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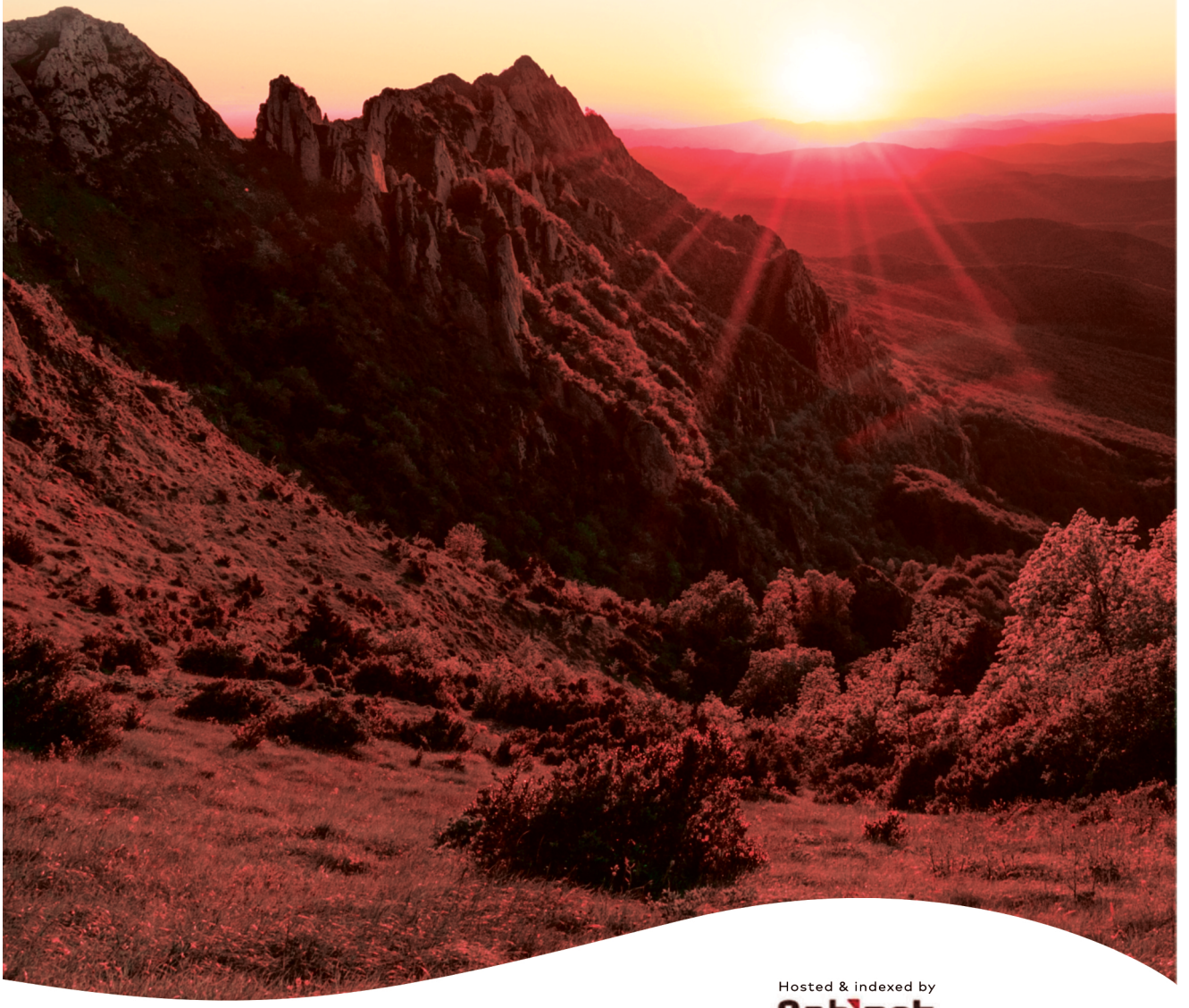

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Digitalising Higher Education: ICT skills and teacher capacitation for sustainability in Zimbabwean universities

