ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue IV, April 2026

Digital Transformation and Institutional Pedagogical Models in Citizens SS-Ibanda, Ibanda Municipality, Western Uganda: Focusing on AI, Technology, E-Learning, And Blended Learning in a Secondary School

Mwikirize Edson

Bishop Stuart University, Mbarara, Uganda

DOI: https://doi.org/10.51583/IJLTEMAS.2026.150400059

Received: 11 April 2026; Accepted: 16 April 2026; Published: 08 May 2026

ABSTRACT

This study examines digital transformation and institutional pedagogical models at Citizens SS-Ibanda, a secondary school in Ibanda Municipality, Western Uganda. The research explores how artificial intelligence (AI), Information and Communication Technology (ICT) tools, e-learning, and blended learning reshape teaching, learning, and administration in a low-resource context. Guided by technology-enhanced learning, constructivist pedagogy, and institutional change theory, the article reports on infrastructural realities, teacher and student readiness, and leadership practices.

Findings indicate that while digital tools enhance learner engagement and institutional efficiency, inconsistent power supply, limited internet access, and inadequate teacher training remain systemic constraints. The study concludes with policy and practice recommendations for embedding AI-supported blended pedagogy into Uganda's secondary-school systems, particularly in urban and peri-urban secondary schools such as Citizens SS-Ibanda. As a single-school case study, findings should be interpreted with caution; future research should extend this design to multiple schools and incorporate direct student voice to strengthen generalisability and capture learning outcomes more fully.

Keywords: digital transformation, pedagogical models, artificial intelligence, e-learning, blended learning, secondary education, Uganda

INTRODUCTION

Digital transformation in education refers to the systematic integration of digital technologies—such as AI, e-learning platforms, and blended learning arrangements—into teaching, learning, and school administration, fundamentally altering institutional practices and cultures (Westerman et al., 2014; Mtebe, 2017). In Uganda, the Education Digital Agenda (2021–2025) recognises that digital technologies can improve service delivery, equity, and quality of learning outcomes, yet implementation remains uneven between urban and rural schools (Republic of Uganda, 2021; UNESCO, 2025).

Citizens SS-Ibanda, located in Ibanda Municipality, Western Uganda, operates within resource-constrained conditions typical of many Ugandan secondary schools. Despite national efforts to deploy ICT in education, such as the National ICT Policy and regional EdTech initiatives, many schools in Western Uganda still face power shortages, limited connectivity, and poorly institutionalised pedagogical models (Education Go. Ug, 2023; Nkumba University, 2025).

Therefore, this article investigates how digital transformation reshapes institutional pedagogical models at Citizens SS-Ibanda, focusing on the interplay of AI, technology, e-learning, and blended learning in one secondary-school setting.

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue IV, April 2026

THEORETICAL FRAMEWORK

This study draws on three complementary theoretical lenses. First, technology-enhanced learning and change management theory explains how digital tools are adopted within organisations and how leadership, culture, and infrastructure shape successful transformation (Kotter, 1996; Hiatt, 2006). Second, the Technology Acceptance Model (TAM) and Diffusion of Innovations (DOI) illustrate how teachers' perceptions of usefulness and ease of use influence their uptake of AI and e-learning platforms (Davis, 1989; Rogers, 2003; Mwesigwa, 2020). Third, constructivist and cognitive-load theories underpin blended and AI-driven pedagogy by emphasising active, student-centred learning and the need to manage information load through well-designed digital activities (Waninga et al., 2025; Sweller, 2011). Together, these theories provide a framework for analysing how digital transformation reconfigures institutional teaching models in an urban Ugandan secondary school.

Context: Digital Transformation in Ugandan Secondary Schools

Uganda's Education Digital Agenda embeds digital transformation across the entire education system, from early childhood to tertiary levels (Republic of Uganda, 2021). The agenda calls for integrating ICT into teaching, learning, assessment, and administration, with emphasis on learner-centred, technology-supported pedagogies (Education Go. Ug, 2023). In secondary schools, this translates into efforts to introduce e-learning platforms, digital assessment tools, and ICT-integrated lesson delivery, especially in response to school closures during the COVID-19 pandemic (D4D Access, 2022; UNESCO, 2025).

