lewin's three-stage model (unfreezing, changing, refreezing), have been effectively applied in digital education contexts. Best-practice schools use structured communication and change management strategies to address resistance, set realistic expectations, and celebrate small wins (Fullan, 2021). Open communication

and inclusive consultation with teachers, learners, and parents ensure smoother adoption and stronger school-wide commitment.

- ***Monitoring, Evaluation, and Reflective Practice***

Implementing digital change without mechanisms for monitoring and feedback often results in an unsustainable impact. Ruloff and Petko (2025) claim that when best-practice schools aim to establish clear indicators of success, they utilise data (e.g., learner performance, teacher ICT use) and hold regular review meetings to reflect and adapt. Reflection is especially vital in low-resourced schools where iterative problem-solving is essential to navigate systemic constraints (Zwane & Maseko, 2022).

Theoretical Framework

This study was underpinned by Kurt Lewin's Theory of Change, which offers a foundational model for understanding organisational change processes, particularly within educational settings. Lewin (1947) conceptualised change as a three-stage process: Unfreezing, Changing (or Transition), and Refreezing. This framework provides a valuable lens for examining how school principals initiate, manage, and stabilise digital transformation in their institutions. In the context of this study, *unfreezing* refers to the process through which school principals and management teams recognise the need for digital transformation and begin to challenge existing practices, mindsets, and routines. This stage is marked by identifying gaps in teaching and learning practices, responding to external policy directives, and addressing the technological needs of learners and teachers. The principal's role involves creating awareness, building a shared vision, and preparing the school environment, psychologically and structurally, for change. The *changing* stage captures the actual implementation of digital initiatives, such as integrating ICT tools into classrooms, providing teacher training, and developing new administrative systems. During this phase, principals act as instructional leaders, resource mobilisers, and capacity builders. The study examines how they navigate challenges such as infrastructure limitations, staff resistance, or inadequate support from educational authorities. Lewin's model highlights that support, communication, and continuous engagement are critical during this often unstable transition period. In the *refreezing* phase, new practices are institutionalised and become part of the school's culture. For digital transformation to be sustainable, principals must ensure that the new systems and pedagogies are reinforced through policy alignment, ongoing support, and monitoring. This paper examined how principals work to embed these changes into the school's routines, ensuring that digital practices are maintained, evaluated, and improved over time.

Lewin's model provides a structured way to interpret the experiences of school principals as they lead digital transformation within the complex, resource-constrained environments of primary schools in the iLembe District. It enabled the researcher to assess not only the strategies being used but also how change is initiated, managed, and sustained in the context of educational leadership. By applying Lewin's Theory of Change, the study highlights the dynamic and iterative nature of school-level digital transformation, providing insights into the leadership behaviors, institutional challenges, and policy implications associated with managing change in under-resourced settings.

Methodology

This study employed a qualitative multiple-case study design to explore the role of school principals in managing digital transformation in selected primary schools within the iLembe District of KwaZulu-Natal, South Africa. The case study approach is appropriate for capturing in-depth, contextually rich understandings of real-life leadership practices within educational settings

(Yin, 2018). A multiple-case study design further enabled comparative insights across different school contexts, while maintaining a focus on the individual participants' lived experiences. Six school principals from different primary schools within the district were purposively selected. Purposive sampling was used to identify participants who hold leadership positions and possess firsthand experience in managing or supporting digital transformation initiatives in their respective schools. The inclusion criteria focused on schools that had already begun integrating ICT into their teaching and learning, ensuring that participants could provide relevant and meaningful insights. Semi-structured interviews served as the primary data collection method. These interviews allowed for flexibility in exploring the perspectives, experiences, and strategies of school leaders while ensuring consistency across cases through the use of a guiding interview schedule. Interviews were conducted in English, audio-recorded with the participants' consent, and subsequently transcribed verbatim for analysis. Follow-up questions and prompts were used to elicit deeper responses and to clarify emerging themes. The data were analysed using thematic analysis. This method was chosen for its ability to identify patterns across qualitative data while remaining grounded in participants' narratives. To ensure trustworthiness, the study employed member checking, triangulation of perspectives (among principals), and thick description of the cases. The researcher obtained ethical clearance from the relevant institutional ethics committee. The researcher informed participants of the study's purpose, their voluntary participation, and their right to withdraw without penalty, and obtained their informed consent. The researcher used pseudonyms to protect participants' identities and maintained confidentiality throughout the research process. The table below indicates the profile of the research sites and participants.

