POLICY FRAMEWORKS FOR ARTIFICIAL INTELLIGENCE IMPLEMENTATION IN NIGERIAN EDUCATION SYSTEM

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Abstract

This study investigated policy frame works for artificial intelligence implementation in Nigerian education system and ethical concerns in the use of AI. The paper looked at the potential of AI to enhance teaching and learning outcomes while addressing the critical challenges within the Nigerian educational sector, such as inadequate infrastructure, limited teacher capacity, and data privacy concerns. The study identifies five key policy frameworks that can facilitate the integration of AI in schools: the development of a National AI Strategy for Education, investment in AI infrastructure, teacher training and capacity-building programmes, ethical and data privacy regulations, and fostering public-private partnerships. The study concludes that with comprehensive policy planning and strategic implementation, AI can play a transformative role in Nigeria's education system, improving educational quality and ensuring inclusivity for all students. The suggestions highlight the need for collaborative efforts, financial investment, and ethical oversight to ensure sustainable AI integration.

Keywords*: Artificial Intelligence, Education, Policy Frameworks, Nigeria, Teacher Training, Data Privacy, Public-Private Partnerships, AI Infrastructure, National AI Strategy, Ethical Regulations*

Introduction

Artificial Intelligence (AI) is the ability of a machine or computer system to perform tasks that typically require human intelligence, such as problem-solving, decision-making, speech recognition, and learning from data (Adewale, 2021). In the context of education, AI has the potential to significantly enhance the learning experience by providing personalized teaching tools, automating administrative processes, and offering data-driven insights into student performance (Okeke, 2020). AI-powered applications, such as intelligent tutoring systems, learning management platforms, and grading automation, can support teachers in delivering more efficient and tailored learning experiences. Also, AI has the capability to track individual student progress, recommend resources based on their learning needs, and predict academic outcomes, ultimately improving educational quality and equity.

The Nigerian education system, with its over 200 million citizens, faces numerous challenges, including poor infrastructure, inadequate funding, overcrowded classrooms, and a lack of modern educational tools (Ibrahim, 2021). Despite government efforts to address these issues through policies such as the National Policy on Education, which seeks to promote access, quality, and equity in education, significant barriers remain (Oluwaseun, 2020). One of the most pressing concerns is the underfunding of schools, especially in rural areas, which makes it difficult for institutions to access the technology and resources necessary for effective teaching. Additionally, there is a shortage of qualified

teachers, particularly in STEM subjects, and many schools still rely on outdated teaching methods. The introduction of AI in Nigerian schools could provide a solution to some of these issues by offering efficient, scalable, and cost-effective ways to enhance the learning experience and support teachers. However, for AI to be successfully implemented, it requires a comprehensive and well-structured policy framework that guides its adoption and use in educational settings.

A policy framework is a set of guidelines, principles, and strategies that help address specific issues or objectives. In the case of AI in education, a policy framework would lay out the necessary steps for integrating AI technologies into the education system, addressing both opportunities and challenges. It would outline the goals of AI integration, identify stakeholders, establish ethical guidelines, and ensure that the implementation of AI tools is aligned with the educational objectives of the country. A robust AI policy framework would ensure that AI technologies are implemented in a way that enhances educational outcomes, maintains fairness and transparency, and adheres to privacy and data protection standards (Musa, 2022). This framework would also provide a roadmap for addressing challenges such as the digital divide, teacher training, and the ethical use of AI in classrooms.

Several key policy frameworks should be implemented to ensure that AI is successfully integrated into Nigerian schools. First, there should be the creation of a National AI Strategy for Education, which would outline the long-term vision for AI adoption in the education sector. This strategy should identify key areas where AI can be effectively used, such as personalized learning, data-driven teaching methods, and administrative automation, while also ensuring equitable access to AI tools across both urban and rural schools (Ogunleye, 2021). The strategy should also highlight how AI can assist in addressing challenges like overcrowded classrooms and the shortage of qualified teachers by providing personalized learning support to students.

Second, there should be a focus on developing an AI curriculum that is integrated at all levels of education, from primary to tertiary institutions. This curriculum should aim to provide students with the skills and knowledge necessary to thrive in an AI-driven world. It should not only focus on the technical aspects of AI but also cover the ethical, legal, and societal implications of AI, thus preparing students for the complexities of working with AI technologies in various sectors (Adamu, 2021). Additionally, teachers should be trained on how to incorporate AI into their teaching methods and use AI tools to enhance the learning experience.

Third, a robust policy on data privacy and security is necessary to protect students' personal information when using AI systems. As AI systems rely on data to make decisions, it is critical that a framework for safeguarding student data is established. This policy should ensure that AI tools comply with data protection regulations and that student data is handled securely to prevent unauthorized access or misuse (Eze, 2021). In this regard, transparency and accountability in the use of AI algorithms should also be ensured to avoid bias and discrimination.