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Abstract

In today's digital age, the use of Information and Communication Technology (ICT) in education is becoming increasingly important. The incorporation of ICT in education has the potential to change teaching and learning processes, increase access to education, and provide learners with skills needed to flourish in a digital world (UNICEF, 2020). However, for ICT to have a real impact on education, teachers must be trained in how to utilize ICT successfully as there has not been much capacity building programs to empower teachers in this area. Teacher capacitation is the process of preparing and assisting teachers to utilize ICT in education effectively and it is critical for the long-term integration of ICT in education (Jansen, 2023; Thulo,2024). To effectively integrate technology into their teaching and learning activities, teachers must have a variety of ICT abilities. These ICT abilities are divided into two categories: basic and advanced ICT skills. Basic ICT skills are essential for instructors to perform administrative chores, develop digital content, and access digital resources. Advanced ICT skills, on the other hand, are more complicated skills needed by instructors to create engaging and dynamic learning experiences (UNESCO, 2019). Teachers must be trained in curriculum integration, pedagogical practices, technical skills, and digital citizenship in order to accomplish long-term integration. The incorporation of ICT into education provides an opportunity to decolonize education in Africa by promoting fairness, peace, innovation, industrialization, and sustainability (Mazrui, 2003). Using a qualitative method and a case study approach incorporating semi-structured interviews, questionnaires, and classroom observations, this paper examined in depth the importance of ICT skills and teacher capacity for educational sustainability. A random sampling technique was adopted, with lecturers and students from the Midlands State University in Zimbabwe. The study included ten lecturers and twenty University students. Data was analysed using thematic analysis.

Key words: Higher Education, Teacher training, ICT competencies, digital transformation.

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Introduction

Teachers require a diverse set of Information Communication Technology (ICT) competencies to effectively integrate technology into teaching and learning processes. Foundational ICT skills are essential for educators to perform administrative duties, develop digital content, and access online educational resources. The successful integration of ICT into education necessitates that teachers are adequately equipped across multiple dimensions of technological application. According to Bhattacharjee and Deb (2016), ICT refers to Information and Communication Technologies, encompassing tools and resources used to communicate, create, disseminate, store, and manage information. Kumar et al (2020) assert that ICT involves the entire spectrum of activities related to the generation, storage, transmission, retrieval, and processing of information, significantly overcoming the barriers of time, distance, and speed in educational contexts. Moreover, ICT acts as a catalyst for pedagogical innovation, facilitating information exchange, transforming instructional strategies, advancing learning methodologies, supporting scientific research, and expanding access to knowledge (Kumar et al, 2020). Consequently, ICT enhances educational quality by fostering learner motivation and engagement, promoting the acquisition of fundamental skills, and strengthening teacher professional development. Thus, integrating ICT into education has the potential to revolutionise pedagogical practices, broaden access to learning opportunities, and equip learners with the digital competencies necessary to thrive in a technology-driven world. However, for ICT to exert a substantive influence on education, teachers must be adequately trained and supported to utilise it effectively.

Background

Information and Communication Technologies (ICTs) have transformed the world into a global village, enabling real-time communication through platforms such as Skype, Zoom, and Microsoft Teams. ICTs have significantly enhanced education, with technology now deeply integrated into teaching and learning. Globally, ICT is increasingly acknowledged as a vital enabler of educational development, providing access to information through telecommunication platforms and fostering digital engagement. ICT encompasses a broad range of technologies, including computers, tablets, smartphones, internet connectivity, software applications, and digital tools. Students, thus, gain opportunities to operate effectively within the information age.

Although Zimbabwe has embraced ICT integration in education, studies by Musarurwa (2011), Dzinoreva & Mavunga (2022), among others, have identified notable gaps in teacher competencies. Many educators lack the requisite digital capacity, undermining their ability to transfer knowledge effectively. This deficiency obstructs the realisation of the national Education 5.0 agenda, which seeks to align education with national development imperatives. Digitally literate teachers are essential for effective ICT integration in curricula, which, in turn, enhances both communication and information management in schools.