Table 1. Profile of the Research Sites and Participants

| Schools | Participants | Number of learners in the school | Qualifications | Age | Gender | Number of years as a teacher | Number of years as a school principal |
|---------|--------------|----------------------------------|-------------------|-----|--------|------------------------------|---------------------------------------|
| S1 | P1 | 877 | M.Ed. | 52 | M | 23 | 3 |
| S2 | P2 | 913 | M.Ed. in progress | 51 | F | 24 | 7 |
| S3 | P3 | 1208 | PhD in progress | 50 | F | 28 | 8 |
| S4 | P4 | 1014 | B.Ed. Honours | 49 | M | 24 | 9 |
| S5 | P5 | 521 | M.Ed. in progress | 43 | M | 22 | 3 |
| S6 | P6 | 332 | M.Ed. in progress | 46 | M | 21 | 8 |

Keys: M.Ed. – Master of Education, B.Ed. Hons – Bachelor of Education Honours, PhD – Doctor of Philosophy, F – Female, M – Male

Table 1 presents the demographic profile of the participants and the research sites. The six participating schools, all secondary schools within a single education district, were purposively selected as they had initiated the integration of ICT into teaching and learning. For ethical reasons, pseudonyms are used throughout this paper to protect the identities of participants.

Principal 1 to Principal 6 – P1 to P6

School 1 to School 6 – S1 to S6

The findings revealed two themes that reflect the role of principals in managing digital transformation in primary schools within the iLembe District. The inclusion criteria targeted schools that had already initiated ICT integration in their teaching and learning processes, thereby ensuring that participants could offer informed and meaningful perspectives. However, there are variations in the themes as participants provided different experiences, examples, and opinions within each theme. These are discussed in the following section. Verbatim quotes of participants are used to illustrate key findings, provide authentic insights, and support the interpretation of themes emerging from the study.

Findings

Theme 1: Challenges in leading digital transformation

Responding to the question about the challenges they encounter in managing and leading digital transformation in their schools, the data revealed that school principals encounter multiple obstacles in managing ICT integration, including limited budgets, inadequate infrastructure, and insufficient access to reliable internet, teachers' varying levels of digital literacy, resistance to change, and the pressure to balance administrative duties with instructional leadership. These were their views:

Most of the teachers in my school have been here longer than I have, and they were very reluctant to embrace the changes I had to introduce, including using technology in everything we do, teaching, assessment, record-keeping, etc. P1

Echoing these words was P3, who indicated that for S3, the unwillingness to adapt and adjust was informed by a lack of digital literacy among some teachers. This is what they said:

I noticed that sometimes age has to do with the teachers' reluctance to transform and prefer to be stuck in the traditional approaches, but, unfortunately and sometimes things have to change, and that time is now. P3

P4 indicated that most of the challenges in his school were contextual, encompassing facility, resource, and equipment-related issues. This is the view they shared:

As you can see, the school is in a deep rural area, we do not have most facilities for digital transformation, even the internet connection is bad in this area, we even struggle with our cell phones, but we can always find a way. P4

The same challenge was also reiterated by P2, who indicated that the theft challenge was a problem in her school, although she had tried to tighten security each time a theft incident occurred.

In the 7 years that I have been a principal, we have had three theft incidents where the computer laboratory was burgled and computers were stolen, even in the office. We survive by using laptops. P2

From S6, P6 indicated that the workload posed for his school, as he was also a class and a subject teacher. He shared the following:

I am also a teacher and responsible for EMS in the Grade 7 class, so you can only imagine the pressure. But I try to manage digital transformation the best way I can. P6

The findings revealed that school principals encountered numerous challenges in managing digital transformation, including limited budgets, inadequate infrastructure, unreliable internet access, varying levels of digital literacy among teachers, resistance to change, and the strain of balancing administrative duties with instructional leadership. These constraints not only slowed the pace of ICT integration but also created uneven adoption across schools. Viewed through the lens of Lewin's Change Theory, such barriers highlight the difficulty of moving from the "unfreezing"

stage, where stakeholders must recognize the need for change, towards the “changing” stage, which requires developing new practices and mindsets. Resistance to digital transformation, coupled with structural limitations, suggests that many schools remain “frozen” in traditional practices. Principals thus face the dual task of mobilizing resources while also fostering readiness for change among staff. The implication is that without adequate support structures, professional development, and systemic investment, schools may struggle to reach the “refreezing” stage, where digital practices become embedded in teaching and learning. In response to these challenges, principals employed various strategies to manage digital transformation and sustain innovation within their schools.

