



FROM DIGITAL TRANSFORMATION TO ARTIFICIAL INTELLIGENCE: CONTINUITY, STEWARDSHIP, AND ACADEMIC PRODUCTIVITY IN NIGERIAN HIGHER EDUCATION

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Abstract

This article examines the movement of Nigerian higher education from earlier waves of digital transformation to the present moment of generative artificial intelligence (AI) adoption. Drawing on recent Nigerian and continental African scholarship, the article argues that AI should not be understood as a sudden intrusion into an otherwise stable academic environment but as the latest stage in a longer, uneven process of technological adjustment shaped by infrastructure, funding, and institutional capacity. The article traces the historical development of digital transformation in Nigerian universities, the rapid and largely informal emergence of generative AI in teaching, learning, research, and administration, and the continent-wide disparities in access that continue to shape who benefits from these tools. It further situates this discussion within a theological register, reading the continuity of technological change through Ecclesiastes 1:9–11 and the stewardship of resources through Genesis 2:15, in order to argue that responsible AI adoption is best understood as a form of stewardship rather than either uncritical enthusiasm or blanket rejection. The article concludes that Nigerian universities face not the question of whether to engage generative AI, but how to do so in ways that strengthen rather than weaken the underlying purposes of higher education.

Keywords: artificial intelligence, digital transformation, Nigerian higher education, stewardship, academic productivity, technology adoption

1. Introduction

Nigerian universities have spent the past two decades moving, in fits and starts, from paper-based systems toward digital ones. Learning management platforms replaced printed handouts in some faculties, email replaced internal memos in others, and online portals slowly took over the work of registering courses and checking results. This slow, uneven process is usually called digital transformation, and it has always been about more than machines: it concerns how teachers teach, how students learn, how researchers work, and how institutions run themselves. In recent years a new and much faster wave of change has joined this older process, the arrival of artificial intelligence, and



especially generative artificial intelligence, in the daily life of the university. This article traces that movement, from the earlier years of digital transformation to the present moment of AI adoption, and asks what this shift means for teaching, learning, research, and academic work in Nigeria.

The argument developed here is simple but important: artificial intelligence should not be understood as a sudden intrusion into an otherwise stable academic world. It is better understood as the latest stage in a longer, ongoing process of adjustment that Nigerian universities have been living through for many years, a process that has always combined genuine opportunity with genuine difficulty in roughly equal measure. Three terms are used in particular senses throughout. Digitisation means converting records and routines from paper to electronic form. Digital transformation is the wider reorganisation of teaching, research, and administration around digital tools and data, and it changes habits, skills, and institutional culture as well as equipment. Generative artificial intelligence refers to systems, most familiar as large language models, that produce new text, images, or code in response to a prompt.

The article is interpretive rather than empirical. It draws on recent Nigerian and continental African scholarship, on international research on institutional policy and learning outcomes, and on two biblical texts, in order to offer a coherent way of understanding what is happening and of deciding how to respond. Section 2 traces the history of digital transformation, Section 3 describes the arrival of generative AI, and Section 4 considers its effects on academic work. Section 5 examines the uneven conditions of adoption, Section 6 offers a theological reading, Section 7 weighs opportunities against challenges, and Section 8 draws out practical implications before Section 9 concludes.

2. The Long Road of Digital Transformation in Nigerian Higher Education

2.1 From Equipment to Systems

Digital transformation in Nigerian universities did not begin with artificial intelligence. It began earlier, with efforts to bring computers, internet connectivity, and basic software tools into classrooms and administrative offices. A comparative review of e-learning platforms across the United States and Africa found that while African universities, including many in Nigeria, have adopted digital learning tools, they continue to face gaps in infrastructure, staff training, and consistent internet access compared with their counterparts in wealthier regions (Adeniyi et al., 2024). The first phase of this process was largely about equipment. Computer laboratories, campus networks, and administrative software were introduced at different times in different institutions, and their arrival depended heavily on the funding, leadership, and partnerships available to each. Course registration portals, electronic results systems, and learning management platforms followed. What many institutions lacked was the training, maintenance budgets, and stable power that turn installed equipment into working systems, a gap that the comparative review by Adeniyi et al. (2024) identifies in African universities more generally.