Fourth, a policy for continuous professional development of teachers in AI should be developed. Teachers play a central role in the successful integration of AI in the classroom, and they must be equipped with the necessary skills to effectively utilize AI tools. This would involve regular training programmes, workshops, and access to resources that allow teachers to understand how AI can enhance their teaching practices and improve student outcomes. Additionally, teachers should be involved in the decision-making process regarding the adoption of AI tools to ensure that the technology meets their needs and is user-friendly (Ali, 2020).

Lastly, a monitoring and evaluation framework is essential to assess the effectiveness of AI implementation in Nigerian schools. This framework should include regular assessments of the impact of AI on student learning outcomes, teaching practices, and administrative efficiency. By continuously monitoring the use of AI, policymakers can identify areas for improvement, measure progress towards educational goals, and ensure that AI technologies are being used responsibly and ethically (Ogunjobi, 2021). Moreover, this framework should allow for adjustments to be made to the AI policy based on feedback from teachers, students, and other stakeholders.

While AI holds great potential for transforming the Nigerian education system, it requires a well-structured policy framework to guide its implementation. The adoption of AI in schools can improve

learning outcomes, reduce the workload on teachers, and create a more personalized learning experience for students. However, to fully realize these benefits, the government must prioritize the development of an AI strategy, curriculum, data privacy policies, teacher training, and effective monitoring systems. By doing so, Nigeria can leverage AI to modernize its education system and provide students with the tools they need to succeed in an increasingly digital world.

Several scholars have investigated on artificial Intelligence (AI) and its potential integration into educational systems, particularly in developing countries like Nigeria. Adewale (2021) emphasized the role of AI in addressing some of the most pressing challenges within the Nigerian education system, particularly the issues of teacher shortage and overcrowded classrooms. AI has the capacity to provide personalized learning experiences for students, allowing each learner to progress at their own pace. This personalized approach, powered by AI, could alleviate the burden on teachers and ensure that students receive tailored instruction that suits their individual needs. The scholar also argued that AI could help mitigate the challenges posed by a lack of qualified teachers, especially in rural and underserved areas. AI-powered tutoring systems could provide real-time feedback to students, enhancing learning outcomes in environments where teacher-student ratios are high and resources are limited. However, for AI to be effectively implemented in Nigerian schools, there must be substantial investment in both infrastructure and teacher training. While the potential for AI is significant, the practicalities of infrastructure, such as reliable electricity and internet access, must be addressed to ensure the technology works as intended.

Ogunleye (2021) also discussed the importance of developing a comprehensive policy framework to guide the integration of AI in Nigerian schools. He notes that while AI has the potential to transform education, its success depends largely on the alignment of AI initiatives with national education goals. Ogunleye proposes that the Nigerian government should develop a National AI Strategy for Education, outlining clear objectives, funding mechanisms, and strategies for equitable access to AI technologies across all schools, including those in rural areas. This policy framework should prioritize ethical considerations, such as data privacy, algorithmic fairness, and transparency, to ensure that AI applications do not exacerbate existing inequalities in education. While these scholars provide compelling arguments for the potential benefits of AI in Nigerian schools, this research will delve deeper into the practicalities of implementing AI and the challenges surrounding policy development. One significant concern is the digital divide that exists between urban and rural areas in Nigeria. Many rural schools in Nigeria are still grappling with basic infrastructural deficits, making it difficult to envision AI as a widespread solution in the short term. Therefore, this paper will point out areas Nigerian government can balance the need for advanced technology with the reality of infrastructural limitations, particularly in rural and underserved areas.

Also, Ogunleye's (2021) call for a National AI Strategy for Education is an essential component of my paper, but I would further argue that such a strategy must include specific action points for teacher training, curriculum design, and long-term sustainability. While policy frameworks are necessary, their success hinges on practical, localized implementation. One of the key aspects I will explore is how AI can be integrated into teacher professional development programmes to ensure that teachers are equipped not only to use AI tools effectively but also to understand the ethical implications of using AI in educational settings. As Ogunleye (2021) rightly points out, ethical concerns surrounding data privacy, algorithmic bias, and fairness must be a central part of any policy framework, and my research will investigate how these concerns can be addressed in the Nigerian context.

