Digital Transformation in Education and Human-Centred Governance in Africa

Winfred AYANGA[1] - Robert MAGDA[2]

DOI: 10.29180/978-615-6886-30-9_1

Abstract

The adoption of digital technology in higher education has changed current forms of teaching and learning in Africa especially after the COVID-19 pandemic. Digital transformation has extended the academic space, made the tools of novel blended and online education available in wider circles and created cooperation among teachers and students beyond boundaries. The shift has also been notable in the existing imbalances of access, digital literacy and technological infrastructure. The paper will describe the extent and effect of digital transformation on higher education and its effect on human-centred values in a select group of African countries across the continent: South Africa, Nigeria, Rwanda, Kenya Ghana, Zambia and Egypt. The study involves the Technology Acceptance Model and the Human-Centred Digital Governance Theory to explore the effects of human-centred digital governance on the adoption of technology and inclusiveness in education. Qualitative review methodology was applied, and academic literature, policy papers and case studies were reviewed. The thematic content analysis of sources revealed the following: developments in digital transformation in Africa; the benefits of digital learning; limitations and equity issues; and the place of governance in the use of the digital technology. The results indicate that most rapid gains are attained in countries that have working capacity in digital policy and long-term investment in the Information and Communications Technology infrastructure, for example in Kenya and Rwanda. Though under-resourced contexts, the countries are also characterised by bottlenecks related to affordability, digital literacy, cybersecurity, inequality in internet access and institutional unpreparedness. The paper concludes by stating that digital transformation should not rely purely on the use of technologies but on an all-inclusive approach that include governance, capacity building, inclusivity, transparency, accountability and ethics. Equally important is fostering interinstitutional and intra-Africa collaboration and policy dialogue. This study caters for policy makers, scholars and institutions and provides insights for contributing to the development of ethically grounded digital transformation of the education sector in Africa and globally.

Keywords: digital transformation, higher education, human-centred governance, technologies

JEL Classification: 121,033,O15

Introduction

Digital transformation in higher education can refer to the use of digital technology in an attempt to improve teaching, learning, research, and administration processes. Digital transformation has gained traction over the past ten years in Africa and was further catalysed by the COVID-19 pandemic, which highlighted the weak institutional structures and made innovation faster. Education institutions in Africa have continued to gradually introduce the use

[1] PhD Candidate of Management and Business Administration (Social Sciences), John von Neumann University, Budapest, Hungary
[2] Professor, Management and Business Administration (Social Sciences) (PhD), John von Neumann University, Budapest, Hungary, e-mail: rmagda72@gmail.com

of virtual learning environments, Artificial Intelligence (AI), cloud-based computing, data analysis, and the digital services to enhance performance and engagement (Sigfrids et al., 2023; Mhlanga et al., 2022)

Digital transformation offers opportunities including increased accessibility, resilience, innovation and creativity, fosters engagement and learning outcomes, collaboration, well-being and equity in education and offers administrative efficiency. However, the systemic issues, such as disparities in digital access, limited infrastructure, the high cost of high-technology products, lack of digital literacy, cybersecurity concerns and institutional unpreparedness, are also evident (Gbadebo, 2024). In this context, digital technology presents risks to the society. These challenges have necessitated the establishment of frameworks that balance the development of social responsibility, sustainable and inclusive educational outcomes with technology. Despite the challenges including the disruptive nature of the technologies on the education sector, digital transformation is increasingly becoming unavoidable (Mabotha & Ngcamu, 2026). This, therefore, calls for digital transformation to be managed cautiously considering issues such as privacy, civil liberties, cyberattacks and prevention of harmful aspects, and the unique circumstance of the institutions concerned (Wittmann & Meynhardt, 2025),

The African countries are, however, digitizing at varying speeds. South Africa has used digital learning to continue with its educational operations, though it has infrastructure gaps. Nigeria and Ghana have been prolific in the diffusion of internet-based learning through e-learning reforms, whereas, Rwanda and Kenya have become the digital learning leaders in the region following intensive government investments in technology (Mhlanga et al., 2022).

This study focuses on the development and impact of digital technology, the benefits and barriers on the education sector in Africa. The study questioned the influence of the digital transformation in African higher education on human-centred governance. The study is intended to contribute to the more informed understanding of the impact of digital transformation in Africa in line with the United Nations Sustainable Development Goal (SDG4) in inclusive and quality education and African Union Agenda 2063: Africa We Want - education for all, (*Agenda 2063*, 2015). The ethical questions in this case go beyond issues of access and include privacy and sustainability.