2.2 The Pandemic as Accelerator

The COVID-19 pandemic accelerated this process considerably, exposing both the potential and the limits of digital transformation in Nigeria. It showed that many institutions could adapt when necessary, but it also revealed how much depended on electricity supply, internet bandwidth, and the personal devices available to staff and students. These same limitations remain relevant today as



universities consider how far artificial intelligence tools can realistically be integrated into everyday academic work. The pandemic also arrived in an already unsettled academic calendar. Recurrent industrial action by university staff has repeatedly interrupted teaching in Nigeria, and emergency remote teaching therefore left a mixed legacy (Kanu and Pilani, 2025; 2026). It showed that lecturers could learn new tools quickly when they had to, and it established habits of online messaging and file-sharing that persist. It also left a memory of hurried improvisation: platforms adopted without training and dropped when normal life resumed, and students whose only device was a shared or low-specification phone. That experience is part of the background against which generative AI is now received.

2.3 A Continuing Condition

It is important to see digital transformation not as a finished project but as a continuing condition. Universities did not simply move from analogue to digital and then stop; they have continued to adjust to newer waves of technology, often before fully consolidating the previous one. Artificial intelligence is, in this sense, the latest and, so far, the most far-reaching stage in a longer story of technological adjustment within Nigerian higher education. Two consequences follow from this view. The first is that institutional memory matters (Kanu et al., 2025, 2026). Each earlier wave, from email to learning platforms, taught lessons about training, maintenance, and the difference between installing a system and using it well, and a university that treats AI as wholly unprecedented risks discarding what it has already learned. The second is that the pace of change is now set largely outside the university. Earlier technologies were introduced by institutions, which could sequence them. Generative AI arrived on the personal devices of students and staff, so that institutions are responding to a practice that already exists rather than planning an introduction that they control.

2.4 Policy and Regulation

Government and regulatory bodies have also shaped the pace of this transformation, though regulatory responses have often lagged behind the pace of technological change on the ground. Many Nigerian universities have had to develop their own local responses to generative AI well before any comprehensive national framework was available to guide them.

Recent developments show both progress and remaining gaps. Nigeria published its National Artificial Intelligence Strategy in September 2025, setting priorities for 2025 to 2029 (Federal Ministry of Communications, Innovation and Digital Economy, 2025), and the National Universities Commission has been extending its Core Curriculum and Minimum Academic Standards to new programmes, among them artificial intelligence itself (National Universities Commission, 2025). Yet Nigeria has not enacted a standalone AI law, and its governance rests on strategy documents, general legislation, and sector-specific rules (Buza & Taha, 2026; Pilani et al., 2026). A national strategy sets direction; it does not tell a lecturer whether a student may use a chatbot to draft a literature review, or tell a department how to assess a dissertation in that setting. That guidance is still being worked out, and much of it is being improvised by individual universities.



3. The Emergence of Artificial Intelligence and Generative AI

3.1 A Sudden Arrival

Tools such as ChatGPT and similar systems became widely available from late 2022 onward, and their arrival was sudden enough that most universities, in Nigeria and elsewhere, had little time to prepare institutional policies before students and staff had already begun using them. A study on the influence of generative AI in Nigerian higher education found that students are already using these tools extensively for assignments, research support, and general academic work, even where formal institutional guidance is limited or absent (Peters & Olojede, 2025).

Two features of that arrival deserve emphasis. The first is speed. Earlier technologies took years to move from pilot projects to routine use, and universities had time to run training, negotiate licences, and adjust regulations. Generative AI reached students within weeks, at no cost in its basic forms, through tools that need no installation or technical skill. The second is direction. The pressure came from below, from students and junior researchers experimenting on their own initiative, and later from lecturers who noticed the results appearing in their marking piles.

3.2 A Different Kind of Tool

What makes generative AI different from earlier digital tools is its ability to produce finished or near-finished academic material rather than simply storing or transmitting information. This is not simply a faster way of doing familiar academic tasks; it changes who, or what, is doing part of the intellectual work in the first place. Generative AI has also entered Nigerian universities largely through informal, student-led channels, meaning that by the time many institutions began drafting policies, the practice of using these tools was already widespread, making after-the-fact regulation considerably more difficult than it might otherwise have been.