Technological advancements have redefined how individuals live and work, necessitating a shift in teacher education and training. Higher education institutions must prepare future educators to navigate the globalised, 21st-century classroom. Teachers must be equipped with competencies to engage digital-native learners, utilise technology meaningfully, and contribute to the advancement of quality education.

Zimbabwe has enacted several policies to facilitate ICT use. Following recommendations from the 1999 Nziramasanga Education Commission Report, particularly the promotion of computer use in education, the government adopted a National ICT Policy in 2005. According to Isaac (2007), this policy was informed by an e-readiness survey supported by Harvard University, which revealed significant disparities in ICT preparedness across the country. Earlier strategies such as Vision 2020 and the National Science and Technology Policy (2002) also informed the 2005 policy. Its vision was to transform Zimbabwe into a knowledge-based society by 2020, with a mission to accelerate ICT development and application in support of socio-economic growth. The policy aimed to foster ICT infrastructure, promote training to produce skilled professionals, and ensure equitable ICT access across gender, age, and disability lines.

Zimbabwe also benefits from a proactive civil society sector in ICT development. Organisations such as World Links Zimbabwe have played pivotal roles since the late 1990s (Isaac, 2007). The Ministry of Primary and Secondary Education (MoPSE) has supported several initiatives, including the Schools Computerisation Programme (2000), the Presidential e-Learning Programme (2011), and the Electronic Ministry Application Platform (2016) (Dzinotyiwei & Taddese, 2020). In 2016, a second ICT policy, the Zimbabwe National Policy for Information and Communication Technology, was introduced under the then Minister of ICT, Postal and Courier Services, Supa Mandiwanzira. Although dated 2016, the policy was officially launched in 2018 (Musarurwa, 2018). It

reaffirmed the role of ICTs in national development and education, with a focus on enhancing school connectivity, bridging the urban–rural digital divide, and improving teaching and learning.

To build ICT human capital, the government initiated collaborative programmes between universities and government departments. One such intervention was the Teacher Capacity Development Programme (TCDP), initially piloted at Great Zimbabwe University and later extended to other institutions. In 2017, Midlands State University (MSU) aimed to enrol 10,000 teachers in the TCDP by 2027. The MSU Vice-Chancellor, cited in *The Sunday News* of 4 June 2017, stated that the initiative sought to equip teachers with tertiary-level ICT education to improve teaching quality nationwide.

Complementing national efforts are broader policy instruments, such as the ICT Policy for Primary and Secondary Education (2019–2023), launched in October 2019, and the current ICT Policy Framework (2022–2027). The latter outlines Zimbabwe's digital masterplan aligned with Vision 2030, the National Development Strategy 1 & 2 (NDS1 & 2), and the Smart Zimbabwe 2030 strategy. It envisions a digitally driven economy that improves citizens' quality of life and aligns with international frameworks, including the Sustainable Development Goals (SDGs), the African Union's Agenda 2063, and the Digital Transformation Strategy for Africa (2020–2030).

Despite these developments, there remains a persistent gap in teacher ICT competencies. Dzinoreva & Mavunga (2022), Majoni & Majoni (2015), and Musarurwa (2011) have all underscored the limited proficiency among teachers in using ICTs for instructional purposes. In response, capacitation programmes have been initiated at universities, including MSU, to upskill educators and promote digital literacy.

The global literature further contextualises Zimbabwe's situation. Employing a qualitative design in South Africa, Ngambi (2016) found that pre-service teachers often lacked the knowledge required to integrate content, pedagogy, and technology effectively. The study also highlighted insufficient ICT competencies among some university lecturers, limiting their capacity to train student teachers appropriately.

Similarly, Mboga (2024) examined ICT integration at the University of Nairobi, identifying infrastructure limitations, inadequate ICT skills, and institutional culture as key barriers. The study concluded that successful ICT integration in

higher education depends on infrastructure development, financial investment, and sustained professional development for academic staff.

