



Towards a responsible artificial intelligence policy framework for Nigerian colleges of education: implications for educational leadership, policy and teacher preparation

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ABSTRACT

Artificial Intelligence (AI) is rapidly changing higher education. It is reshaping teaching, learning, research, governance, and administration. Even with the growing global use of AI, its integration into Nigerian Colleges of Education is uneven. This is due to weak institutional policies, limited digital infrastructure, insufficient understanding of AI, ethical concerns, and poor governance. Most studies have looked at AI adoption, its opportunities, challenges, and ethical issues in higher education. However, few have focused on creating governance frameworks for teacher education institutions. This paper aims to fill that gap by proposing a Responsible Artificial Intelligence Policy Framework (RAIPF) for Nigerian Colleges of Education. The paper draws on recent research and international policies on responsible AI in education. It examines the leadership, policy, technology, ethics, teaching, and governance aspects of AI integration. The proposed framework includes seven related policy pillars: leadership and governance, AI policy and compliance, digital infrastructure and readiness, capacity building and professional learning, curriculum innovation and responsible AI teaching, ethics and data governance, and monitoring, evaluation, quality assurance, and ongoing improvement. Together, these pillars create a governance framework that encourages strategic AI governance and inclusive AI implementation in Nigerian Colleges of Education. This paper contributes to educational management and policy discussions by suggesting a specific AI governance framework that can guide policy development, improve teacher preparation, inform regulations, and provide a basis for future research on responsible AI in teacher education.

1. Introduction

Artificial Intelligence (AI) is one of the most transformative technologies influencing higher education today. Advances in machine learning, natural language processing, computer vision, predictive analytics, and generative AI have changed teaching, learning, research, assessment, student support, and administration at institutions worldwide (Bond et al., 2024; Zawacki-Richter et al., 2024). These technologies have improved instruction, personalized learning, automated routine tasks, enhanced decision-making, and increased opportunities for educational research and innovation.

The rapid growth of generative AI applications, especially large language models and AI educational tools, has sped up digital change in higher education. Universities and other institutions are increasingly using AI to help with curriculum design, adaptive learning, automated assessment, academic advising, research assistance, institutional planning, and administrative tasks. While these innovations have great potential to enhance educational quality and institutional effectiveness, they also raise important concerns about ethics, governance, academic integrity, transparency, accountability, privacy, intellectual property,

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and fair access to AI technologies (UNESCO, 2023; Crompton & Burke, 2023). Discussions about AI in higher education have moved beyond technology to focus on responsible governance and policy development.

International organizations emphasize that successful AI integration in education relies not just on technological progress but also on effective governance and responsible policy actions. UNESCO (2023) advocates for institutional policies that promote ethical AI use, safeguard learners' rights, protect personal data, ensure transparency, and present AI as a tool that supports human expertise rather than replacing it. Similarly, the Organisation for Economic Co-operation and Development (OECD, 2024) stresses the importance of human-centered AI, accountability, digital inclusion, and responsible data governance as key principles for implementing AI in education. In higher education, educational leadership is crucial for the responsible integration of AI. Institutional leaders must create strategic policies, provide visionary guidance, mobilize resources, enhance staff skills, ensure ethical practices, and create governance structures that can support sustainable digital change (Bond et al., 2024). Thus, AI implementation is now seen as a challenge in educational management and policy that demands effective leadership, coordination, and continuous quality assurance.

In Africa, AI adoption in higher education is growing, despite challenges like lack of funding, unreliable power supply, limited digital infrastructure, poor internet access, and weak policy enforcement. Even though many institutions recognize AI's transformative potential for teaching, research, and administration, implementation remains uneven. This is because comprehensive governance frameworks and AI policies are often missing (Falebita & Kok, 2024). These challenges highlight the need for policy approaches that reflect the realities of African higher education systems.

Nigeria has seen a rise in interest in AI, especially with the increasing availability of generative AI technologies. Universities, polytechnics, and Colleges of Education are slowly integrating AI into teaching, research, writing, assessment, and administration. However, AI implementation in Nigerian institutions is still uneven due to gaps in digital infrastructure, readiness, AI understanding, leadership support, policy development, and ethical governance (Bali et al., 2024; Abubakar et al., 2024). While recent studies address AI adoption, digital skills, educational technology, and ethical concerns, there has been little focus on developing solid institutional governance frameworks for responsible AI implementation, particularly in Colleges of Education. The literature has mainly centered on technology adoption, neglecting the necessary leadership, policy, governance, and quality assurance aspects needed for lasting integration. This creates a crucial gap in educational management and policy research.

Addressing this gap is vital because Colleges of Education play a unique role in Nigeria's higher education landscape. They are responsible for training professional teachers for basic education, significantly affecting the digital skills, teaching methods, and ethical standards of future educators. Therefore, Colleges of Education must integrate AI responsibly for the overall quality of teaching and learning in Nigerian primary and secondary schools. Achieving this goes beyond just acquiring AI technologies. It requires strong leadership, comprehensive policies, adequate digital infrastructure, continuous professional development, ethical governance, and solid quality assurance processes.

Despite the growing research on AI in higher education, existing studies mainly focus on AI adoption, digital change, AI skills, ethical issues, and teaching practices. There has been limited attention to creating integrated institutional policy frameworks tailored to the unique governance needs and teacher education goals of Nigerian Colleges of Education. This is

critical because successful AI implementation depends not only on technology availability but also on coordinated governance that ensures responsible, ethical, and inclusive AI use. Therefore, there is a pressing need for a governance framework that combines leadership, policy, infrastructure, professional learning, curriculum innovation, ethical oversight, and quality assurance in one institutional model.