The aims of the study are:

i. To examine the level of digital penetration in select countries in Africa.
ii. To find out the influence of digital transformation in education on governance
iii. To remark on the benefits, as well as the opportunities that digital transformation has presented in higher education.

Research questions:

i. How digitized has the African higher learning become?
ii. How do we enhance digital transformation using governance, policy and innovations?
iii. What have been the opportunities and advantages behind this change?

Literature Review

The African higher education digital transformation has been developing at an extremely quick rate during the past five years with primary change drivers being the need to improve accessibility, to offer increased flexibility, and to improve the performance of the institutions involved. One of the events that caused higher education institutions to adopt online solutions in such a brief duration was the COVID-19 pandemic. Whereas the shift demonstrated the inadequacy of digital infrastructure, it also sped up institutional investments in learning management systems, as well as remote learning capabilities (Chrusciak et al., 2025).

Most of the activities that spurred the development of digital learning potential in Nigeria and South Africa were triggered particularly by the COVID-19 pandemic, while universities' use of e-learning platforms and Information and Communications Technology (ICT) infrastructure began to gain traction in supporting online learning activities (Baale, 2024); Mhalanga et al., 2022).

A review of Ghana's digital transformation demonstrates significant progress in its digital and AI integration with efforts aimed at bridging the gaps, and the International Monetary Fund (IMF) put Ghana as the regional leader in AI preparedness. However, the country is puzzled by similar challenges witnessed in other African countries including effective governance framework. In this respect, conscious efforts are being made at institutional levels and other sectors address capacity and other adoptions issues (Sarpong, 2023).

In the recent years Zambia has witnessed progressive integration of digital transformation in different sectors as part of addressing innovation, capacity development and economic growth. The higher education sector in Zambia is largely government controlled. The adoption of digital transformation and AI has been gradual, mainly stewarded by national policies, as well as institutional initiatives (O'Bryan, 2024).

The first ones in digital and AI preparedness are Rwanda and Kenya because the countries have already established such state investments in technology that can spur higher education innovation. Rwanda is no exception as universities have also implemented systems and adaptive learning and research with the use of AI to support students (Sebihi et al., 2025). Innovation in the higher education sector has also been enhanced by rapidly emerging African EdTech start-ups, low-bandwidth learning solutions, which can be deployed using infrastructural realities (Baale, 2024).

Egypt, like the other North African neighbours, has also witnessed exponential growth in advanced level broadband, mobile phone and internet usage. However, it is faced with disparities including affordability, gender equity and penetration. The AI capacity remains low across all major sectors, and there is poor integration of databases and human capacity. Despite the handicaps, the National AI strategy is intended to place Egypt among the tech-based economies (*Ministry of Communications and Information Technology*, n.d.).

Researchers have also established that digital transformation has a positive influence on inclusiveness, student engagement, and international cooperation given that it builds a hybrid learning environment (Kaliisa et al., 2022; Zhang, 2022). In addition, the application of online school reporting systems assists in the planning and decision-making of institutions, (Maluleke, 2024). It addresses issues of relevance and quality and prepares learners for the digital age (A. D. Gbadebo, 2024).

Nevertheless, studies also suggest several limitations to the digital learning ecosystem. The imbalance in the use of internet, devices and digital literacy shows the existence of digital divide in Africa. This phenomenon is disproportionately present among rural learners, low-income learners, and women (Baale, 2024; Šević et al., 2025; Zisengwe, 2024). The quick implementation of AI in some countries like Nigeria, Lesotho, and Rwanda, have met resistance from teachers who fear the risk of losing jobs, as well as raise ethical concerns (Mabotha & Ngcamu, 2026).

The other weaknesses are poor data governance and cybersecurity. Issues of cybercrimes and data hacking in the academic systems have remained a course source of worry. This has been exacerbated in institutional cyberspace security by weak policies (Mogaji & Nguyen, 2023). The fact that institutional platforms keep breaking down also limits their effectiveness as numerous systems cannot be interoperable with ministries and universities (*Artificial Intelligence in Education - AI | UNESCO*, 2025). These challenges have continued to erode confidence in the importance of digitalisation in the African public. Additionally, the

implementation of the initiatives has tended to be top-down with minimal public participation. However, a comprehensive understanding of the adoption of technologies has been lacking among the institutions and other stakeholders. It is important, therefore, that technologies including underlying mechanisms for digitalisation of the education sector are clearly seen. Considering these challenges, a human-centred governance is necessary in ensuring linkages between the technology and public good. At the same time, in Africa countries like Kenya, Rwanda, Nigeria, South Africa have made commendable progress in digitalising education: the implementation of the programmes have not received attention (Goshtasbpour et al., 2023).