The Nigerian education system is expected to integrate Artificial Intelligence (AI) to enhance teaching, learning, and administrative efficiency. However, AI adoption in Nigerian schools remains limited due to inadequate infrastructure, lack of skilled personnel, and the absence of a clear policy framework. While efforts have been made to improve digital literacy and technology integration, these initiatives have not specifically addressed AI implementation.Despite these efforts, AI adoption remains unstructured, leading to disparities in access and concerns about ethical implications. This gap limits students' exposure to global technological advancements and hampers the efficiency of school administration. Without a structured policy framework, the potential benefits of AI in education may

not be fully realized.To bridge this gap, there is a need for well-defined policy frameworks to guide AI integration in Nigerian schools. How can Nigeria develop and implement effective policies to ensure equitable and sustainable AI adoption in its education system?By exploring these issues, this paper aims to offer practical suggestions for the successful implementation of AI in Nigerian schools, ensuring that it becomes a tool for enhancing education while addressing the socio-economic disparities in the country.

Policy Frameworks for Artificial Intelligence Implementation in Nigerian Education System

The implementation of Artificial Intelligence (AI) in the Nigerian education system requires well-structured policy frameworks as opined by Odome and Nwogu (2019); which includes a National AI Strategy for Education, which provides a clear roadmap for AI adoption, and an AI Infrastructure Development Framework, which ensures the availability of necessary resources such as electricity, internet connectivity, and digital tools. Additionally, a Teacher Training and Capacity-Building Policy is essential for equipping educators with AI literacy, while Ethical and Data Privacy Regulations safeguard student data and prevent biases, and a Public-Private Partnership (PPP) Framework for AI Integration fosters collaboration between the government, private sector, and international organizations to drive AI adoption and sustainability.

National AI Strategy for Education as a **Policy Framework for Artificial Intelligence Implementation**

National AI Strategy for Education is essential for the successful implementation of Artificial Intelligence (AI) in the Nigerian education system. This strategy provides a structured roadmap for integrating AI into teaching, learning, and administrative processes, ensuring that its adoption is systematic, inclusive, and aligned with national education goals. Without a clear strategic framework, AI adoption in schools may remain fragmented, leading to inconsistencies in implementation and widening the technological gap between schools with access to digital resources and those without. As observed by Okafor (2022), countries that have successfully integrated AI into education have done so through a structured national strategy that clearly defines objectives, guidelines, and implementation mechanisms. Such a strategy ensures that AI is not introduced arbitrarily but is aligned with broader educational reforms aimed at improving learning outcomes.

The National AI Strategy for Education should outline specific goals for AI integration, including enhancing personalized learning, automating administrative tasks, and improving access to quality education for students in remote areas. Personalized learning, powered by AI, allows students to receive tailored instruction based on their individual learning styles and progress, which has been shown to improve retention and engagement (Eze, 2021). Additionally, AI-driven administrative tools can reduce the workload on educators by automating grading, attendance tracking, and data analysis, thereby allowing teachers to focus more on student engagement. However, without a national strategy, AI implementation may be uncoordinated, leading to disparities in how schools adopt and utilize AI tools. Nwankwo (2023) emphasized that in countries without a clear national AI policy, the use of AI in education often results in inequality, as only well-funded schools can afford to adopt AI-powered solutions while underfunded institutions struggle to keep up.

Furthermore, a comprehensive National AI Strategy for Education should address regulatory and ethical concerns associated with AI adoption in schools. AI systems rely heavily on data collection and algorithmic processing, raising issues of privacy, security, and potential biases in decision-making. Adebayo (2020) argued that a national policy is necessary to establish ethical guidelines that ensure AI technologies used in education are transparent, fair, and free from biases that could disadvantage certain student groups. The strategy should also specify measures for monitoring and evaluating AI systems to ensure they align with the ethical standards required for educational applications. Without these safeguards, AI adoption in Nigerian schools may pose risks related to data privacy violations and algorithmic discrimination.

Another critical component of the National AI Strategy for Education is ensuring that AI adoption is inclusive and equitable. Many schools in Nigeria, particularly those in rural areas, lack the infrastructure necessary to support AI-driven education. If AI policies are not designed with inclusivity in mind, there is a risk that only elite schools in urban centers will benefit from AI advancements, further widening the digital divide. According to Chukwuma (2022), a well-structured national AI policy should prioritize equitable distribution of resources and provide funding mechanisms to support underprivileged schools in adopting AI tools. This can be achieved through government-funded initiatives that provide schools with necessary AI infrastructure, training programmes for teachers, and partnerships with technology providers to ensure affordability and accessibility.

