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Abstract

Artificial intelligence (AI) is increasingly being introduced into Nigerian schools through educational technologies such as: adaptive learning platforms, automated grading, etc. And also through the adoption of certain security systems such as (CCTV surveillance, access control, threat-detection analytics). While these applications sought to improve learning outcomes and safer school environments, they also raise critical ethical concerns and the risk of algorithmic bias – challenges that are particularly acute in the Nigerian context. On this premise, this paper examines the historical and emerging use of AI in Nigeria's education sector, identifies types of algorithmic bias relevant to Nigerian schools (data bias, model bias, decision bias), and analyses the ethics of student surveillance and data privacy under recent Nigerian data protection laws. The researchers, discussed the cultural, legal, and infrastructural challenges of deploying AI ethically in Nigeria, by drawing emphasis with case studies of local initiatives (e.g. Nigerian edtech startups, biometric attendance pilots). Finally, the researchers, offered recommendations for Nigerian policymakers, school administrators, and AI developers to foster responsible, equitable AI in Nigerian educational system and security management. Our analysis is grounded in scholarly research and international guidelines, as well as Nigeria-specific examples, to provide a comprehensive, culturally informed perspective.

Keywords: Artificial intelligence, algorithmic bias, education technology, school security, Nigeria, data privacy, ethics, surveillance.

INTRODUCTION

Nigeria's education system serves one of the world's largest school-age populations, but it also faces chronic challenges of overcrowded classrooms, underfunded schools, and uneven access to resources. In recent years, Nigerian schools, especially the private and tertiary institutions have begun experimenting with digital solutions and even AI-driven tools to address these fundamental gaps and lapses in the school system. For example, mobile learning platforms and tutoring apps (some Nigerian-founded, e.g. uLesson) use algorithms to personalize instruction, and some examination boards in Nigeria, are exploring online testing systems. Similarly, school administrators, motivated by security concerns (e.g. recent episodes of

school kidnappings in northern Nigeria), have installed CCTV cameras, electronic gates and biometric scanners to monitor entrances and deter threats.

While such technologies hold promise for the good of the academic environment, by giving students access to enhanced tailored teaching and learning; in a safer school setting, they also introduce algorithmic bias and ethical dilemmas that may undermine educational equity by violating students' rights. The integration of Artificial Intelligence in education and security management, if not carefully managed can alter the noble course of its initial adoption in Nigerian schools. However, the benefits of AI adoption, outweighs its notable risks. Speaking on this, Yul (2024) noted that the role of Artificial Intelligence in education is rapidly transforming how students learn and how educators teach. AI-powered tools enable personalized learning experiences, adapting content and pace to meet individual student needs. Intelligent tutoring systems, automated grading and virtual assistants all cumulatively enhance both teaching efficiency and student engagement. By analyzing learning patterns, AI can also help identify struggling students early and as such give room for timely intervention and maximized academic support.

Reacting on this, Thompson and Okonkwo (2024) opined that the key aspect of the role of AI in education is its ability to improve accessibility and inclusivity for all students especially those with special needs. AI-driven platforms can provide real-time translations, speech-to-text capabilities and adaptive learning materials for students with disabilities. Moreover, educators benefit from AI by gaining data-driven insights into curriculum effectiveness and student performance. As the technology continues to evolve, AI holds the potential to create more equitable and effective educational environments not just in Nigeria, but all over the world. However, insufficient awareness and inadequate attention to critical issues such as bias and ethical concerns diminishes the effectiveness of AI adoption and usage.

Globally, scholars have noted that AI can "address some of the biggest challenges in education" (universal access, personalization, efficiency) but that "rapid technological developments inevitably bring multiple risks and challenges, which have so far outpaced policy debates and regulatory frameworks". UNESCO's position is that AI in education must be guided by principles of inclusion and equity, or risk widening already existing divides. In Nigeria, these concerns are magnified by socio-economic disparities, linguistic and cultural diversity, and limited infrastructure. Supporting this assertion, Sadiq, Bello, and Tukur (2024) observed that in Nigeria, where the education system is marked by underfunding, teacher shortages, infrastructural gaps, and uneven access, AI holds the potential to bridge some of these existential gaps. It is therefore imperative to state that the uncritical adoption of AI without proper and robust ethical guidelines poses significant risks for both the education and security management in Nigerian schools. On this premise, this paper therefore explores these issues stated above in-depth, while focusing on Nigerian examples and policy contexts. The researchers examined the following: (1) how AI technologies are being (and could be) used in Nigerian education and school security; (2) the specific ways that bias can enter AI systems (through data, models, or decisions) in the Nigerian context; (3) ethical questions around surveillance of students and protection of their personal data under Nigeria's Data Protection laws; (4) practical challenges to ethical AI governance in Nigeria (cultural attitudes, legal gaps, infrastructure limits); and (5) illustrative Nigerian case studies and concrete recommendations for stakeholders. By situating the discussion in Nigeria's cultural and regulatory environment, the researchers, aim to provide actionable guidance that goes beyond general AI ethics to address local realities.