The literature thus explains that digital transformation is a dynamic process which ought to have coordinated activities including the following: infrastructure, policy, capacity of teachers, cybersecurity and inclusive access systems. However, the effect of digital transformation on human-centred governance in the education sector in Africa has not been precisely addressed, which necessitates a systematic literature review.

Theoretical Framework

To come up with the theoretical framework of explaining the dynamics of digital adoption and human-centred governance in higher education in Africa, this paper applied the Technology Acceptance Model (TAM) and the Human-Centred Design Theory.

Technology Acceptance Model (TAM)

The theory intends to forecast how new technologies will be accepted and used by the society by way of looking at behavioural aspects. Kamal et al. (2019) argues that TAM has become a significant framework in understanding technology, the internet of things and interactions involving technology. The model is premised on the Theory of Reasoned Action (TRA), which asserts that beliefs influence attitudes, which in turn generates intention and ultimately, behaviour. The Technology Acceptance Model (TAM), therefore, holds the view that acceptance and the continued use of technology is anchored on two psychological variables that include the perceived ease of use (PEOU) and perceived usefulness (PU). The theory postulates that the users find the digital technologies more acceptable because of the simplified ease of use, availability, and suitability within academic objectives. On the other hand, the rejection relates to situations where technology is complicated, unreliable and unsupported. TAM theory can be used to identify the variables influencing the adoption of new technologies in education.

The South Africans and the Nigerians have shown that the only way that major digital adoption gains can be realized is when higher education institutions are organized in a way that assists in meeting the needs of the users and when the institutions offer guides and training to learners among other digital resources (Mhlanga et al., 2022; Baale, 2024).

Human-Centred Design Theory

Human-Centred Design (HCD) Theory is a problem-solving methodology that has at the core the desires, perspectives and needs of people. It means developing solutions by involving human perspectives in the entirety of the process through an inclusive and collaborative process (Djatmiko et al., 2025). The theory emphasises the importance of synergy between all stakeholders (Garcia-Lopez et al., 2020). Human-centred design, therefore, focuses on the needs of the learners and on meeting them by leveraging on technology in a process that creates user-friendly learning experience. HCD, therefore, is meant to ensure that digital technologies and tools are tailored for learners in a way that increases productivity and efficiency.

Considering the fact that equity, access, privacy, and empowerment of the user are the most important features of the digital transformation of human-centred digital governance, prioritisation of the user – students, teacher, administrator or community – is essential. HCD

increases the likelihood of all stakeholders benefiting from the digital learning solutions, as well as enhances educational outcomes in terms of addressing uniqueness, accessibility, the fostering of engagement, motivation and accessibility.

TAM and Human-Centred Design theory can be collectively discussed as complementary tools of analysis. Whereas TAM describes the micro-level factors of technology acceptance at a personal level, the Human-Centred Design Theory addresses the macro-level factors of equity and ethics of digital transformation. In other words, HCD is intended to reorient the mindsets and actions of the participants of the education sector towards people-centred, interactive approaches in addressing education challenges. At the centre of HCD is multidisciplinary collaboration, people's context, creativity and interaction, all of which challenges the often-rigid education delivery mechanisms, and address differing demands and perceptions.

All these perspectives collectively suggest that digital transformation is a fundamental shift in the educational systems particularly for the African countries, where the education sector is still characterised by inadequate technology that fails to address inclusiveness, learners' vulnerabilities, accessibility barriers associated with rural learners, low-income earners, and women. Further, epistemological concerns remain a major challenge. Digital platforms available in Africa tend to emphasise Western content and modes of knowledge, with minimal regard to local languages, cultures, customs and they appear to perpetuate global hierarchies and threaten sovereignty of local communities.