This paper addresses this gap by proposing the Responsible Artificial Intelligence Policy Framework (RAIPF), a tailored governance framework for Nigerian Colleges of Education. Unlike earlier studies that mostly focus on AI adoption, the RAIPF includes leadership and governance, institutional policy, digital readiness, professional development, curriculum innovation, responsible teaching, ethics, academic integrity, data governance, and ongoing evaluation into a cohesive policy structure. Although designed for Nigerian Colleges of Education, this framework offers valuable insights for teacher education institutions in other developing countries looking for context-sensitive approaches to AI governance.

Rather than simply seeing AI as a technological advancement, this paper argues that effectively integrating it into Colleges of Education is a governance challenge. It requires visionary leadership, coherent policies, strategic investments, ethical oversight, continuous professional learning, and systematic quality assurance. By proposing the Responsible Artificial Intelligence Policy Framework (RAIPF), this paper adds to educational management and policy scholarship by presenting a governance model that can guide policy development, strengthen teacher training, assist educational leaders and policymakers, and lay the groundwork for future research on responsible AI in teacher education.

Purpose of the Paper

This paper's purpose is to propose a Responsible Artificial Intelligence Policy Framework (RAIPF) for Nigerian Colleges of Education. This framework will guide the strategic adoption and governance of AI in teaching, learning, research, educational leadership, and institutional administration. Specifically, the paper reviews contemporary research and international policy developments, examines the leadership, governance, and policy issues linked to AI integration in higher education, and crafts a specific framework to aid institutional leaders, policymakers, and regulatory bodies in enhancing teacher preparation, institutional efficiency, responsible AI governance, and sustainable digital transformation in Nigerian Colleges of Education.

Why Nigerian Colleges of Education Need a Responsible Artificial Intelligence Policy Framework

The rapid growth of Artificial Intelligence (AI) offers remarkable chances to transform higher education through better teaching, learning, research, administration, and decision-making. Worldwide, universities are increasingly using AI technologies to enhance instruction, personalize learning, boost research productivity, and improve institutional effectiveness (Bond et al., 2024; UNESCO, 2023).

In Nigeria, the increasing awareness and use of AI in higher education institutions have not been matched by policy development. While lecturers and students use AI applications for academic writing, lesson preparation, research support, assessment, and administrative tasks, many institutions lack clear policies that outline acceptable AI use, ethical responsibilities, governance structures, quality assurance mechanisms, and institutional accountability (Bali et al., 2024; McDonald et al., 2024). This gap in policy leads to uncertainty about responsible AI

practices and creates challenges related to academic integrity, data privacy, algorithmic bias, intellectual property, and quality assurance.

This situation is especially important in Nigerian Colleges of Education. These institutions prepare future teachers who will work in increasingly tech-driven learning environments. Teacher education institutions must integrate AI into their academic and administrative processes while equipping prospective teachers with the knowledge, skills, and ethics needed for responsible AI use in classrooms. Without a clear policy framework, AI integration may vary widely and rely too much on individual lecturers instead of a cohesive institutional strategy.

Moreover, the lack of AI policies may widen gaps between Colleges of Education regarding technological readiness, staff skills, curriculum innovation, and overall effectiveness. Institutions with stronger leadership and better digital resources may advance quickly, while others may fall behind. This creates unequal opportunities for both lecturers and student teachers. Such disparities weaken national efforts to improve teacher education and prepare graduates for the demands of a digital society.

Recent international policy guidance emphasizes the need for educational institutions to adopt human-centered approaches to AI implementation. This includes creating governance structures that support transparency, accountability, fairness, inclusiveness, privacy protection, and meaningful human oversight (UNESCO, 2023). Similarly, recent research indicates that effective leadership and policy development are key to ensuring responsible and sustainable AI integration in higher education (Bond et al., 2024). These recommendations demonstrate the need for tailored policy responses that reflect the specific contexts of individual education systems instead of relying only on generic global guidelines.

Given this backdrop, Nigerian Colleges of Education need a comprehensive, context-specific policy framework to guide the planning, implementation, governance, monitoring, and ongoing evaluation of AI integration. This framework should assist institutional leaders in balancing technological innovation with educational values, professional ethics, regulatory compliance, and quality assurance. It should also offer direction for improving capacities, transforming curricula, investing in digital infrastructure, encouraging research innovation, and collaborating with stakeholders. In response to this need, this paper proposes the Responsible Artificial Intelligence Policy Framework (RAIPF) as a guide for the responsible adoption and governance of AI in Nigerian Colleges of Education.

Theoretical Foundations of the Responsible Artificial Intelligence Policy Framework (RAIPF)

The Responsible Artificial Intelligence Policy Framework (RAIPF) proposed in this paper is based on two complementary theories: Diffusion of Innovation Theory (DOI) and Transformational Leadership Theory (TLT). Combining these theories provides a strong way to understand both the institutional adoption of Artificial Intelligence (AI) and the leadership needed for effective governance in Nigerian Colleges of Education. While Diffusion of Innovation Theory explains how technological innovations are introduced, adopted, and institutionalized, Transformational Leadership Theory outlines the leadership needed to foster organizational change, inspire innovation, and sustain overall transformation. Using these theories together strengthens the foundation of the proposed policy framework by connecting technological adoption with educational leadership and governance.

Diffusion of Innovation Theory

Diffusion of Innovation (DOI) Theory, developed by Rogers (2003), explains how innovations spread within a social system over time through different communication channels. The theory identifies five factors that influence the adoption of innovations: relative advantage, compatibility, complexity, trialability and observability. Although initially created to explain the spread of innovations in general, the theory is widely applied in studies of educational technology and digital transformation because it offers valuable insights into how ready institutions are for innovation.