AI Infrastructure Development Frameworkfor Artificial Intelligence Implementation

AI Infrastructure Development Framework is essential for the effective implementation of Artificial Intelligence (AI) in the Nigerian education system. The success of AI-driven education depends significantly on the availability of reliable technological infrastructure, including internet connectivity, electricity, digital devices, and cloud-based platforms for data storage and processing. Without these foundational elements, AI adoption in schools will remain limited, further deepening the digital divide between well-funded institutions in urban areas and underprivileged schools in rural regions. According to Olumide (2022), the absence of a robust digital infrastructure has been one of the biggest obstacles to integrating AI in Nigerian schools, as many institutions struggle with unstable power supply, inadequate computer laboratories, and limited access to high-speed internet. A comprehensive infrastructure framework should, therefore, prioritize the development of digital resources to ensure that all students and teachers, regardless of location, have access to AI-powered learning tools.

One of the key components of an AI Infrastructure Development Framework is the provision of stable electricity in schools to support digital learning environments. Many Nigerian schools, especially those in rural areas, experience frequent power outages, making it difficult to integrate AI-powered tools that require uninterrupted access to computers and the internet. Akinwale (2021) emphasized that for AI-driven education to be effective, schools must be equipped with alternative power sources such as solar energy and inverter systems to ensure continuous access to digital resources. Government and private sector investments in renewable energy solutions can help bridge this gap and provide schools with the reliable electricity needed for AI implementation.

Another crucial element of the infrastructure framework is broadband internet access, which is fundamental for AI-driven learning applications, cloud-based assessments, and real-time data processing. Currently, internet penetration in Nigerian schools is inconsistent, with many institutions lacking affordable and high-speed internet connectivity. Ezeji (2023) noted that without internet access, AI-driven tools such as adaptive learning platforms, virtual tutoring, and intelligent feedback systems cannot function effectively, limiting the potential of AI in enhancing personalized learning experiences. A well-defined policy should outline strategies for expanding broadband infrastructure in schools, including government subsidies for educational institutions, partnerships with telecommunications companies, and the establishment of community internet hubs in underserved areas.

Equally important is the provision of digital devices and AI-powered learning tools in schools to facilitate technology-enhanced education. Many students and teachers lack access to essential digital devices such as laptops, tablets, and smartboards, which are necessary for AI-based learning experiences. According to Nwachukwu (2020), AI applications in education require interactive platforms and tools that allow students to engage with digital content, conduct research, and collaborate on virtual projects. A comprehensive infrastructure framework should, therefore, include policies for equipping schools with AI-compatible devices through government funding, donations from private organizations, and school-level technology adoption programmes.

Furthermore, a strong AI Infrastructure Development Framework should emphasize cybersecurity and data protection measures to safeguard student and institutional information from cyber threats. AI applications often involve the collection and processing of sensitive data, making it

crucial to establish security protocols that prevent data breaches and ensure compliance with ethical AI standards. Chijoke (2021) highlighted that a lack of cybersecurity measures in AI adoption can expose schools to hacking, data manipulation, and privacy violations, which could undermine trust in AI-based education. The framework should, therefore, outline cybersecurity policies, including encryption techniques, user authentication protocols, and regular system audits to protect digital learning environments. The AI Infrastructure Development Framework serves as a critical foundation for the successful implementation of AI in the Nigerian education system. Without stable electricity, high-speed internet, adequate digital devices, cloud-based storage, and cybersecurity measures, AI adoption in schools will be ineffective and inaccessible to many learners. A well-defined policy that addresses these infrastructure challenges will ensure that AI-driven education is not only feasible but also sustainable, bridging the digital divide and providing all students with equal access to technology-enhanced learning experiences. As AI continues to shape global education, Nigeria must prioritize infrastructure development to fully harness its potential and improve educational outcomes.

Teacher Training and Capacity-Building Policy for Artificial Intelligence Implementation

A well-structured Teacher Training and Capacity-Building Policy is crucial for the successful implementation of Artificial Intelligence (AI) in the Nigerian education system. The effectiveness of AI-driven education depends not only on the availability of technology but also on the ability of teachers to integrate AI tools into their teaching methodologies. Unfortunately, many educators in Nigeria lack the necessary digital skills and pedagogical knowledge required to utilize AI-powered learning solutions effectively. According to Okechukwu (2021), teachers play a fundamental role in shaping how AI is adopted in classrooms, yet most of them have not received adequate training to integrate AI-based tools into their lesson plans. A robust policy framework must, therefore, prioritize continuous professional development and digital literacy training for teachers to ensure they can effectively harness AI for teaching and learning.