In Nepal, government-led initiatives have similarly sought to embed ICT into the education system, driven by societal demands (Dulal, 2019). Within Zimbabwe, Maduva et al (2024) examined barriers to digital governance and identified challenges such as digital illiteracy, unaffordable internet access, exclusion of marginalised populations, technical constraints, and inadequate policy implementation. Their study emphasised the importance of targeted government interventions to facilitate national digital transformation.

The lack of digital fluency among teachers continues to be a concern. Many educators remain disconnected from technological developments occurring in their own classrooms. As *The Chronicle* (13 September 2022) noted:

> *Government has an obligation to equip our teachers with competencies and pedagogic skills that will enable them to teach Sciences and Mathematics and use Information Communication Technologies in teaching.*

Teacher training in ICT Skills

The Ministry of Primary and Secondary Education (2018) report stated that although the percentage of trained teachers at the primary and secondary levels is high, only about 15% of primary teachers have minimum basic computer skills while less than 2% of secondary teachers are specialist teachers in computer science. In this regard, teachers require a range of ICT skills to effectively integrate technology into their teaching and learning practices. These ICT skills can be categorized into two groups, which are basic and advanced ICT skills.

Basic ICT skills are fundamental skills that teachers require to carry out administrative tasks, create digital content, and access digital resources. These skills include computer literacy, proficiency in basic software applications, and internet skills. Computer literacy skills include being able to use a computer's operating system, file management, and file organization skills. Proficiency in basic software applications involves the use of tools such as word processing software to create lesson plans, presentations, and student assignments (Das, 2024). Teachers need internet skills to access online resources, search for information, and communicate with colleagues and students.

Advanced ICT skills are more complex skills that teachers require to develop engaging and interactive learning experiences. These skills include skills in educational software, multimedia design, and online communication and

collaboration tools. For example, teachers can use educational software to create simulations, animations, and games that make learning fun and interactive (Ou & Kane, 2013). They can also use multimedia design tools to create videos, podcasts, and other digital content that can be shared with students. Online communication and collaboration tools enable teachers to communicate with students, colleagues, and parents in real-time, share information, and work collaboratively.

Methodology

The study employed a qualitative research design (Robert & Wilson, 2002), utilising a case study approach as outlined by Lim et al (2020). Data were collected through semi-structured interviews, structured questionnaires, and classroom observations. Participants were drawn from the Faculty of Education at Midlands State University using purposive sampling. The sample comprised of ten lecturers and 20 university students.

A structured electronic questionnaire was administered to assess faculty members' ICT competencies and their perceptions of the impact of ICT on teaching and learning. In addition, faculty members participated in semi-structured interviews to provide in-depth insights into their experiences with integrating ICT into their pedagogical practices.

Focus group discussions were conducted with students to explore their engagement with ICT-based learning and their perceptions of how technology influences sustainability within the university context. The collected data were analysed thematically. Interview and focus group transcripts were systematically coded, categorised, and interpreted to identify emerging themes and patterns in alignment with the study's objectives.

In accordance with Hogan (2023), ethical protocols were strictly observed throughout the research process. Informed consent was obtained from all participants prior to data collection. The study adhered to the ethical standards of Zimbabwean educational institutions, ensuring participants' anonymity and the confidentiality of all responses. The findings from the interviews, questionnaires, and focus group discussions were synthesised to present a comprehensive account of ICT skills, teacher capacitation, and their implications for sustainability within Zimbabwean higher education institutions.

Results

The integration of ICT in education has been steadily growing and is becoming compulsory in the educational agenda. The section is divided into three parts which are the importance of ICT in Zimbabwean schools, areas of teacher capacitation and challenges faced in ICT integration.

Importance of ICT in Zimbabwean Schools

In 21st-century Zimbabwe, the integration of ICT into education has emerged as a critical component of contemporary pedagogy. The transformative potential of ICT lies in its capacity to empower both educators and learners, enhancing the teaching process, improving access to information, and fostering higher-order thinking skills such as critical thinking, problem-solving, and creativity. As Dulal (2019) observes, teacher educators increasingly conceptualise ICT in education not only as the teaching of ICT skills but also as the application of technology in academic instruction, administration, and school management. A lecturer interviewed stated:

> *One of the key advantages of ICT in education is its ability to provide easy access to a vast amount of information and learning resources. Digital platforms, such as online libraries, e-books, educational websites, and open educational resources enable students and educators to access up-to-date information from diverse sources* — ***Lecturer 4***

Lecturers at Midlands State University generally concurred that the integration of ICT has the potential to reduce the knowledge gap between developed and developing nations by facilitating equitable access to quality education. However, many still associate ICT primarily with the computer laboratory and do not fully recognise its cross-cutting role within the broader educational system.