This theory is especially relevant to AI integration since Artificial Intelligence is an educational innovation that requires acceptance, support, and systematic implementation within organizations. Colleges of Education vary in leadership capacity, digital infrastructure, funding, organizational culture, and staff skills. Therefore, the adoption of AI is unlikely to be uniform across institutions. According to Diffusion of Innovation Theory, institutions are more likely to adopt AI when its educational benefits are clear, implementation is backed by policies, and stakeholders are prepared through capacity development and ongoing engagement. Recent studies continue to use DOI to explain AI adoption in educational settings, emphasizing the importance of leadership, institutional readiness, communication, and organizational support for sustainable AI integration.

Despite its strengths, Diffusion of Innovation Theory has limitations. It mainly describes how innovations spread but provides little insight into the leadership, governance, and ethical considerations needed for responsible AI implementation. It also assumes that organizations have relatively equal chances to adopt innovations, which may not be the case in many Nigerian Colleges of Education where resource constraints and policy issues affect technological adoption. Thus, DOI alone cannot fully explain the leadership and governance aspects of responsible AI integration.

Transformational Leadership Theory

Transformational Leadership Theory, developed by Bass (1985) and later expanded by Bass and Avolio (1994), explores how leaders inspire their teams to embrace change, pursue innovation, and meet shared institutional goals. The theory highlights four related dimensions: idealized influence, inspirational motivation, intellectual stimulation, and individualized consideration. These aspects encourage leaders to foster innovation, build staff capacity, promote collaboration, and create an institutional culture supportive of ongoing improvement.

Integrating AI into Colleges of Education requires visionary educational leaders who can develop institutional AI policies, gather resources, enhance digital infrastructure, support professional development, set ethical standards, and guide organizational change. Educational leaders play a key role in shaping institutional readiness for AI by setting strategic priorities, supporting innovation, encouraging collaboration, and ensuring that AI aligns with educational values and institutional goals. Recent studies on AI and educational leadership stress that successful AI integration relies on leadership capability, strategic governance, and institutional vision, not just on technological investments.

Nevertheless, Transformational Leadership Theory has its limitations. While it effectively explains the leadership behaviors that drive organizational change, it provides little guidance on how technological innovations spread across institutions. The theory mainly focuses on

leadership effectiveness without addressing the adoption characteristics of new technologies or the organizational dynamics involved in innovation diffusion.

Integrating the Two Theories

Neither Diffusion of Innovation Theory nor Transformational Leadership Theory alone offers a complete explanation for the responsible integration of AI in Nigerian Colleges of Education. However, when combined, they provide complementary perspectives that strengthen the foundation of the proposed Responsible Artificial Intelligence Policy Framework (RAIPF). Diffusion of Innovation Theory describes how AI adoption can happen within institutions, while Transformational Leadership Theory outlines the leadership skills necessary to start, coordinate, and maintain that process.

The combination of these theories offers a solid basis for the seven policy pillars proposed in this paper. The framework acknowledges that successful AI integration relies not only on technological readiness but also on visionary leadership, clear policies, ethical governance, stakeholder engagement, capacity building, ongoing monitoring, and organizational learning. As a result, the proposed RAIPF expands on existing theoretical perspectives by translating principles from innovation diffusion and transformational leadership into a context-specific policy framework for Nigerian Colleges of Education.

The RAIPF therefore translates the principles of Diffusion of Innovation Theory and Transformational Leadership Theory into practical policy actions that fit the needs of Nigerian Colleges of Education.

The Proposed Responsible Artificial Intelligence Policy Framework (RAIPF) for Nigerian Colleges of Education

Despite the increasing enthusiasm for AI in Nigerian higher education has shifted the focus from mere technological advancements to the necessity for effective governance, institutional leadership, ethical application, and sustainable policy formulation. Recent research indicates that the successful incorporation of AI relies on coherent institutional policies, strategic leadership, digital preparedness, staff proficiency, and quality assurance systems that guarantee the responsible and effective use of AI technologies (Bond et al., 2024; UNESCO, 2023; OECD, 2024). As a result, numerous higher education institutions are adopting comprehensive AI governance frameworks that strike a balance between innovation and accountability, transparency, and educational excellence.

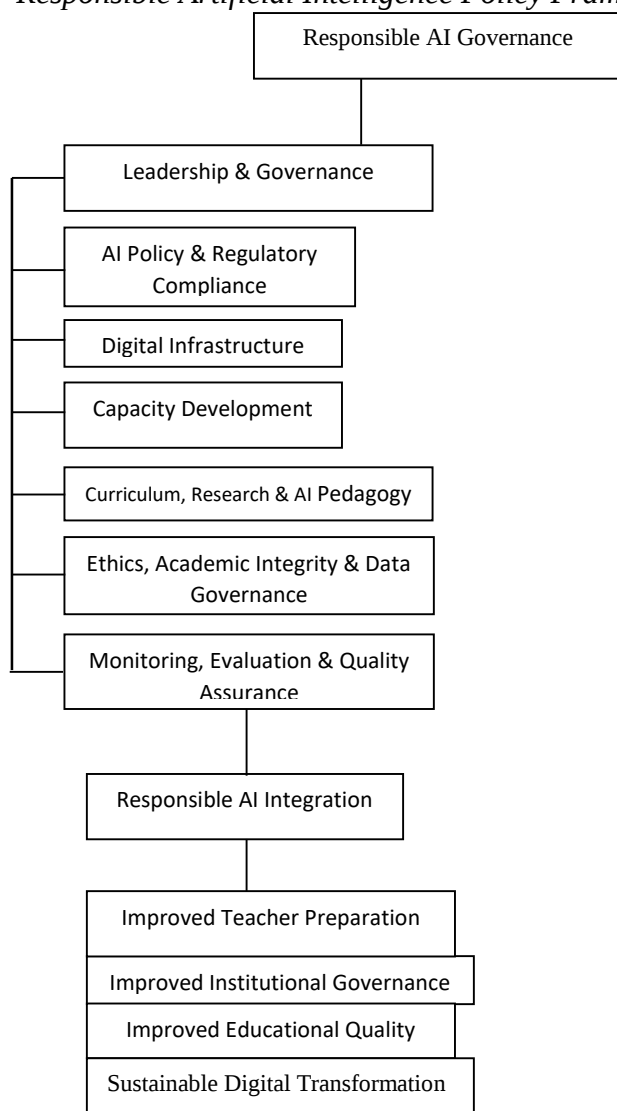
Despite the increasing enthusiasm for AI in Nigerian higher education, Colleges of Education are still grappling with challenges such as inadequate digital infrastructure, limited AI knowledge among faculty, a lack of sufficient institutional policies, and fragile governance frameworks for AI implementation (Bali et al., 2024; Falebita & Kok, 2024). These obstacles highlight the urgent need for a tailored policy framework that can assist educational leaders in the responsible planning, execution, monitoring, and ongoing enhancement of AI initiatives.