One of the key components of this policy should be the integration of AI training into teacher education programmes in colleges and universities. Many teacher training institutions in Nigeria still follow traditional curricula that do not incorporate AI-related skills such as machine learning applications, adaptive learning technologies, and data-driven instructional strategies. As noted by Ijeoma (2022), the absence of AI-focused training in teacher education results in a significant knowledge gap, making it difficult for educators to adopt AI-powered teaching methods. The policy should mandate the inclusion of AI courses in teacher education programmes to equip pre-service teachers with foundational AI knowledge before they enter the workforce.Additionally, the policy should emphasize continuous professional development (CPD) programmes for in-service teachers to help them stay updated on emerging AI trends. AI technology is constantly evolving, and teachers need regular training to keep pace with new AI-driven educational tools. Eze (2023) argued that without ongoing professional development, teachers risk becoming obsolete in an AI-powered educational environment. Therefore, the framework should establish structured CPD workshops, certification programmes, and online learning platforms that provide teachers with hands-on experience using AI applications in the classroom. Government agencies, universities, and private technology firms should collaborate to design training modules that address the specific needs of educators at different levels of expertise.

Also, the policy must promote peer mentorship and collaborative learning among teachers to facilitate knowledge sharing and best practices for AI integration. Many educators may find AI technology intimidating, and peer mentoring can help them gain confidence by learning from colleagues who have successfully implemented AI-driven teaching strategies. According to Adeyemi (2020), mentorship programmes create a supportive environment for educators, enabling them to exchange ideas and explore AI-based instructional approaches together. The policy should encourage schools to establish AI learning communities where teachers can collaborate, share experiences, and develop innovative teaching techniques using AI tools.

Another essential aspect of the policy is the provision of government-sponsored AI training grants and incentives to encourage teachers to participate in AI capacity-building programmes. Financial constraints often limit educators' access to professional development opportunities, making it necessary for the government to provide funding support. Chukwuma (2021) highlighted that in countries where AI training is prioritized, teachers are given financial incentives and career advancement opportunities for acquiring AI-related skills. A policy framework that offers training grants, stipends, and promotions based on AI proficiency will motivate teachers to embrace AI-driven education.

Ethical Considerations in the Use of Artificial Intelligence

Ethical considerations refer to the moral principles and guidelines that researchers follow to ensure the integrity of their work and the protection of participants' rights and well-being. These considerations address issues such as informed consent, confidentiality, privacy, avoiding harm, and ensuring honesty and transparency in conducting and reporting research (Resnik, 2020). Akpomi (2024) stated that Researchers must respect the dignity, autonomy, and safety of participants while also ensuring that their work adheres to professional and legal standards.

In research, ethical considerations often include:

- Informed Consent: Participants must be fully informed about the nature of the research and provide their voluntary agreement to participate.
- Confidentiality and Privacy: Researchers must protect participants' data and personal information from unauthorized access.
- Minimizing Harm: Researchers should avoid causing physical, psychological, or emotional harm to participants.
- Honesty and Integrity: Ensuring that research is conducted and reported truthfully and that findings are not falsified or misrepresented.

Ethical guidelines are often enforced by institutional review boards (IRBs) or ethics committees to ensure research upholds high moral standards and respects participants' rights.

Artificial Intelligence (AI) refers to the simulation of human intelligence processes by machines, especially computer systems (Russell and Norvig, 2016). AI encompasses various technologies that enable machines to perform tasks that typically require human intelligence, such as learning, reasoning, problem-solving, perception, language understanding, and decision-making. AI can be categorized into two broad types:

1. Narrow AI (Weak AI): AI systems designed to perform specific tasks, such as voice recognition, image classification, or recommendation systems. Examples include virtual assistants like Siri and Alexa or chatbots.
2. General AI (Strong AI): Hypothetical AI that can understand, learn, and perform any intellectual task that a human can. General AI remains a long-term goal and is not yet developed.

Key components of AI include machine learning, where algorithms improve their performance through experience, and deep learning, a subset of machine learning that involves neural networks inspired by the human brain.

AI is widely applied across industries, from healthcare and finance to autonomous vehicles and education and natural language processing.Artificial Intelligence (AI) has introduced to research writing, numerous advantages, such as increased efficiency, enhanced data analysis, and automation of repetitive tasks. While AI can streamline various aspects of the research process, its misuse can undermine the integrity of academic work. Ethical considerations such as maintaining research integrity, safeguarding data privacy, mitigating algorithmic bias, and ensuring proper attribution of AI-generated contributions are important.

Researchers have a responsibility to use AI as a tool that supplement their expertise, without compromising the principles of transparency, accountability, and intellectual honesty. By adhering to these ethical standards, researchers can control the use of AI responsibly, ensuring that its benefits are realized while upholding the values central to scholarly work.

When discussing AI ethical considerations in research writing, it is important to address the complex interactions between AI technologies and the ethical frameworks that guide research. The rise of AI as a tool in academia has brought forth unprecedented opportunities but also significant challenges related to privacy, bias, intellectual property, and accountability. To thoroughly identify these, let us examine them in the context of research integrity, data security, bias mitigation, and the responsibility of researchers.