These theoretical perspectives provide a conceptual foundation for positioning digital transformation in ways that bring to the core human dignity, inclusivity and fairness. From the standpoint of human-centricity, digital transformation must ensure that the least advantaged members of society must benefit from technological development. This perspective underscores the need to ensure that technological progress remains grounded in compassion and contextual sensitivity in order to effectively and efficiently deliver the desired goals (Mauti & Nyambane, 2025).

These theoretical lenses are very much relevant in Africa, where the digital divide is of major concern morally and even politically. In that regard digital transformation must be addressed holistically from the point of view of infrastructure, digital literacy, inclusivity and participation in decision-making processes. The institutions including governments must ensure that policies and regulations address the principles of transparency and fairness as well as the impact of the transformation on social and environmental sustainability (Mhlanga et al., 2022).

Conceptual Framework

The conceptual framework describes the relationships among the study variables, i.e. digital transformation and human-centred governance. Digital transformation in this case is conceptualised as the independent variable, whereas human-centred governance is conceptualised as the dependent variable. Digital transformation and human centred governance affect higher education in Africa. Digital transformation of the higher education systems in Africa is an outcome of the interaction of several variables including digital infrastructure, affordability, digital competencies, policy governance, and accessibility.

Digital learning is supported by digital infrastructure that comprises broadband connectivity, access to devices and digital platforms. Rwanda and Kenya have moved more quickly towards the implementation of online learning system due to established infrastructure in the ICT sector (Nguyen & Mogaji, 2023). The second variable is affordability, i.e. the financial capacities of institutions and students to access the digital tools. One of the greatest obstacles to equalized learning in several African countries such as South Africa and Nigeria, which are still facing imbalances in their infrastructures, is high internet cost and the cost of technological devices (Nguyen & Mogaji, 2023; Zisengwe, 2024). The other variable relates to

digital competences. The quality of education as well as the implementation of technologies can only succeed if all stakeholders adequately appreciate digitalisation. This involves enhancing the digital literacy of all players. In cases of ineffective capacity building, teachers have been witnessed to exhibit hostility to emerging technologies, whereas students have demonstrated difficulty in using online system of learning (Okoye et al., 2024). The other important element is policy governance. This involves, principles, rules and frameworks including institutional coordination and regulatory mechanisms used to control the use of technologies.

Digital transformation of the education sector therefore is intrinsically dependent on human-centricity as the mail pillar. Human centred governance in this context is centred around participation, accountability in the decision-making processes, human rights, trust and sustainability (Jin et al., 2024), operational structures and tools including methods and resources aimed at implementation and mainstreaming (Djatmiko et al., 2025). This involves balancing digitalization with security, inclusivity and ethical standards (Chrusciak et al., 2025).

Methodology

Qualitative, interpretive research design was used for this study. Literature synthesis method, which is suitable for studying the latest policy and technology trends, was applied. Secondary data were acquired through search using peer-reviewed journal articles, academic databases, institutional reports, and online education policy reports. Qualitative method was relevant considering its consistency with conceptual research and its relevance in developing an initial understanding from a second data set (Balkis et al., 2024).

The group of seven African countries (South Africa, Zambia, Nigeria, Ghana, Rwanda, Kenya and Egypt) was chosen as the sample size due to their extensive investment in ICT and technological infrastructure of digital policies. The sampling method used was purposive with West and Central, Southern and Eastern African regions being represented by two countries each, whereas one country represented the northern part of Africa. Literature discussing the digital transformation adoption, challenges, governance, and AI-enabled learning was chosen from the select countries. The analysis was done based on thematic coding, where the information was extracted and coded based on emerging themes in the research questions: developments in digital transformation, the benefits of digital learning, limitations and equity issues, and the place of governance in the use of digital technology.

Only the articles of reputable academic journals and international organizations containing evidence were used. Triangulation of the information across countries and cross-examination of similar or conflicting information across the sources were made to increase validity. The methodological drawbacks of the research are that secondary data was applied in the study, and therefore it was not possible to observe the experiences of the stakeholders directly. However, given the limitations of secondary data, particularly regarding lived experience, the extensive and diverse sources of data were meant to provide sufficient comparative understanding at the global level and they enable the establishment of structural patterns.