Interviewees further highlighted that ICT enables personalised learning experiences, which can accommodate individual learners' needs and learning styles. Adaptive learning platforms, powered by algorithms, assess student progress and adjust content delivery accordingly. This aligns with findings by the National Education Policy Center (2015), which established that ICT tools significantly enhance student motivation and academic performance, particularly in personalised learning environments.

> *ICT facilitates personalised learning and is motivating to students, as they can access a wide range of information, especially on the internet* — ***Lecturer 7.***

Respondents also emphasised the collaborative benefits of ICT. Tools such as virtual classrooms, video conferencing, and online discussion forums were seen as fostering global connections and enabling cross-cultural exchanges. These technologies allow communication among students, teachers, and even parents, regardless of location.

> *We can do online learning with my students. I can even send their homework on WhatsApp and it is easy to discuss. If they need anything, students can communicate at any time* — ***Lecturer 3.***

Moreover, participants highlighted the pedagogical advantages of ICT, including its ability to support interactive and innovative teaching methods. Educational software, simulations, and multimedia resources were said to enhance learner engagement and overall effectiveness.

> *Instructors who effectively integrate ICT into their teaching practices experience higher levels of student engagement and satisfaction* — ***Lecturer 6.***
>
> *Incorporating ICT in education nurtures essential 21st-century skills such as critical thinking, problem-solving, creativity, and digital literacy* — ***Lecturer 10.***

These findings align with the Framework for 21st Century Learning (Partnership for 21st Century Learning, 2019), which advocates for equipping learners with skills essential for thriving in a digitally interconnected world. Moorhouse & Wong (2022) further argue that ICT integration through blended teaching modalities supports remote and flexible learning, allowing both students and teachers to engage with content independently and asynchronously.

Collectively, these perspectives underscore the multifaceted benefits of ICT in education, including enhanced access to information, personalised learning, improved collaboration, innovative pedagogy, and the development of digital competencies. As the curriculum evolves in response to digital transformation, the shift from teacher-centred to learner-centred education becomes increasingly pronounced. To sustain this trajectory, educators and policymakers must make deliberate investments in ICT infrastructure and training to prepare learners for the demands of a dynamic and technology-driven global society.

Areas of teacher capacitation to achieve sustainable integration in Zimbabwe

Education is the cornerstone of sustainable development, and for Zimbabwe to achieve meaningful ICT integration in its education sector, the capacitation of teachers is essential. According to UNESCO (2020), teacher capacitation involves the continuous enhancement of educators' skills, knowledge, and competencies,

enabling them to deliver quality education while adapting to technological and pedagogical shifts. Preparing and supporting teachers to effectively use ICT is foundational to the sustainable integration of technology in education, an approach that is long-term, systemic, and beneficial to all stakeholders.

Findings from the study indicate that capacity development efforts in Zimbabwe are uneven. While many teachers demonstrate high levels of technological adaptation and confidence in using ICT, others lack critical competencies required for curriculum-wide integration. Effective technology integration begins with preparing teachers to use digital tools to create inclusive, engaging, and interactive learning environments. Training in the use of educational applications, e-learning platforms, and interactive multimedia tools can greatly enhance teaching and learning outcomes. UNESCO's (2020) *The Future of Education* report highlights the centrality of ICT in achieving Sustainable Development Goals (SDGs), particularly Goal 4 on inclusive and equitable quality education.