Utilizing Diffusion of Innovation Theory (Rogers, 2003) and Transformational Leadership Theory (Bass, 1985; Bass & Avolio, 1994), this paper introduces the Responsible Artificial Intelligence Policy Framework (RAIPF) for Nigerian Colleges of Education. This framework synthesizes insights from current literature on AI governance, educational leadership, and digital transformation to offer a comprehensive policy guide for institutional leaders, governing councils, policymakers, and regulatory bodies. It consists of interconnected policy pillars that

collectively foster ethical AI governance, institutional effectiveness, improved teaching and learning, enhanced teacher preparation, and sustainable digital transformation.

Figure 1 presents the Responsible Artificial Intelligence Policy Framework (RAIPF). The framework positions responsible AI governance as the central coordinating mechanism through which seven interrelated institutional policy pillars collectively support ethical AI implementation, improved teacher preparation, institutional effectiveness, and sustainable digital transformation in Nigerian Colleges of Education.

Responsible Artificial Intelligence Policy Framework (RAIPF)



The seven pillars of the Responsible Artificial Intelligence Policy Framework (RAIPF) are presented in a logical and interconnected sequence that reflects the progressive requirements for responsible AI integration in Nigerian Colleges of Education. The framework begins with leadership and institutional governance, which provide the strategic direction for AI implementation, and progresses through policy, infrastructure, capacity development, curriculum innovation, and ethical governance before culminating in monitoring, evaluation, and quality assurance. Although each pillar addresses a distinct aspect of institutional AI governance, they are mutually reinforcing and should be implemented as an integrated system to achieve responsible, effective, and sustainable AI integration.

Pillar 1: Leadership and Institutional Governance

Leadership and institutional governance form the foundation of the proposed Responsible Artificial Intelligence Policy Framework (RAIPF), as the effective integration of AI is fundamentally reliant on strategic vision, institutional commitment, and sound governance. Educational leaders are pivotal in formulating AI policies, mobilizing financial and technological resources, enhancing institutional capacity, fostering stakeholder engagement, and ensuring that AI implementation is in harmony with institutional objectives and ethical standards (Bond et al., 2024; Sposato, 2025). UNESCO (2023) further underscores the necessity for institutional leadership to guarantee human oversight, transparency, accountability, and responsible decision-making throughout the AI implementation process. In Nigerian Colleges of Education, effective leadership is crucial for fostering an environment conducive to the successful planning, coordination, and sustainability of AI initiatives. Informed by Transformational Leadership Theory, this pillar acknowledges that visionary leaders stimulate innovation, bolster staff confidence, promote collaboration, and nurture an organizational culture that welcomes responsible technological advancement (Bass, 1985; Bass & Avolio, 1994). Consequently, institutional leaders should establish AI governance frameworks, devise strategic implementation plans, facilitate ongoing professional development, and allocate sufficient resources for digital transformation. By offering strategic direction and institutional coordination, leadership acts as the catalyst that empowers the effective execution of all other elements of the RAIPF.

Pillar 2: Artificial Intelligence Policy and Regulatory Compliance

Institutional policies and regulatory frameworks are essential for the responsible incorporation of Artificial Intelligence (AI) in higher education, as they offer clear directives regarding acceptable AI usage, ethical obligations, data governance, accountability, and academic integrity. As AI technologies become increasingly embedded in teaching, learning, assessment, research, and administrative processes, higher education institutions require comprehensive policies that ensure AI applications are aligned with institutional objectives, national regulations, and internationally accepted ethical principles (UNESCO, 2023; OECD, 2024).

Recent findings suggest that numerous higher education institutions are formulating institutional AI policies to tackle concerns such as transparency, human oversight, privacy protection, intellectual property, and the responsible utilization of generative AI (McDonald et al., 2024; European Commission, 2024). Conversely, many Colleges of Education in Nigeria have yet to create comprehensive AI governance policies, resulting in disparities in AI adoption and heightening the risk of misuse, ethical breaches, and uneven implementation across institutions (Bali et al., 2024). This deficiency in policy highlights the necessity for institutional frameworks that establish clear operational standards for AI deployment.

The proposed Responsible Artificial Intelligence Policy Framework (RAIPF) emphasizes that each College of Education should formulate a thorough institutional AI policy that distinctly outlines governance structures, roles and responsibilities, acceptable and prohibited AI practices, ethical standards, data privacy and security requirements, academic integrity provisions, intellectual property considerations, compliance mechanisms, and procedures for regular policy review. These institutional policies ought to align with the guidelines set forth by the National Commission for Colleges of Education (NCCE) and other pertinent national

regulatory bodies, while also integrating internationally recognized principles of responsible AI governance. At the systemic level, the NCCE should devise national policy guidelines and quality assurance benchmarks to foster consistency in AI governance across Colleges of Education, while granting institutions adequate flexibility to tailor implementation to their unique contexts and strategic priorities. Together, these institutional and regulatory initiatives will bolster accountability, enhance public trust, and encourage the ethical, inclusive, and sustainable integration of AI within Nigerian teacher education.