Findings

To begin with, all the reviewed countries are all moving towards digital transformation, albeit not in the same way. Rwanda and Kenya are the fastest-growing ones because of the significant rise in the level of government investment in ICT and the development of digital policy, AI-based academic systems, in particular (Sharawy, 2023). On the other hand, South Africa and Nigeria boast a very high growth rate but will still possess weak technological infrastructure that continues to slow down universal access (Mhlanga et al., 2022; Baale, 2024). Despite

achieving significant progress regarding AI readiness, Egypt's AI capacity is still low in all sectors including governance, infrastructure, data technology and ecosystem. Other challenges are insufficient awareness and poor integration of databases, as well as improper AI use in higher education institutions (Sharawy, 2023; Government of Egypt, 2025).

From the reviewed literature, it is evident that the ethical and responsible use of AI in all the African countries is still couple with continental, country and institutional digital transformation (A. Gbadebo, 2024). According to the African Union Digital Transformation Strategy for Africa, digital transformation is critical to Africa's innovativeness and sustainable growth (*The Digital Transformation Strategy for Africa (2020-2030), African Union*, n.d.). In this context, several countries have established structures to manage digital transformation and AI integration: for example the Ghana Artificial Intelligence Association, the Egyptian National Council of AI, the South African Artificial Intelligence Institute and Centre for Artificial Intelligence Research (Sarpong, 2023).

Second, concerning enhanced teaching, learning and student engagement, online education has brought about flexibility, education and institutional personalization and hardiness as evidenced in Kenya, Zambia, Egypt and South Africa. The online learning management systems and AI-based applications have assisted the universities to introduce continuity in academic programmes besides enhanced monitoring of student performance (Sebihi et al., 2025). It is through virtual interaction that international cooperation in academics has been achieved. AI technologies also support learner-centred education and tailored feedback mechanism. According to Lewis et al. (2024), AI enhances attentiveness and can be leveraged for both theoretical knowledge and practical skills. AI, therefore, has the potential to enhance learning experiences and engagements. Funda et al. (2024) posit that AI tools enabled the transition to remote learning during emergency situations like the COVID-19 pandemic (Funda & Mbangeleli, 2024).

Third, the greatest constraint for African higher education institutions remains to be the digital divide. Rural students, families with low income and female students are overrepresented because they do not have access to uninterrupted internet and digital devices across the digital literacy levels (Sharawy, 2023). This shows both domestic and international inequality. The disparities in access and skills levels, the impact of poor digital connectivity and shortage of resources are evident in all the countries. The digital gap in Africa has been attributed to factors including shortage of digital infrastructure, technical skills, and costs. Application of AI therefore has the potential to improve access and inclusion by broadening learning opportunities through remote learning particularly, where traditional delivery methods are not the most appropriate. Therefore, AI interventions should be supported with investment in infrastructure, through mainstreaming AI literacy and readiness of institutions and training to bridge both the access and skills gaps in all sectors.

The fourth issue is related to digital literacy and lack of capacity building opportunities. All the countries reported the need for capacity and expertise including appropriate digital skills. Teachers are supposed to undergo methodical professional growth to fulfil the requirements of digital and AI-based study tasks. Based on the survey of the teaching staff in different regions, the teachers are worried about vague policy schemes, the absence of training and possible loss of jobs due to AI usage (Alshahrani et al., 2025; Sharmin et al., 2026). These uncertainties stem from the envisaged adjustments to new technology and have resulted in resistance to change. This call for provision of guidance and the right perspective on technology, which is closely connected to deficiencies in institutional leadership.

The fifth issue is digital governance including policy and framework. Many institutions lack well-defined policies to inform the implementation of diversity, equity and inclusion among other human-centred elements when driving digital policy. Many countries exhibit ineffective cybersecurity models, ineffective IT and policy regulations as well as trust and

sustainability challenges. Whereas all the reviewed countries indicated the existence of several strategies, frameworks and policies, they also showed the existence of fragmentation of policy implementation and weak coordination among the various stakeholders and sometimes lack of consensus among the various government bodies. Most institutions cannot guarantee the privacy of the data, therefore, students and other stakeholders become targets of cyber-attacks and identity thefts. Teacher perceptions of AI-supported pedagogy and automation risks in African higher education are visible (Sharmin et al., 2026).

Discussion

The results of the literature review show the collaboration of a number of interdependent dimensions, such as government investment, digital skills, affordability, and governance affected digital transformation in African higher education. Due to the proactive digital investment nature of Rwanda and Kenya, these two countries have evolved at a better pace and thus offer a high impact of the capacity of the public digital policies on innovation in higher education. South Africa and Nigeria, on the other hand, are not in the same situation as the infrastructure distribution is uneven and the infrastructure is not affordable (Mhlanga et al., 2022).