One respondent noted the absence of institutional support structures for ICT pedagogical integration:

> *There are no clear training measures that teach us as teachers how to teach pupils incorporating ICT advancements. But from my own initiative and through my degree programme at university, I studied a module in ICT. I have no idea how to fix the gadgets if trouble arises* — ***Lecturer 5.***

Respondents also identified the need for training in essential technical skills. Teachers require the ability to troubleshoot technical issues, manage digital content, and effectively operate online platforms. Familiarity with hardware, software, and digital content creation tools was considered critical for sustainable ICT use. However, many educators indicated that government-sponsored training initiatives in these areas remain inadequate. As Dzinoreva & Mavunga (2022) argue, a lack of institutional investment in teacher ICT training significantly hampers technological advancement in the curriculum.

Without systematic capacitation, efforts to embed ICT into Zimbabwean education risk being superficial and unsustainable. Therefore, targeted professional development programmes are needed, supported by government policy and institutional frameworks, to ensure that all teachers are equipped to leverage ICT in pursuit of pedagogical excellence and national development goals.

A lecturer in the study noted that:

> *Teachers need to be capacitated to effectively integrate ICT into the curriculum. They need to understand how to design and develop ICT-based lessons and activities that align with curriculum objectives. They need to know how to incorporate ICT tools into lesson planning, classroom activities, and assessment tasks. This will help to make learning easier and more interesting, and produce better results* — ***Lecturer 6.***

This sentiment reflects the reality that teacher capacitation programmes remain limited, with many teachers learning through peer engagement or personal initiative. Interviewed students also pointed to challenges associated with the Continuous Assessment Learning Activities (CALAs) component of the new curriculum. CALAs introduced complex tasks that require technological literacy to navigate. As of 2024, there has been a shift from CALAs to Heritage-Based Education, further increasing the demand for teacher adaptability in response to evolving policy landscapes. Technological advancements have therefore placed increasing responsibility on teachers to update their pedagogical approaches continuously.

Interviewees consistently argued that teachers must be equipped to use ICT tools to enhance pedagogical practice. This includes the ability to design interactive and engaging lessons tailored to diverse learner needs. For example, visual learners benefit more from videos and slides than traditional verbal explanations. As one participant stated:

> *Some learners are visual learners, so teachers need to create videos and slides that help them remember what they have seen and heard* — ***Lecturer 6.***

Despite the value of ICT integration, infrastructure limitations persist. In many schools, computers have been acquired through donations, but are rendered unusable due to lack of electricity or connectivity:

> *In some schools, the computers have been accessed through donations, but there is no electricity*— ***Lecturer 8.***

Digital citizenship and environmental education

Interview respondents also highlighted the importance of capacitating teachers to promote digital citizenship among students. Digital citizenship involves the responsible and ethical use of technology, including online safety, digital privacy, and awareness of cyberbullying. Teachers must guide learners in critically evaluating online content and identifying misinformation. Concerns were raised regarding students' unsupervised access to social media platforms:

Most students go online for TikTok, Facebook, and other sites—especially for pornographic material. They need to be taught digital citizenship.

Sustainable ICT integration also involves promoting environmental consciousness. Teachers play a vital role in fostering eco-friendly attitudes among students. Capacitation in environmental education strategies, such as integrating sustainability themes into lesson plans, can instil a sense of environmental stewardship. The Environmental Management Agency (EMA) of Zimbabwe offers resources and training aimed at strengthening environmental education in schools.

Inclusive Education

Inclusive education ensures equitable learning opportunities for all students, regardless of ability, socio-economic status, or location. For sustainable ICT integration, teachers must be equipped to accommodate learners with diverse needs. Institutions of higher learning must ensure accessibility for students from disadvantaged backgrounds and rural areas, especially those lacking electricity or internet connectivity. Capacitation in inclusive pedagogical practices such as differentiated instruction and Universal Design for Learning (UDL) can foster supportive and equitable classroom environments. UNESCO provides comprehensive frameworks on inclusive education to guide such initiatives.