Pillar 3: Digital Infrastructure and Technological Readiness

The successful implementation of Artificial Intelligence (AI) in higher education hinges on robust digital infrastructure and technological readiness. AI applications depend on consistent internet connectivity, dependable electricity, cloud computing services, digital learning platforms, state-of-the-art computer laboratories, cyber security systems, and access to AI-enabled educational software. In the absence of these essential technologies, the effective realization of institutional AI policies and leadership initiatives becomes unfeasible (Bond et al., 2024; UNESCO, 2023). Thus, digital infrastructure emerges as a critical factor in determining an institution's readiness for AI integration.

Evidence from developing nations reveals that insufficient technological infrastructure is among the most significant obstacles to AI adoption in higher education. Issues such as unreliable power supply, inadequate internet connectivity, insufficient ICT facilities, limited access to licensed AI applications, and a lack of funding persistently hinder the effective utilization of AI in numerous African higher education institutions, including those in Nigeria (Falebita & Kok, 2024; Bali et al., 2024). These challenges impede teaching, research, institutional administration, and the training of digitally proficient educators.

The proposed Responsible Artificial Intelligence Policy Framework (RAIPF) emphasizes the need for ongoing investment in digital infrastructure to foster an environment conducive to effective AI implementation. Colleges of Education should prioritize the establishment of high-speed internet access, a reliable power supply, secure digital learning management systems, AI-compatible hardware and software, institutional cyber security measures, and dedicated funding for digital transformation. Furthermore, government agencies and development partners should facilitate infrastructure development through targeted funding and collaborative initiatives. Enhancing technological readiness will lay the groundwork for successful AI integration.

Pillar 4: Capacity Development and Professional Learning

The effective incorporation of Artificial Intelligence (AI) within Colleges of Education relies not solely on the presence of digital infrastructure but also on the expertise, skills, and competencies of both academic and administrative personnel. As AI technologies advance at a rapid pace, ongoing professional development is essential to empower lecturers, administrators, librarians, ICT staff, and student teachers to utilize AI tools in an effective, ethical, and responsible manner. Research indicates that AI literacy and digital competence are vital factors influencing the successful adoption of AI in higher education, as they bolster educators' confidence, foster instructional innovation, and prepare institutions for technological transformation (Bond et al., 2024; UNESCO, 2023).

In numerous Nigerian Colleges of Education, the lack of AI literacy, restricted digital skills, and inadequate opportunities for ongoing professional development pose significant obstacles

to AI integration (Bali et al., 2024; Falebita & Kok, 2024). As a result, many educators find themselves unable to fully leverage the educational advantages of AI or effectively tackle the ethical and pedagogical challenges it presents. Bridging these capacity gaps is crucial for training teacher educators who can subsequently equip future teachers with the necessary competencies for AI-enhanced teaching and learning.

Within the proposed Responsible Artificial Intelligence Policy Framework (RAIPF), this pillar promotes institutional commitment to continuous professional learning through regular training programs, workshops, seminars, certification courses, mentoring initiatives, and communities of practice centered on responsible AI usage. Colleges of Education should incorporate AI literacy into their staff development policies and teacher education programs while fostering collaboration with technology experts, professional organizations, and development partners. Ongoing capacity development will bolster institutional readiness and improve teaching effectiveness, promote innovation, and ensure the effective and ethical use of AI across all institutional functions.

Pillar 5: Curriculum Innovation, Research, and Responsible AI Pedagogy

Curriculum innovation is essential for ensuring that Artificial Intelligence (AI) plays a significant role in teacher education. As AI continues to reshape educational practices, Colleges of Education must revise their curricula to provide pre-service teachers with the necessary knowledge, skills, and ethical competencies to teach and learn effectively in AI-enhanced environments. Recent research highlights the need for higher education institutions to go beyond merely using AI as a technological tool, advocating instead for the integration of AI literacy, computational thinking, digital citizenship, critical thinking, and responsible AI practices into teaching and learning processes (UNESCO, 2023; European Commission, 2024; Bond et al., 2024).

In addition to curriculum reform, Colleges of Education should foster research and innovation that explore the pedagogical, ethical, and institutional ramifications of AI in teacher education. Evidence indicates that collaborative research and interdisciplinary partnerships play a crucial role in developing context-specific AI solutions that meet local educational needs while promoting innovation and evidence-based decision-making (OECD, 2024; Zawacki-Richter et al., 2023). Enhancing research capacity will also empower institutions to assess the effectiveness of AI integration and contribute to both national and international discourse on educational innovation.

Within the proposed Responsible Artificial Intelligence Policy Framework (RAIPF), this pillar supports the systematic incorporation of AI-related competencies into teacher education curricula, the advancement of responsible AI pedagogical practices, and institutional backing for AI-focused educational research. Colleges of Education should regularly evaluate their curricula to incorporate emerging technological advancements, encourage educators to implement learner-centered AI-enhanced instructional methods, and establish research initiatives that inform institutional policy and practice. These measures will ensure that graduates possess the professional competencies required to use AI responsibly while strengthening the contribution of Colleges of Education to educational research, innovation, and national development.

Pillar 6: Ethics, Academic Integrity, and Data Governance

The swift integration of Artificial Intelligence (AI) in higher education has raised substantial ethical, legal, and academic issues that necessitate thorough institutional responses. Although AI presents significant opportunities for improving teaching, learning, research, and administrative efficiency, its improper use could jeopardize academic integrity, data privacy, intellectual property rights, transparency, fairness, and public trust (UNESCO, 2023; OECD, 2024). Therefore, the responsible incorporation of AI demands ethical governance frameworks that uphold educational values while fostering innovation.