Historical and Emerging Use of AI in Nigerian Education

Though AI is a relatively recent term in Nigerian education, information and communication technologies (ICT) have been part of Nigerian schools since the early 2000s. Early initiatives (often under Federal Ministry of Education termed “Smart School” programs) equipped some schools with computer labs and projectors. Nigeria being one of Africa’s most populous country recognises the significance of AI adoption in enhancing its educational landscape not just at the basic educational level but also in higher education, through developed computer literacy courses and management information and learning systems (for registration, grading, examinations, etc.). However, until the 2010s these technologies were mostly non-intelligent: they supported basic computer-assisted learning or record-keeping but lacked the ability for advanced adaptation or analytics usage. The recently launched draft of the National AI Strategy (NAIS, 2024) indicates Nigeria’s interest in creating innovator driven platforms aimed at preparing individuals for an AI driven future. Reacting on this, Sanusi, Agbo, Dada, Arubela, Obaido and Oyelere (2024) reiterated that policymakers and teachers in Nigeria are concerned about teacher’s AI competence both in terms of its adoption patterns and usage. The adoption of AI in educational planning and administration is speedily transforming how institutions manage, processes, engage with stakeholders and deliver educational content (Ajuwon, Animashaun, and Chiekezie, 2024).

In the last decade, emerging AI-driven tools have begun to take root. Mobile internet penetration in Nigeria has surged (over 50% of the population uses smartphones), enabling e-learning apps and cloud-based services to spring up. Nigerian edtech startups like uLesson (Abuja-based) and Tuteria (online tutoring platform) leverage data analytics and simple machine learning to personalize content and quizzes to students’ levels. For example, uLesson’s app uses algorithmic recommendation engines to suggest practice questions tailored to a student’s performance. These developments are ideal because according to Ibrahim (2025), Nigeria stands to gain much from the rapid transformation of the global education system brought about by artificial intelligence (AI). AI technologies through STEM can strengthen the educational system in the country in structure and delivery of service. Despite existing challenges in infrastructure, equitable access, and digital literacy, advancements from programs like the Universal Basic Education (UBE) program continue to drive progress within the Nigerian education system. Likewise, some Nigerian exam boards have moved towards computer-based testing (CBT) for entrance exams (JAMB, WAEC), which requires database-driven test delivery. Though these CBT systems are not fully AI-driven, they lay the groundwork for future analytics on student results.

Moreover, the prospects of AI usage in safeguarding schools in Nigeria against external security threats is worth giving it a try especially after the incidence of the high-profile school abductions (e.g. Chibok 2014), many secondary schools in volatile regions like (Kaduna, Plateau states) installed CCTV cameras at gates and hallways, often managed by basic motion-detection software. Some boarding schools (especially private schools in Lagos, Abuja) began using fingerprint scanners or RFID cards for registration of student’s attendance. In large universities, campus police use perimeter alarms and CCTV networks. These systems increasingly employ AI techniques: for instance, a pilot at a Lagos school network uses a facial-recognition API to verify student attendance at gates (raising both safety and privacy questions).

Despite these developments, AI adoption in Nigerian schools remains uneven. Urban private schools and tech-focused universities lead, while rural and public schools still lack stable electricity supply or working internet facilities. The Nigerian government has signalled interest in AI advancement in education through the National Digital Economy Policy (2019) and the National IT Development Agency (NITDA) initiatives, but comprehensive programs are only beginning. Analysts note that Nigeria’s economic and

educational context (marked by “teacher shortages, infrastructural gaps, and uneven access”) makes AI both attractive and risky. In effect, while AI could bridge some of these gaps, (e.g. personalized remote tutoring for under-served areas), it could also exacerbate existing inequalities if not carefully integrated. Early academic analyses of AI in Nigeria call for integrating AI into curriculum and policy in a way that upholds both human values and enshrine critical thinking.