The same fluency that makes these tools useful makes their errors hard to detect. Such systems are known to produce confident statements that are false, including references to publications that do not exist, a limitation commonly called hallucination (Ji et al., 2023). A student who lacks the background to check a claim gets little warning from the fluent surface of the text. Verification, always part of scholarly practice, therefore becomes a more prominent skill, and it matters especially for locally grounded work, since most large language models are trained on material produced overwhelmingly in the Global North and may handle questions about Nigerian law, history, and languages less reliably than questions about Europe or North America. Students also use these tools for many reasons: to clarify difficult readings, to check grammar in a second or third language, to generate revision questions, and sometimes to avoid work altogether. A policy that treats all of these uses as one thing is unlikely to be fair or effective.

4. Changing Patterns of Teaching, Learning, Research, and Academic Work

4.1 Policy Responses

Global research on institutional responses to generative AI shows that many universities are moving away from blanket bans toward more structured policies that try to balance innovation with academic standards (Jin et al., 2025), a pattern corroborated by comparative policy research (Wang et al., 2024). The move from prohibition to regulated use reflects a practical recognition that bans are hard to enforce when the tools run on any phone, and a pedagogical recognition that graduates will work



where such tools are ordinary. It also transfers responsibility, since a structured policy asks each course, and often each lecturer, to decide what is allowed. That is workable only where lecturers have the time, training, and confidence to decide.

4.2 Teaching and Learning

There is emerging evidence that, when carefully designed and supervised, AI-supported learning can produce measurable gains. A large-scale randomised evaluation conducted in secondary schools in Edo State, Nigeria, found that students who used a generative AI tool as a supervised virtual tutor for English language learning over six weeks achieved substantially better outcomes than a comparison group (De Simone et al., 2025). Broader reviews describe how these tools are reshaping teaching innovation, inclusion, and assessment practice more generally (Sousa & Cardoso, 2025). Two cautions apply to this evidence. The Edo State study concerned secondary school pupils learning English through a supervised tutoring programme over six weeks; it does not show that unsupervised access to a general-purpose chatbot will benefit university students working on open-ended tasks. The features that appear to matter, namely structure, supervision, and a defined educational purpose, are exactly those that informal student use lacks. For lecturers the more immediate changes lie in preparation and feedback, such as drafting outlines, generating practice questions, and producing first-pass comments on student writing. Such uses can save time, but they raise questions about the nature of feedback, taken up in Section 7.

4.3 Research and Scholarly Writing

In research the uses are similarly wide. Scholars use generative tools to summarise literature, polish prose, structure proposals, write code, and explore unfamiliar fields. For researchers writing in English as a second or third language, and for early-career researchers without access to well-resourced writing centres, these tools can reduce real disadvantages (Kanu and Pilani, 2024). The risks are equally familiar: fabricated citations, superficial reading, homogenised prose, and unclear authorship. Journals and funders are still settling what disclosure they expect, and Nigerian researchers, whose work is often judged by international publishers, must navigate norms that change while they write.

4.4 Assessment and Administration

Assessment practices deserve particular attention, since they sit at the meeting point between teaching, learning, and academic integrity. Traditional take-home assignments have become considerably harder to trust as a measure of independent student ability, and the resulting patchwork of individual institutional responses illustrates how far policy still lags behind classroom practice. Administrative work, too, is beginning to feel the influence of these tools, extending the reach of artificial intelligence well beyond the classroom into the ordinary machinery of institutional life (Okonkwo et al., 2025). Assessment shows the difficulty most clearly. Written coursework was long treated as evidence of what a student could do alone. When that assumption fails, institutions can return to invigilated examinations, add oral components, require drafts and reflective commentary, or redesign tasks around class discussion or local data. Each option has costs, and they fall unevenly:



large classes make oral assessment slow, and examinations depend on venues and staff that are already stretched.

5. The Adoption of Emerging Technologies across Nigerian Universities

5.1 Infrastructure and Capacity

Adoption of any new technology in Nigerian higher education has always been shaped by conditions that are not purely about willingness or interest. Broader continental research on the artificial intelligence divide in Africa shows that internet penetration across the continent remains around thirty-eight per cent, with less than one per cent of the world's data centres located there (Malatji, 2026). Continental assessments of AI readiness consistently point to weak digital infrastructure, limited training programmes, and inconsistent policy support as the main obstacles to more equitable AI adoption, with the African Union's continental strategy explicitly identifying capacity building and infrastructure development as urgent priorities for member states (African Union, 2024).