Theme 2: School principals’ strategies for overcoming the challenges

In response to the question on strategies that school principals can adopt to effectively manage digital transformation in their schools, participants identified several key approaches, including establishing a clear vision and strategic plan, investing in teacher capacity and professional development, leading by example, ensuring monitoring, feedback, and continuous improvement, mobilizing resources and enhancing infrastructure, as well as fostering a collaborative and innovative school culture. From S1, the participant revealed that having a strategic plan and collaborating with external stakeholders has helped him in his role as a school manager. This is what he said:

What helps me amidst the challenges is to have a vision and a plan, and to make sure that all members in my team buy into the vision. I have also received assistance and some sponsorship from external stakeholders, and that has greatly helped me as a manager and the teachers in using ICT in their teaching. P1

P3 indicated that due to the size of the school, she had to ensure that she leads by example and also invests in capacity building and professional development of all teachers in the school. This was her view:

I had no choice but to gradually introduce technology into our daily operations in the school, as this school is big. Through workshops with groups of my team, I have managed to get them to use ICTs in their daily work. I also think it helps to lead by example as a manager. We work in a data-driven environment, so our teachers have to toe the line as well. P3

From S4, it emerged that teachers were encouraged to use their personal devices to introduce digital transformation into the school.

Our school is in a deep rural area with contextual challenges, and teachers use their cell phones to integrate ICT into teaching. Mine is to ensure that we have some connectivity so that learners can access online resources, broaden their knowledge base, and participate meaningfully in digital learning opportunities. P4

Participants highlighted several key approaches to managing digital transformation, including establishing a clear vision and strategic plan, investing in teacher capacity and professional development, leading by example, ensuring monitoring, feedback, and continuous improvement, mobilizing resources and enhancing infrastructure, and fostering a collaborative and innovative school culture. For example, Participant S1 emphasised that having a well-defined strategic plan and collaborating with external stakeholders greatly assisted him in navigating his role as a school manager. These strategies align with Lewin’s Change Theory, which emphasizes the importance of creating momentum for change through “unfreezing,” transitioning to the “changing” stage by implementing targeted actions, and consolidating gains during “refreezing.” By setting a clear vision, modelling digital leadership, and investing in teacher development, principals are actively guiding their schools through the change process, ensuring that digital practices become

sustainable rather than temporary interventions. Ultimately, these approaches suggest that successful digital transformation requires both structural planning and cultural shifts within schools.

Discussion

The findings from this study provide in-depth insights into how school principals in the iLembe District lead and manage the digital transformation process within primary schools. Using Lewin's (1947) Change Theory as a lens, the discussion interprets the principals' experiences through the stages of *unfreezing*, *changing*, and *refreezing*. This framework helps illuminate how principals initiate, implement, and sustain digital transformation in the face of contextual and systemic challenges. Two dominant themes emerged: Challenges in leading digital transformation and School principals' strategies for overcoming the challenges.

The findings reveal that principals' efforts to lead digital transformation are shaped by structural, cultural, and capacity-related constraints. Participants identified unreliable infrastructure, inconsistent connectivity, and limited technical support as the most pressing barriers. Compounding these were low digital literacy levels among teachers, insufficient funding, and a lack of coherent policy guidance from education authorities. From the perspective of Lewin's "unfreezing" stage, these barriers illustrate the difficulty of breaking away from entrenched routines and mindsets that characterise many rural schools. Teachers' anxiety about technology use and fear of being rendered obsolete reflect resistance typical of this early stage of change. Principals thus face the complex task of creating readiness for transformation, challenging existing norms while fostering a shared understanding of the need for digital integration. Moreover, cultural resistance and systemic inequities emerged as context-specific obstacles, particularly in under-resourced rural schools. In these settings, digital transformation is not only about technology adoption but also about addressing deeper issues of access, equity, and capacity. These findings resonate with the literature that argues digital reform in African contexts must be viewed through both a leadership and socio-economic lens, as leaders must mediate between ambitious national policy goals and local realities.