Recent research has revealed growing concerns about plagiarism, unauthorized AI-assisted evaluations, algorithmic bias, misinformation, data security, and the absence of transparency in AI-generated content (Bond et al., 2024; McDonald et al., 2024). These issues highlight the necessity for higher education institutions to create explicit ethical guidelines that regulate the acceptable use of AI by faculty, students, researchers, and administrators. Ethical AI governance must also ensure that human judgment remains pivotal in educational decision-making and that AI systems are utilized to enhance, rather than supplant, professional expertise.

Within the proposed Responsible Artificial Intelligence Policy Framework (RAIPF), this pillar promotes the formulation and enforcement of institutional policies that encourage ethical AI usage, uphold academic integrity, protect personal data, and ensure adherence to pertinent legal and regulatory standards. Colleges of Education should implement ethical review processes for AI applications, offer regular awareness programs on responsible AI usage, reinforce institutional policies on plagiarism and intellectual property, and establish data governance mechanisms that ensure privacy, security, accountability, and transparency. By integrating ethical principles into institutional practice, Colleges of Education will foster responsible innovation, strengthen stakeholder confidence, and ensure that AI contributes positively to educational quality and societal development.

Institutions should establish procedures for identifying, assessing, and mitigating potential risks associated with AI systems, including algorithmic bias, misinformation, cyber security threats, and unintended educational consequences.

Pillar 7: Monitoring, Evaluation, Quality Assurance, and Continuous Improvement

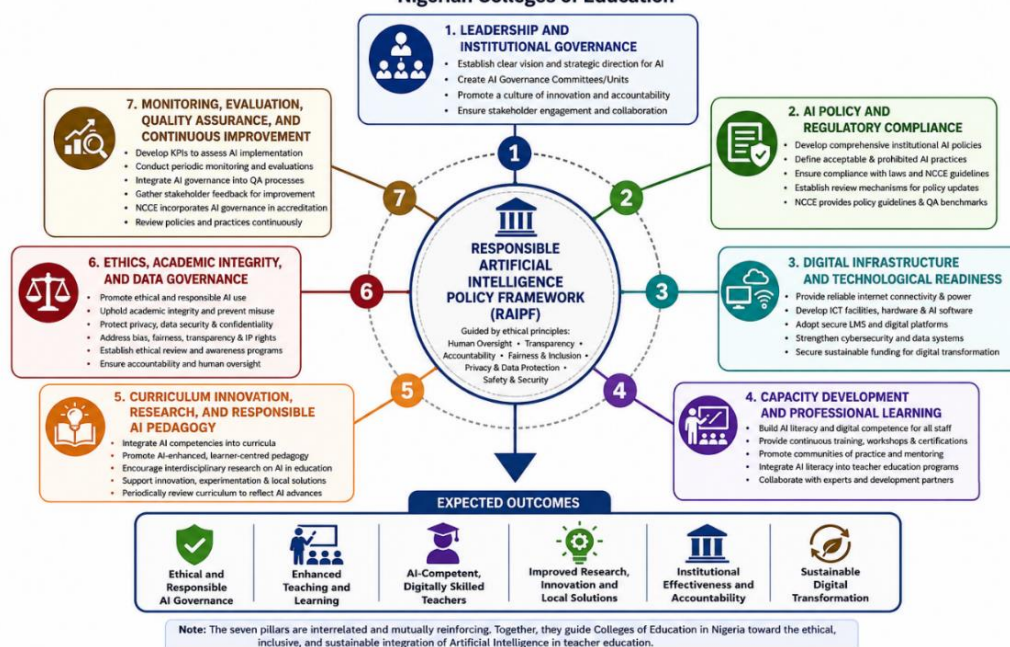
The effective execution of Artificial Intelligence (AI) policies necessitates ongoing monitoring, systematic evaluation, and quality assurance to guarantee that institutional goals are met and emerging challenges are swiftly addressed. Given the rapid evolution of AI technologies, regular assessments are crucial for determining the relevance, effectiveness, ethical standards, and alignment of institutional policies with educational objectives. Monitoring and evaluation also empower institutions to pinpoint implementation gaps, evaluate the influence of AI on teaching, learning, research, and administration, and make decisions based on evidence for continuous enhancement (UNESCO, 2023; OECD, 2024).

Quality assurance has emerged as a vital aspect of AI governance in higher education, as it fosters accountability, institutional effectiveness, and confidence among stakeholders. Recent research highlights the necessity for higher education institutions to establish measurable indicators for evaluating AI implementation, which should encompass staff competence, student learning outcomes, ethical adherence, technological reliability, and user satisfaction (Bond et al., 2024; European Commission, 2024). Regular evaluations also promote institutional learning by identifying best practices and informing continuous policy refinement.

Within the proposed Responsible Artificial Intelligence Policy Framework (RAIPF), this pillar promotes the creation of institutional monitoring and evaluation systems to assess the implementation and effects of AI initiatives. Colleges of Education are encouraged to develop key performance indicators (KPIs), perform periodic reviews of AI policies, integrate AI governance into internal quality assurance processes, and establish feedback mechanisms for stakeholders, including lecturers, students, administrators, employers, and regulatory bodies. At the national level, the National Commission for Colleges of Education (NCCE) should incorporate responsible AI governance into institutional accreditation and quality assurance processes. Continuous monitoring and evaluation will ensure that AI policies remain responsive to technological advances, institutional priorities, and the evolving needs of teacher education in Nigeria.