This inclusivity also applies to language in ICT-enabled classrooms. Zimbabwe's linguistic diversity, with 16 official languages, necessitates that teachers are trained in multilingual and bilingual education. The MPSE provides guidelines for implementing multilingual instruction within ICT contexts. Garcia-Lazaro et al (2022) argue that initial teacher education must address the political and pedagogical implications of technology use to prevent the persistence of outdated classroom methods:

Sometimes it is difficult to explain components of a computer to students. I have to ask another teacher to help explain in the local language, which I am now trying to learn — ***Lecturer 2.***

Life skills and entrepreneurship education

Equipping students with life skills and entrepreneurship education is critical for national development and individual empowerment. Teachers must be capacitated to integrate these competencies into the curriculum effectively. The Zimbabwe Education Cluster has underscored the importance of embedding entrepreneurship education to equip learners with practical skills and socio-economic agency. Teacher training should thus include modules on financial

literacy, project-based learning, and enterprise development, ensuring learners are prepared for real-world challenges.

Sustainable integration and professional development

The sustainable integration of ICT in Zimbabwean education hinges on a well-prepared teaching workforce. Professional development programmes must keep pace with technological innovation. Investing in continuous training enables teachers to deliver ICT-based education effectively. Furthermore, sustainable ICT integration requires long-term planning, including resource mobilisation from government agencies and partnerships with non-governmental organisations (NGOs) to improve access to technology and infrastructure.

Challenges of implementing ICT skills education in Zimbabwe

While ICT presents transformative opportunities in education, numerous structural barriers persist in Zimbabwe. Chief among these is infrastructural deficiency.

Infrastructure and Connectivity

Interview participants identified inadequate infrastructure and limited internet connectivity, particularly in rural areas, as major constraints. Many schools lack essential ICT hardware, such as computers, tablets, and smartphones, while others suffer from unreliable connectivity:

> *There are limited ICT gadgets for learners. Even when available, internet connectivity is a serious problem* — ***Interview Participant.***

High costs of digital devices and educational software also place these tools out of reach for many institutions. Zimbabwe's persistent economic difficulties, compounded by low public sector wages, limit household and institutional capacity to invest in ICT. The National ICT Policy (2020) recognises these barriers and advocates for expanded access to ICT resources through strategic public-private partnerships.

Electricity supply

Reliable electricity is fundamental to ICT use in schools. However, erratic power supply undermines digital learning efforts. Interviewees reported prolonged load shedding and limited access to alternative energy sources:

> *There is no way you can use ICT gadgets without electricity. Load shedding can go for up to 18 hours. Generators are expensive to run, and most schools have no solar power* — ***Lecturer 9.***

The African Development Bank (2021) stressed the importance of investing in renewable energy to support digital transformation in Zimbabwe. Without reliable electricity, even well-resourced schools cannot implement ICT-based education effectively.

Digital divide

Respondents also raised concerns about the urban–rural digital divide. Urban schools typically enjoy better infrastructure and connectivity, while rural institutions are often underserved. This disparity exacerbates educational inequality and restricts nationwide ICT adoption.

Digital literacy and training

According to study participants, digital literacy and inadequate training remain critical challenges hindering the effective utilisation of ICT in Zimbabwean education. Respondents emphasised that limited digital competencies among both educators and students significantly impede the integration of ICT into teaching and learning. The introduction of ICT has necessitated a redefinition of teacher roles, pedagogical strategies, and instructional approaches. However, many teachers are inadequately prepared for this shift. A study by the Research Council of Zimbabwe (RCZ, 2018) revealed that a large proportion of teachers lack the necessary training to effectively integrate ICT tools into their teaching practices. This shortfall is often attributed to the limited availability of digital devices in teacher training colleges and universities, which constrains the capacity of lecturers to equip pre-service teachers with practical ICT skills.

The consequence of inadequate digital training is the underutilisation of available technologies, which in turn hampers the development of learners' ICT competencies. Even in cases where training initiatives are introduced, respondents identified concerns about the content's relevance and localisation. They argued that the widespread adoption of foreign ICT materials, often developed for different educational contexts, impedes learners' ability to relate to the content and apply it meaningfully. As one respondent observed,

> *Most content in ICT programmes is foreign, such that learners fail to relate it to our local situation.*

This disconnect highlights the urgent need for ICT education that aligns with Zimbabwe's socio-cultural context and curricular goals. The MOPSE (2019) recognises this challenge, affirming the importance of developing locally relevant content to support ICT skills education. Without culturally appropriate

and contextually aligned learning materials, ICT instruction may remain superficial and disconnected from learners' realities.