1. Research Integrity and AI

Research reporting is anchored in the principles of integrity, and AI's involvement should not compromise these standards. The use of AI tools in the forms of automated writing assistants such as ChatGPT, Claude AI, Perplexity AI, Scispace, Consensus AI, R Discovery, Meta AI for WhatsApp and Facebook, etc. should not be used without the Researcher's intervention and direction. (Williams, 2021). However, Researchers must ensure that these AI tools are used to enhance, not substitute, the genuine intellectual effort that research demands.

One key ethical consideration involves plagiarism. AI-powered tools can generate text based on prompts, potentially leading to inadvertent plagiarism if Researchers do not adequately attribute sources or over-rely on AI-generated content without scrutiny (Ikechukwu, 2023). To maintain academic integrity, researchers should verify the authenticity of AI outputs and cite any assistance offered by AI tools in generating or analyzing data.

2. Data Privacy and AI in Research Writing

AI tools are highly dependent on large datasets to generate insightful analyses. This often includes text mining, natural language processing (NLP), or using machine learning algorithms to find patterns in data. However, when dealing with sensitive or personal data, such as medical records or private correspondence, it becomes crucial to implement strict data privacy protocols (Adebayo, 2022). Researchers should be aware of data privacy laws like the General Data Protection Regulation (GDPR) in Europe and similar legislation in other regions. Any AI tools used in research must comply with these regulations, ensuring that personal data is anonymized and securely stored (Obioma, 2023). A major concern is the potential for AI tools to de-anonymize data, inadvertently revealing identities through pattern recognition techniques, which can violate ethical standards around privacy and confidentiality.

3. Bias in AI-Generated Research Outputs

A major ethical dilemma in AI research is algorithmic bias. AI systems, particularly those involved in data analysis and literature review, can inherit biases from the datasets they are trained on. If the training data is twisted by demographic, social, or cultural biases, the AI's output can reinforce these biases (Okoro, 2021). In the area of research writing, this can lead to misrepresentations of findings, unfair treatment of certain groups, or flawed conclusions. Researchers must critically assess the datasets and AI tools they use, ensuring that they are diverse, inclusive, and representative of the populations under study (Eze, 2023). Additionally, researchers should disclose potential biases in their methodology sections, describing how they addressed or mitigated these concerns during data analysis and review of literature, and closely watch out for incessant use of the following words multifaceted, landscape, complex, pivotal, program, moreover, foreign fictitious citations and so on as to avoid over reliance and biases in generated outputs.

4. Intellectual Property and AI

AI tools raise questions about the ownership of intellectual property (IP). When AI is used to assist in writing or generating research ideas, there are concerns about authorship and who should take credit for the final product. Current academic conventions typically recognize human authorship, but with AI's increasing role in research, the boundaries of authorship are becoming blurred (Afolabi, 2024). For instance, if an AI algorithm suggests a novel hypothesis or contributes to data interpretation, how much credit should be given to the AI, if any? Should the developers of the AI tool also be credited? These are significant ethical questions that require careful consideration and standardization in research practices (Adebayo, 2022). Ethical guidelines are evolving, and researchers should stay informed about emerging standards from academic publishers and ethical bodies.

5. Accountability and Transparency

Accountability is a key ethical principle in any research process. When using AI in research, transparency becomes paramount to ensure that readers, reviewers, and the academic community understand how AI contributed to the research (Obinna, 2023). Researchers must clearly disclose AI's role in generating content or analyzing data, detailing the specific tools used, the methodologies applied, and any limitations or potential biases these tools may have introduced. Failure to transparently disclose the use of AI can lead to a loss of trust in the research findings. Journals are increasingly requiring researchers to submit detailed AI usage disclosures as part of the publication process to maintain transparency. Similarity index using AI should not exceed 20% in Journals in Elsevier, Scopus while other international Journals in Google Scholar should not exceed 30%. (Iruke 2021). Many journals such as IARD journal, Africa British Journal, give room for Researchers to give credit to works obtained from AI.

AI presents exciting opportunities for enhancing the efficiency, scope, and quality of research. However, these advantages come with significant ethical responsibilities. Researchers must remain vigilant about the ethical implications of AI tools, particularly concerning data privacy, bias, intellectual property, and accountability. It is critical to ensure that AI is used responsibly, and that the integrity of the research process is maintained at every step. By following ethical guidelines, Researchers can harness the power of AI without compromising the core values of honesty, fairness, and transparency that are central to academic research (Afolabi, 2024).

To sanitize Researchers from over dependence on AI, Institutional Review Boards (IRBs), Ethics Enforcement Committees, Research and Development, and Quality Assurance units should assess recent AI check tools such as Turnitin- Pro, and ZeroGPT, to help in matching similarity index for works done with AI. Turnitin version is outdated, and the use should be discouraged.