Collectively, the seven pillars of the RAIPF are mutually reinforcing and should be implemented as an integrated governance system rather than as isolated policy interventions. Leadership provides strategic direction; institutional policy establishes governance standards; digital infrastructure enables implementation; professional learning strengthens institutional capacity; curriculum innovation prepares future teachers; ethical governance safeguards responsible AI use; and continuous monitoring ensures institutional learning and policy improvement. Together, these pillars provide a comprehensive pathway for **strategic AI governance and effective institutional implementation** within Nigerian Colleges of Education.

Figure 1: The Proposed Responsible Artificial Intelligence Policy Framework (RAIPF) for Nigerian Colleges of Education



Implications of the Proposed Responsible Artificial Intelligence Policy Framework (RAIPF)

The Proposed Responsible Artificial Intelligence Policy Framework (RAIPF) carries significant implications for educational policy, institutional governance, teacher education, and quality assurance within Nigerian Colleges of Education. By merging leadership, policy development, digital infrastructure, capacity building, curriculum innovation, ethics, and

ongoing evaluation into a cohesive governance framework, the RAIPF offers a strategic method for fostering the responsible and sustainable implementation of AI in teacher education. This framework addresses the increasing demand for higher education institutions to transition from the fragmented application of AI technologies to comprehensive governance systems that guarantee accountability, transparency, and educational effectiveness (UNESCO, 2023; OECD, 2024).

For institutional leaders, the framework serves as a practical resource for creating thorough AI governance structures that align technological advancements with institutional missions and strategic goals. Provosts, Governing Councils, Academic Boards, and ICT directorates can leverage the framework to develop institutional AI policies, form governance committees, enhance quality assurance processes, and coordinate capacity development initiatives. This unified approach aligns with emerging international guidelines that highlight the importance of leadership, institutional preparedness, and responsible governance as essential elements for the successful integration of AI in higher education (Bond et al., 2024).

Moreover, the framework has considerable implications for teacher education. Colleges of Education bear the responsibility of training teachers who can adeptly incorporate emerging technologies into classroom practices while upholding professional ethics and educational standards. By fostering AI literacy, curriculum innovation, and responsible AI pedagogy, the RAIPF plays a vital role in equipping teachers with the digital competencies necessary for effective use of AI to enhance teaching, learning, assessment, and educational research. This aligns with UNESCO's vision that AI should strengthen, rather than replace, the professional role of educators and should always support human-centred learning (UNESCO, 2023).

At the national level, the framework offers valuable guidance for the National Commission for Colleges of Education (NCCE), the Federal Ministry of Education, State Ministries of Education, and other regulatory bodies overseeing teacher education. The RAIPF may act as a reference point for formulating national guidelines, quality assurance standards, and institutional accreditation criteria concerning AI governance in Colleges of Education. Such alignment in policy would foster uniformity in AI implementation while enabling institutions to tailor the framework to their specific contexts and developmental goals. Moreover, the framework promotes collaboration among educational institutions, government entities, professional organizations, technology firms, and development partners. Collaborative efforts among multiple stakeholders are crucial for mobilizing financial resources, enhancing digital infrastructure, fostering research and innovation, and ensuring equitable access to AI technologies throughout Colleges of Education. Recent literature also underscores that partnerships are vital for achieving sustainable and inclusive AI implementation in higher education (European Commission, 2024; OECD, 2024). In summary, the proposed RAIPF enhances educational management and policy by offering a governance framework that is context-specific and addresses the opportunities and challenges linked to AI integration in Nigerian Colleges of Education. If implemented effectively, the framework could bolster institutional governance, enhance teaching and learning, improve teacher preparation, promote ethical AI practices, and facilitate the digital transformation of teacher education in Nigeria.

Implementation Strategies for the Proposed Responsible Artificial Intelligence Policy Framework (RAIPF)

The effective execution of the Responsible Artificial Intelligence Policy Framework (RAIPF) necessitates a well-coordinated and phased approach that engages institutional leaders, regulatory bodies, government entities, academic personnel, students, and external stakeholders. The implementation process should be driven by strategic planning, active stakeholder involvement, appropriate resource distribution, and ongoing institutional learning to ensure that AI has a beneficial impact on teaching, learning, research, and institutional governance (UNESCO, 2023; OECD, 2024).

The initial strategy for implementation is to conduct an institutional readiness assessment. Colleges of Education must assess their current digital infrastructure, leadership capabilities, staff competencies in AI, institutional policies, and financial preparedness prior to launching AI initiatives. Such evaluations will allow institutions to pinpoint implementation deficiencies and prioritize resource allocation based on their specific needs (Bond et al., 2024).

Secondly, institutions ought to create AI governance frameworks tasked with overseeing policy implementation, ensuring compliance, and advising institutional leadership on emerging AI challenges. These governance frameworks should comprise representatives from academic departments, ICT units, quality assurance offices, legal services, libraries, student organizations, and institutional management to facilitate inclusive decision-making and accountability.

Thirdly, ongoing investment in professional development is crucial. Regular workshops, seminars, certification programs, and communities of practice should be organized to enhance AI literacy among faculty, administrators, librarians, ICT staff, and student teachers. Continuous capacity building will bolster institutional confidence and encourage the responsible application of AI across both academic and administrative domains (UNESCO, 2023). Another significant strategy involves reinforcing partnerships among Colleges of Education, the National Commission for Colleges of Education (NCCE), universities, technology companies, professional associations, and international development partners. Such collaborations can support knowledge sharing, research, infrastructure development, staff training, and resource mobilisation, thereby enhancing institutional capacity for sustainable AI integration (European Commission, 2024).