Furthermore, respondents stressed that ICT tools are dynamic and continually evolving. As such, educators must be trained to use basic application software and digital tools proficiently to enable successful integration into everyday classroom practice. The absence of such foundational training contributes to low adoption rates and inconsistent ICT usage across institutions.

While ICT integration holds immense potential to transform teaching and learning in Zimbabwe, its success is contingent upon overcoming multiple structural and pedagogical obstacles. These include digital literacy gaps, lack of locally relevant content, inadequate infrastructure, electricity shortages, limited access to hardware and software, and the absence of a robust and adaptive policy framework. By addressing these multifaceted challenges through systemic investment and targeted teacher capacitation, Zimbabwe can harness the full potential of ICT to enhance educational quality and equip educators with essential 21st-century skills.

Top of Form

Conclusions

Based on the findings of the study, it can be concluded that the integration of ICT in Zimbabwean educational institutions is significantly hindered by multiple interrelated challenges. Chief among these is the inadequate ICT infrastructure, which limits both teachers' and learners' access to essential digital tools such as computers and tablets. The high cost of these devices, compounded by broader economic constraints, renders them inaccessible to many schools and students, ultimately affecting educational outcomes. Furthermore, limited internet connectivity, primarily due to persistent electricity shortages and financial constraints, impedes the consistent use of ICT for teaching and learning.

A widespread lack of digital literacy among educators and students also presents a critical barrier, as many teachers have not received adequate training to integrate ICT effectively into their pedagogical practices. This skills gap reflects a broader deficiency in sustained teacher capacitation programmes. Additionally, the adoption of foreign ICT content that lacks cultural and curricular relevance has emerged as a significant concern. The absence of locally contextualised educational materials diminishes the effectiveness of ICT integration, as learners struggle to relate to content not aligned with their lived experiences. Addressing these challenges through targeted investment, policy reform, and contextualised training programmes is essential for realising the transformative potential of ICT in Zimbabwean education.

Recommendations

To successfully integrate ICT in Zimbabwean schools, the government must adopt a multifaceted strategy that addresses both infrastructural and pedagogical dimensions. First, the availability and affordability of digital hardware must be prioritised. Initiatives such as subsidised tablet distribution schemes or "bring your own device" policies can significantly enhance access to technology for both educators and learners. Equally important is the maintenance and regular upgrading of existing devices to keep pace with technological advancements.

Second, the development of locally relevant educational materials, including digital textbooks, multimedia content, and interactive applications, can enrich the learning experience and foster greater engagement. Establishing collaborative platforms where educators can share resources and pedagogical strategies would further support professional growth. Third, robust infrastructure is

essential to underpin ICT integration. Reliable internet connectivity and a stable electricity supply are prerequisites for digital learning; hence, sustained investment in national digital infrastructure is critical to support e-learning, virtual platforms, and continuous teacher development.

Fourth, comprehensive and ongoing ICT training programmes are required to build teachers' confidence and competence in using technology effectively. These programmes should be tailored to Zimbabwe's contextual challenges and encompass both basic digital literacy and advanced pedagogical techniques for curriculum integration. Delivery methods may include workshops, seminars, and online courses.

Finally, a strong and coherent policy framework is vital to guide ICT integration. The government should develop and implement policies that prioritise ICT in teacher capacitation, allocate adequate funding, and establish implementation guidelines. Public-private partnerships should also be leveraged to mobilise resources and technical expertise. The strategic use of ICT redefines learning by promoting collaboration, peer interaction, and improved communication. When teachers are digitally literate, they are better equipped to integrate ICT into the curriculum, thereby enhancing the overall efficiency, interactivity, and sustainability of the teaching and learning process.

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