The cautionary notes on the use of AI, given by Okebukola (2024):

- *100% Dependence on AI is abomination for the scholar*
- *AI should be your "Boy", Boy" not your Master*
- *Your Creativity and innovation must show when you use AI and*
- *Start with your 'Head' and only supplement with AI 'head'* are worth adhering to.

Conclusion

The implementation of Artificial Intelligence (AI) in the Nigerian education system presents a promising opportunity to enhance learning outcomes, bridge educational gaps, and prepare students for the demands of the 21st century. However, for this transformation to be successful, it is crucial that the Nigerian government takes a proactive role in developing a comprehensive National AI Strategy for Education, investing in necessary AI infrastructure, and ensuring that teachers are adequately trained to leverage these technologies. Ethical guidelines for AI use, alongside data privacy regulations, must be established to safeguard the interests of students and educators. Additionally, fostering public-private partnerships will be instrumental in securing the resources and expertise needed to integrate AI effectively across the education system. By adopting these recommendations, Nigeria can create an inclusive, innovative, and sustainable educational environment that prepares students to thrive in a

technology-driven world. Through careful planning, collaboration, and continuous evaluation, the integration of AI into Nigerian education can contribute significantly to the nation's development and its global competitiveness.

Suggestions

Based on the study on policy frameworks for Artificial Intelligence (AI) implementation in Nigeria's education system, the following five suggestions are proposed:

1. The Nigerian government should prioritize the establishment of a clear, comprehensive National AI Strategy for Education to provide a structured framework for integrating AI into the education system.
2. The Nigerian government should invest in the development of AI infrastructure across the education system, including high-speed internet, reliable electricity, and modern computing devices.
3. The Nigerian government should implement comprehensive teacher training programmes focused on enhancing digital literacy and equipping educators with the skills to effectively use AI tools in the classroom.
4. The Nigerian government should establish clear ethical guidelines for the use of AI in education, ensuring that AI systems are transparent, unbiased, and reliable
5. The Nigerian government should promote the development of AI-driven educational content and tools that are specifically tailored to the local context.
6. The Nigerian government should establish a monitoring and evaluation system to track the progress and effectiveness of AI integration in schools.

References

Adamu, A. (2021). Integrating AI curriculum in Nigerian schools: A pathway to future-ready education. *International Journal of Educational Research and Development*, 9(2), 123-134.

Adebayo, S. O. (2020). Ethical concerns in AI adoption in education: Ensuring fairness and transparency. *Educational Ethics and Technology, 5*(3), 88-101.

Adebayo, T. (2022). Addressing bias in AI algorithms for Nigerian educational tools. *Journal of Educational Innovation and Policy, 7*(1), 43-55.

Adebayo, T. (2022). AI in research: Data privacy concerns and regulatory frameworks. *Journal of Technology and Ethics, 10*(2), 45-61.

Adewale, A. (2021). The role of artificial intelligence in addressing challenges in Nigerian education. *Journal of Educational Technology and Innovation*, 12(3), 45-58.

Adeyemi, A. B. (2020). The role of peer mentorship in AI adoption among Nigerian educators. *International Journal of Educational Collaboration, 15*(1), 45-59.

Afolabi, J. (2024). Intellectual property in the age of AI: Who owns AI-generated content? *Research Ethics Review, 15*(1), 20-35.

Akinwale, O. (2021). The role of renewable energy in supporting AI-driven education in Nigerian schools. *Journal of Educational Sustainability and Technology, 6*(4), 75-89.

Akpomi, M. E., & Nwuke, T. J. (2024, September 24–25). *Ethical considerations in using Artificial Intelligence (AI) for reporting research results (RRR)*. Lecture delivered at the maiden edition of the Workshop training on Research Writing and Data Analysis, "Research Dynamics in AI Era," Institute of Education, Rivers State University, Port Harcourt, Nigeria.

Akpomi, M.E. (2024).Rivers State University Draft Artificial Intelligence (AI) Policy. Akpomi-Margaret-Module 8 Project Report. VICBHE. Unpublished.

Ali, M. (2020). Teacher training for the integration of artificial intelligence in classrooms: Challenges and strategies. *Journal of Teacher Education and Development*, 18(4), 92-107.

Chijoke, A. O. (2021). Cybersecurity in AI adoption: Protecting Nigerian schools from digital threats. *International Journal of Cybersecurity in Education, 7*(2), 120-132.

Chukwuma, I. (2021). Financial incentives for AI training in education: A model for Nigerian teachers. *Educational Funding and Development Review, 6*(2), 122-135.