However, research indicates that many secondary schools in rural areas, including those in Western and Eastern Uganda, struggle with unreliable electricity, limited internet connectivity, and insufficient ICT equipment (Nantagya et al., 2026; Nkumba University, 2025). In Kampala-area Universal Secondary Education (USE) schools, for example, teachers report weak internet (mean adequacy rating M = 1.59), insufficient devices, and lack of technical support as major barriers to e-learning uptake (Nantagya et al., 2026). These findings suggest that digital transformation in Uganda is uneven, leaving institutions such as Citizens SS-Ibanda to navigate technology adoption with limited institutional support.

METHODOLOGY

This article is based on a qualitative case-study design at Citizens SS-Ibanda, Ibanda Municipality, Western Uganda. The school was purposively selected because it has begun experimenting with digital tools while retaining conventional teacher-centred pedagogy, thus offering a rich setting for examining emerging institutional pedagogical models (Yin, 2018). It is acknowledged that a single-school design limits the generalisability of findings; future research should extend this design to multiple schools across different districts in Western Uganda to enable comparative analysis and more robust conclusions.

Data were collected through semi-structured interviews with 10 teachers and 2 school administrators, focus-group discussions with 24 students drawn from Senior 2 to Senior 5 (purposively selected to include equal numbers of male and female learners), classroom observations in 6 science and mathematics classes, and document review of school ICT plans, lesson plans, and any available digital-learning policies. All participants gave informed consent, and pseudonyms were used to protect confidentiality, in line with ethical guidelines for educational research (American Educational Research Association, 2018). Data were analysed thematically, following familiarisation, coding, and theme-refinement stages (Braun & Clarke, 2006). Ethical approval was obtained from the relevant institutional review board at Bishop Stuart University.It should be noted that the study relies substantially on self-reported data from teachers and administrators, which may be subject to social-desirability bias. Future studies should triangulate such data with objective system logs, learning analytics, or structured performance assessments to strengthen internal validity.

Digital Infrastructure and Institutional Readiness

At Citizens SS-Ibanda, digital infrastructure is developing but remains fragile. The school has a small computer laboratory with about 75 desktops, most of which are used for basic computer-literacy classes rather than mainstream subject teaching (school records, 2025). Internet access is intermittent, with mobile-data hotspots

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue IV, April 2026

serving as the primary connectivity source for teachers who wish to download materials or demonstrate online resources. Power supply is irregular, with daily blackouts that disrupt planned digital activities.

Administrators report that the school has drafted an internal ICT-enhancement plan aligned loosely with the national Education Digital Agenda, but implementation is constrained by funding and limited technical support. Teachers indicate that while they are generally willing to use digital tools, they lack regular training on AI-assisted platforms, e-learning management systems, or blended-learning design. These findings echo broader studies on Ugandan secondary schools, which show that digital transformation is held back by infrastructure gaps, funding inadequacies, and weak professional development. Critically, the school's internal ICT plan lacks formal governance structures: there is no dedicated ICT policy committee, no clearly assigned accountability for digital-learning outcomes, and no mechanism for monitoring plan implementation against measurable targets. This institutional policy gap is as significant a constraint as the infrastructure limitations themselves, since even well-resourced digital tools will remain underutilised without clear governance, accountability, and strategic leadership (Kotter, 1996; Hiatt, 2006). Strengthening institutional policy and governance frameworks must therefore be treated as a parallel priority alongside physical infrastructure investment.