For a lecturer or student these continental figures become practical constraints. Electricity may fail in the middle of a lesson planned around online tools. Mobile data is costly relative to many students' incomes, and the available device is often a phone rather than a laptop, which shapes what kinds of work are practicable. Some of the most capable AI tools require paid subscriptions, so the quality of assistance a student receives may depend on ability to pay. A university that sets an AI policy without addressing these differences builds unequal access into its own rules.

5.2 A Continental Pattern

This continental picture of coordinated response to shared, cross-border technological and developmental challenges has itself become a subject of theological reflection within recent African scholarship. Reading the African Union's efforts to respond to climate change, pandemics, and migration through the account of dispersed peoples and confounded cooperation in Genesis 11:1–9, Kanu, Pilani, and Nwadiakor (2026) argue that continental initiatives requiring shared language, shared purpose, and shared infrastructure inevitably confront the same fragility of cooperation dramatised in that narrative. A companion study extends this reading to the African Union's broader response to global challenges, arguing that theological reflection on Babel offers socio-political insight into why continental coordination — whether on migration, pandemics, or, by clear extension, digital and AI infrastructure — remains so difficult to sustain even where the underlying technological need is widely acknowledged (Anthony & Michael, 2026). Nigerian universities' uneven experience of AI adoption, described above, is a local instance of exactly this wider continental pattern: shared aspiration toward a common technological future repeatedly fragmented by unequal capacity.

The value of this reading lies less in the details of Babel than in its realism. It reminds us that shared goals do not automatically produce shared capacity, and that cooperation across institutional and national boundaries must be built deliberately.

5.3 Gender and Institutional Variation

There is also a gender dimension to this picture. Research on digital access across the African continent has found that women are generally less likely than men to own smartphones or have



reliable internet access, a gap rooted in broader social and economic inequalities. If this pattern holds within Nigerian universities, AI adoption could unintentionally widen existing inequalities unless institutions take deliberate steps to ensure equal access to devices, connectivity, and training. Institutional variation within Nigeria itself, between federal, state, and private universities compounds this unevenness, shaping not only how quickly AI tools are adopted but also who benefits most from their use.

Institutional variation deserves more attention than it usually receives. A well-endowed private university may negotiate institutional licences, provide campus-wide connectivity, and employ staff to train lecturers, while a state or federal university with very large enrolments may have limited bandwidth and few technical staff. Since the licensing of the first private universities in 1999, the Nigerian system has grown more diverse, and no single national picture of AI adoption exists. Gender is only one axis; disability, rural origin, and language background may matter as much, and are far less well documented.

6. Stewardship and Continuity: A Theological Reading of Technological Change

The pattern traced in the preceding sections — continuity beneath apparent novelty, and unevenness in who bears the costs and reaps the benefits of change — invites reflection through two biblical texts that speak directly to continuity and stewardship.

6.1 Continuity: Ecclesiastes 1:9–11

Ecclesiastes 1:9–11 observes: “What has been will be again, what has been done will be done again; there is nothing new under the sun. Is there anything of which one can say, ‘Look! This is something new’? It was here already, long ago; it was here before our time.” Read alongside the history traced above, this text offers a corrective to two opposite temptations: treating generative AI as an unprecedented rupture with no historical antecedent, and treating it as merely another tool indistinguishable from the learning management systems that preceded it. The Preacher’s insight is that apparent novelty sits within a longer continuity of human striving and adjustment — precisely the continuity this article has argued Nigerian universities are living through.

The Preacher’s statement is sometimes read as fatalism, but its function in the book is closer to sobriety. Qoheleth does not deny that particular things change; his concern is with the human tendency to imagine that one’s own moment is unprecedented, and with the loss of memory that follows, since the passage closes by noting that former generations are not remembered. For universities the application is institutional memory. A university that remembers how earlier technologies were adopted, resisted, misused, and absorbed is better placed to respond to generative AI than one that treats each wave as a new emergency. What is new about AI is real, but it is new in degree and mechanism, and it arrives inside a history.