Ultimately, the implementation process should be bolstered by ongoing monitoring, regular reviews of policies, and mechanisms for quality assurance. Institutions are encouraged to create quantifiable performance indicators to measure progress, assess the effectiveness of policies, and pinpoint areas that need enhancement. Continuous feedback from stakeholders should guide policy updates to ensure that the framework adapts to technological progress, institutional goals, and emerging educational demands. By employing these implementation strategies, the RAIPF can function as a practical resource for achieving effective AI integration across Nigerian Colleges of Education.

Limitations of the Proposed Framework and Directions for Future Research

The Responsible Artificial Intelligence Policy Framework (RAIPF) introduced in this document is a conceptual model formulated through the integration of current literature on artificial intelligence, educational leadership, governance, and teacher education. While this framework offers a systematic policy guide for the responsible incorporation of AI in Nigerian

Colleges of Education, it has yet to be empirically validated in actual institutional environments. Therefore, its practical effectiveness and relevance across various institutional contexts have yet to be confirmed through empirical research.

Moreover, the framework was specifically designed for Nigerian Colleges of Education due to their unique role in teacher training and their distinct governance and regulatory landscape. Although certain elements of the framework may be applicable to universities, polytechnics, and other higher education institutions, the contextual variations in institutional roles, organizational frameworks, and resource availability may necessitate suitable modifications prior to broader implementation. As AI technologies continue to advance, future policy developments, technological breakthroughs, and regulatory shifts may also require regular updates to the framework (UNESCO, 2023; OECD, 2024).

Future research should thus prioritize the empirical validation of the RAIPF through qualitative, quantitative, and mixed-methods studies that engage institutional leaders, lecturers, student teachers, and policymakers from Nigerian Colleges of Education. Additionally, comparative studies with universities, polytechnics, and teacher education institutions in other African nations would yield valuable insights regarding the framework's transferability and contextual applicability. Moreover, subsequent studies could investigate the impact of the proposed framework on institutional governance, curriculum innovation, staff capacity development, ethical AI practices, and educational quality. Such research endeavors would aid in the ongoing refinement of the RAIPF and bolster the evidence base for responsible AI governance in teacher education.

Conclusion

The swift progression of Artificial Intelligence (AI) offers considerable opportunities for revolutionizing teacher education by enhancing teaching, learning, research, institutional administration, and educational decision-making. Nevertheless, the lack of comprehensive institutional policies and governance frameworks presents significant obstacles to the effective governance and implementation of AI in Nigerian Colleges of Education. This paper contended that the adoption of AI must go beyond mere technological acquisition to include effective leadership, policy formulation, digital infrastructure, professional capacity building, curriculum innovation, ethical governance, and ongoing institutional assessment.

To tackle these challenges, the paper introduced the Responsible Artificial Intelligence Policy Framework (RAIPF) as a context-specific governance structure designed to guide the integration of AI within Nigerian Colleges of Education. Based on the Diffusion of Innovation Theory and Transformational Leadership Theory, the framework outlines seven interconnected policy pillars that collectively enhance institutional readiness, responsible AI governance, educational quality, and sustainable digital transformation. The framework also contributes to the growing body of knowledge on educational management and policy by providing a practical guide for institutional leaders, policymakers, regulatory agencies, and other stakeholders responsible for the future of teacher education in Nigeria.

While the RAIPF is primarily conceptual, it provides a structured and evidence-based foundation for the development of institutional policies and strategic decision-making. Its effective implementation could enhance institutional governance, improve teacher training, encourage ethical AI practices, elevate educational quality, and contribute to Nigeria's overarching digital transformation agenda. As AI continues to transform higher education

worldwide, Nigerian Colleges of Education must embrace proactive and contextually appropriate policy frameworks that ensure technological advancements are in harmony with educational values, professional ethics, and national development goals.

Ultimately, the Responsible Artificial Intelligence Policy Framework (RAIPF) serves as a strategic guide for Nigerian Colleges of Education to leverage the transformative capabilities of Artificial Intelligence while maintaining educational quality, institutional accountability, professional ethics, and sustainable national development.

Recommendations

In light of the proposed Responsible Artificial Intelligence Policy Framework (RAIPF), the following recommendations are suggested to facilitate the responsible and sustainable integration of Artificial Intelligence (AI) within Nigerian Colleges of Education:

1. The National Commission for Colleges of Education (NCCE) should formulate national policy guidelines and quality assurance standards to facilitate the responsible adoption, governance, and assessment of AI in Colleges of Education throughout Nigeria.
2. Governing Councils and the management of Colleges of Education ought to develop comprehensive institutional AI policies that explicitly outline governance frameworks, ethical standards, acceptable AI practices, data protection protocols, requirements for academic integrity, and strategies for policy enforcement and regular assessment.
3. Federal and State Governments must prioritize investments in digital infrastructure by enhancing internet connectivity, electricity availability, cybersecurity measures, digital learning platforms, and access to AI-driven educational technologies within Colleges of Education.
4. Colleges of Education should institutionalize ongoing professional development programs aimed at enhancing AI literacy and digital skills among lecturers, administrators, librarians, ICT staff, and student teachers.
5. Teacher education curricula should undergo regular reviews to incorporate AI literacy, responsible AI teaching methods, digital citizenship, critical thinking, and the technological skills necessary for effective teaching and learning in the twenty-first century.
6. Institutional management should implement ethical AI governance frameworks that foster transparency, accountability, fairness, academic integrity, protection of intellectual property, data privacy, and responsible AI utilization across teaching, research, assessment, and administrative functions.
7. Colleges of Education and the NCCE should create strong monitoring, evaluation, and quality assurance systems to evaluate the execution and effects of AI policies, identify emerging issues, and promote ongoing enhancement through evidence-based decision-making.

The successful implementation of these recommendations will require sustained collaboration among government, regulatory agencies, institutional leaders, technology partners, and development organizations.

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