The review supports the fact that the TAM is correct, because perceived usefulness and perceived ease of use influence the learner and teacher acceptance of digital platforms. Adoption becomes higher among the stakeholders when learning systems are easy to use, supportable, and available. Nevertheless, adoption is not even because of TAM conditions when there are affordability and access barriers even though the conditions are met. This is in line with the Human-Centred Design Theory, which states that technology should be relevant to human needs, values and social realities to become transformative (Zisengwe, 2024; Mauti & Nyambane, 2025).

The empirical data point to the fact that the most critical barrier to equal participation is the digital divide as opposed to technology availability. Populations living in rural areas and those with low income have lower access to devices and some form of internet connectivity, which perpetuates social inequalities in online education. In the meantime, educator capacity building can be defined as one of the key products of the adoption of AI since anxiety about new technologies and the absence of training limit their use (Alshahrani et al., 2025).

Also, the experience of cybersecurity is a new threat that may jeopardize trust and sustainability, in particular, when there are weak data privacy frameworks (Lebbie et al., 2026). Therefore, it can be observed that digital transformation can be best achieved when human-centred governance, affordability, infrastructure, and capacity development of developing countries progress in whole as opposed to separately. Any university that can invest in infrastructure but without training and governance reforms they are likely to be met with resistance, inequality and lack of sustainability.

Conclusion

In view of the opportunities and contextual challenges facing emerging economies, as well as the developed world, a blend of education and technology has the potential to spur growth and development. This study therefore aimed to investigate the implications of digital transformation in education on human-centred governance in Africa. This review was based on three research questions: How digitized has the African higher learning become; how to enhance digital transformation using governance, policy and innovations; and what have been the opportunities and advantages behind this digital transformation? In response to the questions, the study reveals that digital transformation has been a major route to the modernization of higher education in Africa and many other contexts globally. The study

revealed that the integration of digital and artificial intelligence in education is a critical element in the realization of quality education as well as in nurturing and driving innovation in the whole world not only in Africa.

To attain the benefits of digital transformation including flexibility, improved learning analytics and innovation, there is need for increased access, a human-centred policy, clear ethical guidelines, government commitments, investments and regulatory environments. Other necessary prerequisites include technology, capacity building, governance, inclusive infrastructure and ethical protection.

The study underscored the need for context-sensitive approaches, particularly with regard to the establishment of more equitable and inclusive educational environments by connecting digital transformation with issues of inclusion, diversity and equity. Additionally, a need for a collaborative and inclusive participation was identified in the navigation of the complexities of digital transformation of education, while ensuring that it is aligned with the institutional values and educational objectives.

It emerged from the study that, unless digital transformation is implemented appropriately, it has the potential to perpetuate inequality due to infrastructural shortfall, affordability, internet penetration, cybersecurity and lack of access. The examples of effective digital strategies and long-term investment in countries such as Rwanda and Kenya are a clear indication of the fact that it is possible to modify the situation as long as the process of governance is adjusted to technology.

This study offers insights for policymakers, institutions and educators wishing to contribute to sustainable digital transformation and AI integration in education.

Recommendations

Based on the analysis and the evidence presented, the following recommendations could form the basis of future research.

1. Increase the national ICT infrastructure investment rate in order to minimize the urban-rural and gender digital divide. Inter-country and regional collaboration and partnerships should be adopted to benefit from the interconnectedness of the African countries as part of addressing the affordances and sharing among the communities.
2. Instead of funding digital education as an emergency on a short-term basis, develop long-term models. In addition, support collaboration, exchange of expertise and skills as well as sharing of resources among institutions and countries.
3. Energize the digital governance frameworks on cybersecurity system, student data ethics system, and accountability system. Establish legislation and oversight frameworks in order to ensure that protection of human rights remains at the centre of digital transformation initiatives. Institutions should establish robust AI governance frameworks with well-defined ethical standards.
4. Go more digital and AI-sensitive to gain confidence and competency in teachers' professional development. Expand the literature on social effects of online education, especially when dealing with at-risk learners.
5. Apply strategies of inclusive access such as subsidised devices, low bandwidth-based learning system and community Wi-Fi hotspots.
6. Encourage local collaboration to boost EdTech solutions and disseminate lessons of implementation. Governments and institutions should encourage collaboration, while ensuring the interests of Africans including data when negotiating with national and international partners.