Chukwuma, L. (2022). Bridging the digital divide: Inclusive AI policies for equitable education in Nigeria. *Journal of Educational Development, 16*(1), 45-60.

Eze, M. A. (2021). The impact of AI-driven personalized learning on student engagement and retention in Nigerian schools. *Educational Technology Review, 8*(4), 102-115.

Eze, O. P. (2023). Continuous professional development for teachers in the era of AI. *Educational Policy and Innovation Journal, 8*(3), 85-98.

Eze, S. (2021). Data privacy and security policies for AI systems in Nigerian schools: A comprehensive approach. *Journal of Data Protection and Privacy*, 10(1), 50-63.

Ezeji, T. O. (2023). The importance of broadband internet access in enhancing AI-driven learning experiences in Nigerian schools. *Journal of Digital Education and Policy, 11*(1), 45-58.

Ibrahim, A. (2021). The state of education in Nigeria: Challenges and opportunities. *Educational Policy Review*, 24(1), 112-126.

Ijeoma, A. C. (2022). Bridging the AI knowledge gap in Nigerian teacher education. *Journal of Teacher Education and Pedagogical Studies, 10*(2), 101-115.

Ikechukwu, P. (2023). Addressing the ethical challenges of AI in research writing. *International Journal of Digital Research Ethics, 12*(3), 89-104.

Musa, K. (2022). Framework for AI policy integration in Nigerian education. *Journal of Educational Research and Policy*, 20(4), 213-229.

Nnamdi, M. (2021). Informed consent in the age of AI in education. *Educational Ethics Review, 8*(1), 90-103.

Nwachukwu, S. A. (2020). The impact of digital devices on AI-based learning in Nigerian schools. *Educational Technology and Digital Learning Journal, 8*(3), 55-70.

Nwankwo, A. K. (2023). The consequences of inconsistent AI adoption in educational systems: A comparative study. *Journal of African Educational Technology, 14*(2), 150-163.

Obinna, M. (2023). Accountability in AI-assisted research: Transparency and ethical use. *Nigerian Journal of Academic Integrity, 14*(4), 63-79.

Odome, J. T., & Nwogu, C. A. (2019). The role of policy frameworks in the implementation of Artificial Intelligence (AI) in Nigerian education. *Journal of Educational Technology and Policy, 3*(2), 75-89.

Ogunjobi, O. (2021). Monitoring and evaluation frameworks for AI in Nigerian education. *Educational Technology in Africa*, 15(2), 45-60.

Ogunleye, A. (2021). A comprehensive policy framework for artificial intelligence in Nigerian schools. *Journal of Nigerian Education Policy*, 8(3), 34-47.

Okafor, N. (2023). Transparency in AI: A key to building trust in educational technologies. *AI in Education Journal, 6*(2), 110-124.

Okebukola (2024). Effortlessly Winning Research Grants and Raising Funds. VICBHE MODULE 9 Newsletter N0 3. August 19, 2024

Okechukwu, M. N. (2021). The role of teachers in integrating AI into Nigerian classrooms. *Journal of Educational Technology and Teacher Training, 13*(4), 55-67.

Okeke, I. (2020). Artificial intelligence in education: Potential and challenges for Nigeria. *Journal of African Educational Technology*, 5(2), 78-88.

Okoro, A. (2021). The problem of bias in AI research tools. *African Journal of Technological Research, 8*(2), 22-36.

Olatunji, A. (2022). Monitoring and evaluating AI systems in schools: Ethical perspectives. *Journal of AI and Educational Standards, 10*(3), 130-144.

Olumide, J. A. (2022). Overcoming infrastructure challenges in AI integration in Nigerian schools. *International Journal of Educational Technology and Infrastructure, 9*(2), 103-115.

Oluwaseun, D. (2020). An analysis of educational policies in Nigeria and their impact on technology integration. *Journal of Educational Policy and Practice*, 16(1), 77-89.

Onyekachi, A. (2021). Data security and privacy in AI-based educational systems. *Journal of Cybersecurity and Education, 9*(4), 150-162.

Resnik, D. B. (2020). The ethics of research: An overview. *Journal of Research Ethics, 16*(2), 11-23.

Resnik, D. B. (2020). What is Ethics in Research & Why is it Important? National Institute of Environmental Health Sciences. Retrieved from NIEHS. 20 September 2024.

Russell, S., & Norvig, P. (2016). *Artificial Intelligence: A Modern Approach* (3rd ed.). Pearson.

Uzochukwu, I. (2022). Ethical concerns in the deployment of AI tools in Nigerian schools. *Journal of Educational Technology and Privacy, 12*(3), 72-85.

Williams, D. (2021). The ethics of AI in academic writing. *Technology in Academia, 9*(1),