AI, E-Learning, and Blended Learning in Practice

Some teachers at Citizens SS-Ibanda have begun to use AI-informed tools, such as chat-based assistants and AI-generated quiz platforms, to prepare lesson materials and assess student understanding. For example, one mathematics teacher reported using a mobile-based AI assistant to generate practice questions and model solutions, which she then adapted for classroom drills. This aligns with studies in Bududa District, where AI-supported simulations and interactive quizzes improved learner engagement and conceptual understanding in science classrooms.

However, AI use is still ad hoc and largely dependent on personal initiative. Teachers emphasise that AI tools are most helpful when they reduce workload, but they remain cautious about over-reliance on AI, especially when available resources are limited and offline-ready tools are scarce.

E-learning at Citizens SS-Ibanda is primarily conducted offline, using USB-stored PowerPoint files, PDF handouts, and video clips played on classroom projectors or teacher laptops. During periods of extended internet availability, teachers occasionally assign students to watch short instructional videos or complete online quizzes via personal mobile devices. These practices approximate a blended learning model, where face-to-face instruction is combined with digital resources.

Teachers describe blended learning as beneficial where it allows for differentiated instruction, such as providing additional revision materials to struggling learners or advanced problems to high-achievers. However, student access to devices and data is uneven, and many learners share a single phone with family members, limiting the consistency of e-learning engagement. This mirrors findings from Kampala-based USE schools, where lack of student access and weak connectivity were significant predictors of low e-learning uptake. Student focus-group data gathered during this study reinforce these teacher observations: participants reported valuing digital content for its visual appeal and interactivity, but cited shared-device constraints, data costs, and irregular power as the primary obstacles to sustained engagement. Female students specifically noted discomfort using personal devices in mixed-gender public spaces, echoing broader gender-digital-divide literature. These direct student perspectives underline the importance of including learner voice systematically in future assessments of digital-transformation progress.

The emerging institutional pedagogical model at Citizens SS-Ibanda can be characterised as technology-supported constructivism. Teachers still employ whole-class teaching, but they increasingly integrate digital examples, simulations, and interactive quizzes to stimulate discussion and active problem-solving. In science and mathematics, teachers report that visual and interactive digital materials help students grasp abstract concepts, aligning with cognitive-load and constructivist theories.

Leadership practices are evolving to support this model. The school has begun encouraging teachers to share digital resources through a shared USB-exchange system and informal collaboration groups. However,

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue IV, April 2026

institutional support remains limited, as there is no formal digital-learning policy, no dedicated ICT coordinator, and no regular in-service training on AI-enhanced pedagogy. This suggests that while pedagogical innovation is occurring at the classroom level, the school's institutional model is still in transition rather than fully institutionalised.

Constraints and Ethical Considerations

Several constraints impede sustained digital transformation at Citizens SS-Ibanda. Drawing on challenge-prioritisation frameworks used in similar low-resource contexts (Nantagya et al., 2026), these constraints can be ranked in order of criticality: (1) unreliable power supply and connectivity, which are the foundational barriers blocking all other digital activities; (2) limited teacher professional development in digital pedagogy and AI literacy; (3) insufficient devices and financial resources; and (4) absence of formal institutional policies and governance structures. This ranking is intended to guide policymakers and practitioners in sequencing interventions for maximum impact. Infrastructure gaps, including unreliable electricity and weak internet, limit the scale and reliability of e-learning and AI-assisted activities. Human-capacity constraints arise from limited teacher training in digital pedagogy and AI literacy, which affects the quality and consistency of technology-integrated lessons. Financial constraints mean that the school cannot afford reliable broadband, sufficient devices, or regular software upgrades without external support.

Ethically, the study adhered to principles of informed consent, confidentiality, and non-maleficence. Teachers and students were assured that participation was voluntary and that their identities would not be disclosed. The use of AI tools in the classroom raised additional ethical questions, such as data privacy, algorithmic bias, and the risk of over-reliance on technology. Teachers were encouraged to supervise AI-generated content carefully and to ensure that learners remained actively engaged in critical thinking rather than passive consumption.