6.2 Stewardship: Genesis 2:15

Genesis 2:15 records that the man was placed in the garden “to work it and take care of it.” This is a mandate of stewardship rather than domination: the resources entrusted to a community are to be cultivated responsibly for the flourishing of that community, not exploited carelessly or hoarded unequally. Applied to the infrastructural and resource disparities documented above — in



connectivity, data-centre capacity, and gendered access — this text grounds an ethical claim that responsible AI adoption in Nigerian higher education is a matter of stewardship: those with greater institutional resources bear a corresponding responsibility not to allow the benefits of AI adoption to accrue only to the already-advantaged. Pilani (2024), reflecting on environmental stewardship and the dignity of labour in Genesis 2:4b–15, develops a related argument for the Nigerian context, contending that stewardship properly understood requires attention to the dignity and equitable participation of all labourers within a shared system of resources — a principle with direct application to how Nigerian universities distribute the labour-saving and capacity-building benefits of generative AI across institutions of unequal means. Read together with Pilani's (2025) reflection on the ethics of artificial intelligence and entrepreneurship from a biblical perspective on just labour, these texts suggest that the stewardship of AI in Nigerian higher education is not merely a matter of efficient adoption but of just and equitable distribution of its benefits and burdens.

The verbs in the Hebrew text repay attention. The words usually translated “work” and “take care of” carry connotations of service and of guarding, and commentators often note that the pairing recurs elsewhere for those who serve and guard a sacred place. The garden is entrusted, not owned, and the human being is placed in it to cultivate what is there and to preserve it beyond a single season. For a university, the resources held in trust include not only money and equipment but also the trust of society, the credibility of its degrees, the accumulated knowledge of its disciplines, and the formation of its students. An AI policy that raises productivity while eroding the credibility of the degree has failed as stewardship, however efficient it appears. Stewardship also has a temporal dimension: decisions taken now about assessment, data, and dependence on foreign platforms will shape what later cohorts inherit.

Stewardship concerns, too, the people who work within the system. Lecturers, librarians, technicians, and administrative staff should not find that AI is introduced as a means of reducing their roles without consultation, and students should not be treated merely as users to be monitored. The dignity of labour on which Pilani (2024, 2025) insists applies to all of them.

The two texts are best read together. Ecclesiastes counsels realism about novelty and warns against forgetting, while Genesis supplies a positive charge to cultivate and protect what has been entrusted. The first guards against panic and the second against passivity. Between them they describe a posture suited to a university that neither idolises technology nor flees from it: attentive, historically informed, and responsible for those who will come after. The theological reading adds no new rules; it supplies the orientation from which sound rules can be made.

7. Opportunities and Challenges

7.1 Opportunities

The movement from earlier digital transformation to the present era of artificial intelligence brings clear opportunities: AI tools can help researchers manage large amounts of information, draft manuscripts more efficiently, and access forms of writing and analytical support previously available mainly to well-funded institutions. The World Bank evaluation of AI-supported tutoring in Nigeria offers a concrete example of how, under the right conditions, these tools can produce substantial and



measurable improvements in learning outcomes even in a resource-constrained setting (De Simone et al., 2025).

Several further opportunities merit mention. Generative tools can give immediate, patient responses at any hour, which matters where staff-student ratios are high and consultation time is scarce. They can help students rephrase difficult material, translate between languages, and rehearse arguments, and they can relieve staff of routine drafting so that more time remains for teaching and research. Feedback deserves particular care: comments produced by a tool may be accurate and prompt, but feedback also tells a student that a teacher has read the work, and students should be told when comments are machine-generated. For students with disabilities, tools that summarise, read aloud, or restructure text may remove barriers that institutions have been slow to address. These benefits are conditional: they are realised when tools support human effort and lost when they substitute for it.

7.2 Challenges

At the same time, the challenges are serious. A large study examining the relationship between frequent AI tool use and critical thinking found a significant negative association between the two, identifying cognitive offloading as the key mechanism (Gerlich, 2025). A separate neuroscientific study of essay writing found that participants who relied heavily on a generative AI assistant showed weaker neural engagement and reduced ability to recall or discuss their own written work, a pattern described as the accumulation of cognitive debt (Kosmyna et al., 2025). Academic integrity presents a related challenge: research on student perceptions has found that many students hold inconsistent views about what counts as acceptable AI use (Lund et al., 2025), and frameworks such as the Artificial Intelligence Assessment Scale have been proposed internationally as a way of helping institutions communicate more clearly which forms of AI assistance are appropriate (Perkins et al., 2024). A growing body of Nigerian scholarship is now examining how generative AI is being used, understood, and debated within Nigerian academic communities specifically (Temitope, 2025).