Despite the challenges, principals demonstrated adaptive and visionary leadership consistent with the changing phase of Lewin's model, where new behaviours and practices begin to take root. They implemented strategies that encouraged teacher buy-in, professional growth, and collaborative problem-solving. A key approach involved organising professional development workshops, mentoring sessions, and peer learning platforms to improve teachers' digital confidence. These actions served as catalysts for behavioural and attitudinal change, helping teachers "move" toward embracing new digital practices.

Principals also forged partnerships with local businesses, Non-Governmental Organisations (NGO), and district offices to secure devices and connectivity support, demonstrating how external collaboration can serve as a catalyst for change. They modelled transformational leadership behaviours, such as inspiring a shared vision and encouraging innovation, which helped sustain morale in resource-limited contexts. Through these adaptive strategies, principals effectively navigated the "changing" stage by transforming challenges into opportunities for growth, learning, and empowerment. As digital practices began to stabilise, some principals initiated mechanisms to institutionalise new norms, aligning with Lewin's refreezing stage. For example, they developed school-based Information and Communication Technologies (ICT) policies, incorporated digital tasks into classroom routines, and established teacher-led ICT committees to ensure long-term

continuity and sustainability. These actions indicate that change had moved beyond experimentation toward becoming part of the school's organisational culture.

Applying Lewin's Change Theory clarifies how school principals in iLembe acted as both initiators and stabilisers of digital transformation. Their leadership reflected a dynamic balance between addressing resistance (*unfreezing*), driving innovation (*changing*), and institutionalising new practices (*refreezing*). However, the findings also underscore that successful change is contingent on contextual enablers such as policy coherence, resource availability, and ongoing professional support. Without these, even the most committed leaders struggle to sustain digital transformation.

This discussion highlights that digital leadership in rural African contexts is inherently adaptive and context-bound. Principals must navigate structural inequities while embodying the roles of motivator, strategist, and capacity builder. By interpreting the findings through Lewin's model, it becomes evident that digital transformation is a process of gradual cultural and behavioural change, requiring continuous reinforcement through leadership vision, collaboration, and systemic alignment. Ultimately, the study confirms that managing digital transformation in primary schools is not merely a technical shift; it is a human-centred change process that relies on visionary, resilient, and contextually grounded leadership. The iLembe District experience contributes an African perspective to global discourses on educational change, highlighting the need for policies and leadership development initiatives that empower principals to lead sustained, inclusive, and equitable digital transformation.

Conclusion and implications for practice

This study has shown that principals in the iLembe District occupy a pivotal role in leading and managing digital transformation in primary schools. While their efforts demonstrate commitment and creativity in addressing contextual challenges, persistent barriers, including limited budgets, inadequate infrastructure, unreliable internet access, varying levels of teacher digital literacy, and resistance to change, continue to impede progress. The findings also revealed that principals employ diverse strategies, including developing clear visions and strategic plans, investing in teacher capacity, mobilizing resources, and fostering collaborative school cultures, to drive transformation.

The study recommends the following: strengthening infrastructure and connectivity, embedding a culture of innovation, and enhancing policy and district-level support. Managing digital transformation in iLembe's primary schools requires a multi-level approach that integrates visionary leadership, teacher capacity-building, infrastructural investment, and systemic backing. From a policy perspective, there is a need for clearer implementation frameworks that translate national digital education policies into actionable support for rural and semi-rural schools. This includes sustained funding for ICT infrastructure, continuous professional development for educators, and mechanisms for monitoring progress at the district level. In practice, principals should be empowered as key agents of digital change through leadership training, peer collaboration networks, and mentorship programmes that promote innovation and adaptability. The lessons drawn from iLembe District underscore the importance of coordinated and context-sensitive interventions to ensure that all South African learners, regardless of geographical or socio-economic context, benefit equitably from digital innovation in education.

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