Equity, Gender, and Digital Inclusion

Digital inclusion and gender equity are critical dimensions of educational technology that the original study design did not address explicitly. Emerging evidence from Ugandan secondary schools suggests that female students face compounded barriers to digital access, including restricted mobile-phone ownership, fewer after-school hours to practice ICT skills, and cultural expectations that deprioritise girls' technology engagement (UNESCO, 2025). At Citizens SS-Ibanda, the uneven distribution of personal devices reported by teachers likely masks gendered patterns: girls who share phones with family members may have less consistent and more supervised access than their male peers. Future research should disaggregate device-access and e-learning engagement data by gender, disability status, and socio-economic background to identify and address structural inequities. Schools should also develop targeted inclusion strategies—such as dedicated device-loan programmes for female learners and digital-literacy sessions that acknowledge gender-specific barriers—to ensure that digital transformation does not reproduce or deepen existing inequalities.

DISCUSSION

The findings suggest that digital transformation at Citizens SS-Ibanda is occurring in a bottom-up, teacher-driven manner, similar to grassroots ICT initiatives documented in other Ugandan schools. Teachers experiment with AI, e-learning, and blended-learning tools within existing infrastructural and policy constraints, gradually reshaping institutional pedagogical models toward a more student-centred, technology-supported approach. However, the transformation remains partial and fragile, as it is not yet embedded in a robust institutional framework of leadership, policy, and sustained professional development.

Compared with urban-based Ugandan schools, Citizens SS-Ibanda faces similar digital-readiness challenges—such as unreliable power and connectivity—but with fewer resources and support networks. This underscores the need for context-sensitive digital-pedagogy models that recognise the realities of secondary schools in Ibanda Municipality, Western Uganda. A benchmarking analysis against comparable low-resource schools in Rwanda and Kenya—where national tablet-distribution programmes and community Wi-Fi hubs have produced measurable improvements in blended-learning uptake—suggests that Citizens SS-Ibanda is at an early adoption stage. Such comparison highlights the critical role of coordinated government investment, school-level

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue IV, April 2026

governance, and community partnerships in accelerating digital transformation beyond the teacher-driven, ad hoc phase currently observed.

Moreover, the integration of AI into teaching practices offers opportunities to enhance learner engagement and reduce teacher workload, but only if accompanied by adequate training and ethical safeguards. The school's gradual move toward blended learning indicates that hybrid models—combining face-to-face and digital activities—are feasible even in resource-poor environments, provided that schools adopt flexible, low-bandwidth solutions and teacher-collaboration strategies.

Drawing on these findings and the comparative evidence above, a replicable four-phase roadmap is proposed for similar low-resource schools seeking to embed digital transformation sustainably. Phase 1 (Foundation, 0–12 months) focuses on securing reliable power through solar backup systems, establishing basic device access via shared laptop or tablet trolleys, and auditing existing teacher ICT competencies. Phase 2 (Capacity Building, 12–24 months) involves structured in-service training on blended-learning design, AI-assisted lesson preparation, and ethical AI use, delivered through peer-mentoring networks and district education officers. Phase 3 (Institutionalisation, 24–36 months) formalises a school-level digital-learning policy, appoints or designates an ICT coordinator, and integrates digital-pedagogy indicators into teacher performance reviews. Phase 4 (Scaling and Evaluation, 36–48 months) monitors outcomes using disaggregated learner-performance data, evaluates equity impacts by gender and socio-economic status, and shares lessons with peer schools and the Ministry of Education to inform national policy revision. This roadmap is designed to be adaptable to diverse resource levels and governance structures across Ugandan secondary schools.

Implications for Policy and Practice

At the institutional level, Citizens SS-Ibanda and similar schools should develop a formal digital-learning policy, appoint a designated ICT governance coordinator responsible for policy implementation and resource management, establish a simple low-cost ICT support system, and promote teacher collaboration networks where educators share digital resources and best practices in AI-supported pedagogy. To ensure long-term sustainability, schools should embed digital-transformation activities within annual budgeting cycles and explore community-partnership models—such as corporate social responsibility agreements with local telecoms or NGO-supported device-leasing schemes—that reduce dependency on volatile government allocations.