These findings should be read with care. The critical thinking study reports an association, which does not establish that AI use weakens thinking; it is equally plausible that students with weaker habits of reasoning turn to such tools more often. The neuroscientific study involved a small number of participants performing a single kind of task and was released as a preprint, so its conclusions are best regarded as suggestive and awaiting replication. Neither study focuses on Nigerian university students. Their value lies in identifying a mechanism, cognitive offloading, that deserves attention, and in showing that the risks are not merely rhetorical. They justify neither alarm nor complacency.

7.3 Weighing Benefits and Risks

The evidence for benefit and the evidence for harm are not contradictory, because they concern different conditions. Supervised, purposeful, bounded use appears to help; unstructured use that displaces the effort a task was designed to demand appears to harm. The question for a university is therefore not whether AI helps or hurts but under what conditions, for which students, at what stage of their formation, and with what supervision. That is an empirical question, and Nigerian universities need local evidence to answer it. Until such evidence exists, caution and openness should go together.



8. Practical Implications for Nigerian Universities

If AI adoption is understood as stewardship, several practical implications follow. First, universities need written policies on generative AI that are specific enough to guide practice and flexible enough to be adapted by discipline. A policy that says only that AI must be used responsibly leaves lecturers and students where they began. Graduated frameworks such as the Artificial Intelligence Assessment Scale (Perkins et al., 2024) allow an institution to state, task by task, what level of assistance is permitted and why. Second, staff development should precede enforcement. Lecturers cannot design AI-aware assessments, or judge student work fairly, without time to learn how the tools behave and how they fail. Training should be practical, discipline-specific, and offered to senior staff and administrators as well as junior lecturers.

Third, equitable access should be treated as a matter of policy rather than left to chance. Where a tool is required or encouraged, the institution should ask whether every student can reach it on the devices and connections they have, and should consider institutional licences, offline alternatives, and campus provision for those who lack them. Fourth, assessment should reward process as well as product, through drafts, annotated sources, oral defences, in-class writing, and tasks anchored in local data or fieldwork that general-purpose tools cannot easily fabricate. The aim is not to catch students but to make learning visible.

Fifth, universities should support locally produced research on how these tools are used in Nigerian classrooms, laboratories, and offices, and share what they learn. No single university can build an adequate evidence base alone. The National Universities Commission's approach to curriculum, in which a national core for each programme is combined with a portion left to institutions (National Universities Commission, 2025), suggests that a similar combination of shared standards and local adaptation may be workable for AI. Finally, policies should be reviewed at fixed intervals, because tools, evidence, and student practice will keep changing.

9. Conclusion

Several threads run through this discussion. The first is continuity: artificial intelligence did not appear in Nigerian universities as an isolated event but as part of a longer history of digital adaptation. The second is unevenness: adoption of AI tools has not proceeded at the same pace or with the same benefits across every institution, discipline, or individual. The third is ambivalence: the evidence reviewed here supports neither uncritical celebration nor blanket rejection of generative AI in Nigerian higher education. Read theologically, these threads converge on a single claim: that the question facing Nigerian universities is not whether to engage with artificial intelligence, but how to steward its adoption — cultivating its benefits, tending to its risks, and distributing both responsibly across an institutional landscape marked by real and persistent inequality.

Two limitations should be acknowledged. The article is interpretive, and much of the empirical evidence it cites comes from settings other than Nigerian universities, so its conclusions about local conditions are provisional. The field is also moving quickly, and specific tools, policies, and figures will date. The argument does not depend on any particular product, however, and several directions for research follow from it: how students at different types of institution actually use generative AI,



how lecturers' assessment practices are changing, whether access differs by gender and institutional type, and which forms of policy prove most effective in practice. Stewardship, in the end, is a discipline of attention over time. Nigerian universities that keep watching, remembering, and sharing what they learn will be better placed to ensure that AI serves the purposes for which higher education exists.

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