References

Agenda 2063: The Africa we want ; first ten year implementation plan 201-2063. (2015). African Union Commission.

Alshahrani, F., Alyami, S., Alyami, M., & Alqhatani, A. (2025). Exploring cybersecurity challenges of digital transformation in higher education. https://doi.org/10.54941/ahfe1005828

Artificial intelligence in education—AI | UNESCO. (2025, September 4). https://www.unesco.org/en/digital-education/artificial-intelligence

Baale, L. (2024). Digital Transformation of Education in Africa: Bridging the Gaps and Building the Future. *The Nigerian Journal of Pharmacy*, 58(2), 149–180.

Balkis, S., Johanis, M. A., Habib Sultan, N., & Basir, N. (2024). Gender Equality in the Higher Education Workforce. 21, 107–117.

Chrusciak, C. B., Szejka, A. L., & Canciglieri Junior, O. (2025). Integrating digital transformation with human-centric factors strategies to enhance organisational process performance: The H.O.P.E. model. *Journal of Industrial Information Integration*, 44, 100785. https://doi.org/10.1016/j.jii.2025.100785

Djatmiko, G. H., Sinaga, O., & Pawirosumarto, S. (2025). Digital Transformation and Social Inclusion in Public Services: A Qualitative Analysis of E-Government Adoption for Marginalized Communities in Sustainable Governance. *Sustainability*, 17(7), 2908. https://doi.org/10.3390/su17072908

Funda, V., & Mbangeleli, N. (2024). Artificial Intelligence (AI) as a Tool to Address Academic Challenges in South African Higher Education. *International Journal of Learning, Teaching and Educational Research*, 23(11). https://www.ijlter.org/index.php/ijlter/article/view/11264

Garcia-Lopez, C., Mor, E., & Tesconi, S. (2020). Human-Centered Design as an Approach to Create Open Educational Resources. *Sustainability*, 12, 7397. https://doi.org/10.3390/su12187397

Gbadebo, A. D. (2024). Digital Transformation for Educational Development in Sub-Saharan Africa. *International Journal of Social Science and Religion*, 397–418. https://doi.org/10.53639/ijssr.v5i3.262

Goshtasbpour, F., Pitt, R., Cross, S., Ferguson, R., & Whitelock, D. (2023). Challenges for Innovation and Educational Change in Digital Education in Low Resourced Settings: A Kenyan Example. *Ubiquity Proceedings*. https://doi.org/10.5334/uproc.66

Intersections between civic technology (civic tech) and governance in Nigeria and South Africa. (n.d.). ResearchGate. Retrieved February 20, 2026, from https://www.researchgate.net/publication/384137491_Intersections_between_civic_technology_civic_tech_and_governance_in_Nigeria_and_South_Africa

Jin, Y., Yan, L., Echeverria, V., Gasevic, D., & Martinez-Maldonado, R. (2024). Generative AI in Higher Education: A Global Perspective of Institutional Adoption Policies and Guidelines. https://doi.org/10.48550/arXiv.2405.11800

Kaliisa, R., Palmer, E., & Miller, J. (2022). Lecturers' Perspectives on Mobile Learning in Higher Education: Experiences and Implementation Barriers. *Information Technology, Education and Society*, 18(1), 5–23. https://doi.org/10.7459/ites/18.1.02

Kamal, S., Shafiq, M., & Kakria, P. (2019). Investigating acceptance of telemedicine services through an extended technology acceptance model (TAM). *Technology in Society*, 60, 101212. https://doi.org/10.1016/j.techsoc.2019.101212

Lebbie, M. J. S., Alade, R. M., & Oluwatoyin, E. A. (2026). Cybersecurity Challenges and Barriers to Implementing Moodle for Blended Learning in Resource-Constrained Universities: A Case Study of Sierra Leone. *Open Journal of Social Sciences*, 14(2), 65–84. https://doi.org/10.4236/jss.2026.142006

Lewis, S., Bhyat, F., Casmod, Y., Gani, A., Gumede, L., Hajat, A., Hazell, L., Kammies, C., Mahlaola, T. B., Mokoena, L., & Vermeulen, L. (2024). Medical imaging and radiation science students' use of artificial intelligence for learning and assessment. *Radiography, Current Issues in Radiography Education*, 30, 60–66. https://doi.org/10.1016/j.radi.2024.10.006