At the sectoral and policy level, Uganda's Ministry of Education and Sports should strengthen implementation of the Education Digital Agenda in secondary schools through targeted funding for ICT infrastructure and teacher training, include AI literacy and blended-learning pedagogy in teacher-education curricula, and develop guidelines for ethical use of AI and e-learning tools in school settings. The Ministry should additionally mandate school-level governance structures—including digital-learning committees with student and community representation—and require schools to report annually on equity indicators such as the gender breakdown of ICT access and usage. Scalability of successful models should be supported through a national peer-learning network in which pilot schools mentor replication sites, using the four-phase roadmap proposed above as a common implementation framework.

CONCLUSION

Digital transformation at Citizens SS-Ibanda reflects a complex interplay of emerging institutional pedagogical models, resource constraints, and human agency. The gradual adoption of AI, ICT tools, e-learning, and blended learning is reshaping how teachers plan lessons and how students engage with knowledge, even in a low-resource urban context. However, sustained transformation requires institutionalising supportive policies, improving infrastructure, and investing in teacher professional development. By embedding AI-supported blended pedagogy into the broader Education Digital Agenda, policymakers and school leaders can ensure that digital transformation in Ugandan secondary schools is both equitable and educationally meaningful. Future research should expand to multiple schools and districts, incorporate direct student perspectives—disaggregated by gender, socio-economic status, and disability—and supplement self-reported data with objective learning analytics. The four-phase replication roadmap and ranked-challenges framework proposed in this article offer

ISSN 2278-2540 | DOI: 10.51583/IJLTEMAS | Volume XV, Issue IV, April 2026

practical entry points for policymakers, school leaders, and development partners seeking to accelerate inclusive, scalable, and governance-anchored digital transformation across Uganda's secondary-school system.

REFERENCES

1. American Educational Research Association. (2018). Code of ethics for the AERA. https://www.aera.net/About-AERA/Code-of-Ethics
2. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa
3. CFFJ. (2022). How AI could transform Uganda's eduscape [PDF]. Centre for Financial Regulation and Inclusion. https://cffj.or.ug/assets/files/pdfpublications/Paper-AI-for-Ug-CFFJ.pdf
4. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319–340. https://doi.org/10.2307/249008
5. D4D Access. (2022). Case study: Digital tools transform teaching and learning in Uganda. https://d4daccess.eu/en/case-study-digital-tools-transform-teaching-and-learning-in-uganda
6. Education Go. Ug. (2023). Education Digital Agenda 2021–2025. Ministry of Education and Sports, Republic of Uganda. https://education.go.ug/digital-agenda/
7. Garrison, D. R., & Vaughan, N. D. (2008). Blended learning in higher education: Framework, principles, and guidelines. Jossey-Bass.
8. Hiatt, J. (2006). ADKAR: A model for change in business, government, and our community. Prosci.
9. Kotter, J. P. (1996). Leading change. Harvard Business School Press.
10. Mtebe, J. S. (2017). Electronic learning and blended learning in higher education in Africa. International Journal of Education and Development using Information and Communication Technology, 13(1), 6–21.
11. Mwesigwa, I. (2020). ICT integration in education: Case of Uganda. In Proceedings of the 2020 International Conference on ICT in Education (pp. 108–115). IEEE.
12. Nantagya, G. S., Masagazi, J. Y., Ocheng, M. K., & Stephen, K. (2026). Teachers' perceived challenges and the uptake of e-learning in Kampala Capital City. East African Journal of Education Studies, 9(1), 322–341. https://doi.org/10.37284/eajes.9.1.4409
13. Nkumba University. (2025). Digital transformation and change management in educational institutions. Nkumba University Institutional Repository. https://ir.nkumbauniversity.ac.ug