Mabotha, P. A. P., & Ngcamu, B. S. (2026). Digital Transformation in the Higher Education Sector: A Systematic Literature Review. *Administrative Sciences*, 16(1), 1. https://doi.org/10.3390/admsci16010001

Maluleke, A. F. (2024). Enhancing Learning Analytics through Learning Management Systems Engagement in African Higher Education. *Journal of Education and Learning Technology*, 130–149. https://doi.org/10.38159/jelt.2024565

Mauti, J. M., & Nyambane, A. K. (2025). Ethical Dimensions of Transformative Leadership: Advancing Equity in Technology-Driven Higher Education. *Editon Consortium Journal of Educational Management and Leadership*, 6(1), 32–46. https://doi.org/10.51317/ecjeml.v6i1.642

Mhlanga, D., Denhere, V., & Moloi, T. (2022). COVID-19 and the Key Digital Transformation Lessons for Higher Education Institutions in South Africa. *Education Sciences*, 12. https://doi.org/10.3390/educsci12070464

Ministry of Communications and Information Technology. (n.d.). Retrieved February 20, 2026, from https://mcit.gov.eg/en/Publication/Publication_Summary/9283

Nguyen, N. P., & Mogaji, E. (2023). Artificial Intelligence for Seamless Experience Across Channels. In J. N. Sheth, V. Jain, E. Mogaji, & A. Ambika (Eds.), Artificial Intelligence in Customer Service: The Next Frontier for Personalized Engagement (pp. 181–203). Springer International Publishing. https://doi.org/10.1007/978-3-031-33898-4_8

O'Bryan, J. (2024, April 25). Zambia National ICT Policy 2023. Digital Development Site. https://www.digitaldevelopment.org/library/zambia-national-ict-policy-2023/

Okoye, K., Hosseini, S., Hiran, K., & Nganji, J. (2024). Impact and implications of AI methods and tools for the future of education. https://doi.org/10.3389/978-2-8325-5013-7

Sarpong, R. (2023). Digitalisation of Education in Ghana: An Overview (pp. 97–106).

Sebihi, A., Schoelen, L., & Uwamwezi, B. (2025). Unveiling AI's impact in Rwandan higher education: Navigating trends, challenges, and imperatives at the University of Rwanda. *Discover Education*, 4(1), 166. https://doi.org/10.1007/s44217-025-00576-6

Šević, N. P., Šević, A., Slijepčević, M., & Krstić, J. (2025). AI adoption in higher education: Exploring attitudes and perceived benefits between users and non-users. *Online Journal of Communication and Media Technologies*, 15(4), e202528. https://doi.org/10.30935/ojcmt/17246

Sharawy, F. (2023). The Use of Artificial Intelligence in Higher Education: A Study on Faculty Perspectives in Universities in Egypt. Theses and Dissertations. https://fount.aucegypt.edu/etds/2095

Sharmin, L., Kalima, R., Imran, M., Chauca, M., & Balladares-Burgos, J. (2026). Teachers' perceptions of AI in supporting students' learning within a globally diverse digital settings. *Discover Education*, 5. https://doi.org/10.1007/s44217-025-01089-y

Sigfrids, A., Leikas, J., Salo-Pöntinen, H., & Koskimies, E. (2023). Human-centricity in AI governance: A systemic approach. Frontiers in Artificial Intelligence, 6. https://doi.org/10.3389/frai.2023.976887

The Digital Transformation Strategy for Africa (2020-2030) | African Union. (n.d.). Retrieved February 20, 2026, from https://au.int/en/documents/20200518/digital-transformation-strategy-africa-2020-2030

Wittmann, V., & Meynhardt, T. (2025). Human-centric AI governance: What the EU public values, what it really, really values. *Government Information Quarterly*, 42(4), 102084. https://doi.org/10.1016/j.giq.2025.102084

Zhang, X. (2022). The Influence of Mobile Learning on the Optimization of Teaching Mode in Higher Education. Wireless Communications and Mobile Computing, 2022(1), 5921242. https://doi.org/10.1155/2022/5921242

Zisengwe, M. (2024). Intersections between civic technology (civic tech) and governance in Nigeria and South Africa. *African Journal of Information and Communication* (33), 1–26. https://doi.org/10.23962/ajic.i33.18883