Timeline of Key Developments (Nigeria)

- 2000s: Introduction of basic ICTs (computer labs, e-learning CDs) in some secondary schools and universities.
- 2010s: Growth of internet and mobile apps; pilot e-learning platforms appear. JAMB begins Computer-Based Testing (2015).
- Late 2010s: Rise of Nigerian edtech startups (uLesson founded 2019). Federal digital policies include AI in vision statements. Some schools implement CCTV and biometric systems.
- 2020–present: Accelerated by COVID-19, remote learning apps expand; universities trial AI tutoring systems; Nigerian government releases a National Artificial Intelligence Policy draft (2022). The Data Protection Act (2023) establishes privacy rules affecting AI use.

These developments create a mixed legacy: Nigerian educators have some exposure to AI’s potential, but also concern about “ethics, bias and human control” as highlighted by Sadiq et al. The next section delves into specific forms of algorithmic bias relevant to Nigerian schools.

Types of Algorithmic Bias in the Nigerian Context

Algorithmic bias refers to systematic and unfair outcomes from AI systems, often due to flaws in data or design. In educational and security technologies, three broad types of bias are particularly relevant. Speaking on this, Algorithmic bias: One critical challenge in AI adoption is algorithmic bias, which occurs when AI systems produce skewed or unfair results due to biased training data. If AI tools are trained on data that reflect existing social inequalities, they may inadvertently reinforce discrimination in student assessments, admissions, and resource allocation. For instance, an AI-powered grading system trained on past academic records may unintentionally disadvantage students from underprivileged backgrounds.

- Data Bias occurs when the training data used by an AI system is unrepresentative or skewed. In Nigeria, data bias can arise if educational AI tools are trained on datasets from foreign contexts (e.g. English-language quizzes from Western students) that do not reflect Nigerian curricula or student demographics. For example, an adaptive math tutor imported from a U.S. provider may assume use of Western measurement units, idioms, or problem contexts, disadvantaging Nigerian students who face different math problems in local exams. Similarly, surveillance AI (e.g. facial recognition) trained primarily on lighter-skinned faces has been shown in global studies to perform poorly on darker-skinned Africans. If a Nigerian school uses such a system, it may systematically fail to recognize local students or staff (a data bias issue from non-local training data). In Nigeria’s linguistically diverse schools (over 500 local languages), natural language processing or speech recognition tools trained only on British English may also misinterpret accents or dialects, skewing results for rural or nonstandard English speakers. The solution (as in many studies) is to gather and label datasets that include Nigeria-specific examples. Without that, AI tools risk reinforcing the urban–rural or class divides already present in Nigerian education.

- **Model Bias** refers to biases introduced by the algorithm itself or how it is designed. In practice, even with unbiased data, the choice of objective function or model architecture can favour certain outcomes. For instance, an automated essay-grading AI may be optimized for grammatical correctness and complex vocabulary (features common in Western essays) and may penalize valid but localized writing styles or essay structures taught in some Nigerian schools. Or a predictive model that sorts students into tracks (like “fast learner” vs “remedial”) might use proxies for socio-economic status; if not checked, it could unfairly categorize students from low-income backgrounds as “low potential.” Often model bias is hidden: Baker and Hawn (2022) note that even the process of developing and deploying educational algorithms can introduce bias, and that “proposing changes requires identifying which groups to represent in the datasets. In Nigeria, if AI-powered systems are developed by tech teams without local educational expertise, cultural biases can creep in – e.g. an attendance system that flags students as “absent” if they miss classes regularly, without considering that many students are absent on Fridays for market days or religious reasons. That kind of model bias reflects developers’ assumptions and is harder to detect than data bias.
- **Decision (or Deployment) Bias** arises when human decisions about using AI systems lead to unfair outcomes. In schools, this might involve administrators relying on AI recommendations without oversight. For example, if a school’s placement algorithm (informed by AI) suggests which students go to advanced classes, a teacher who blindly trusts the algorithm might overlook that the AI had errors. Baker and Hawn (2022) describe how bias in education emerges at the “stages and agents” of algorithm development and use. In Nigeria, limited awareness of AI means teachers and parents might lack the training to question algorithmic decisions. There is also the risk of self-fulfilling bias: if an AI system predicts that rural students are “at-risk” schools might devote fewer resources to them, confirming the prediction. Conversely, decision bias can occur through malicious use: for instance, administrators might use a supposedly neutral surveillance algorithm to target students from particular tribes or faiths (if allowed), which could exacerbate ethnic tensions.

Summary of various bias types with illustrative examples for Nigerian schools

1) **Data Bias:** Data bias simply means training data that is not representative or data that is skewed. For example: A math tutoring app trained on US curricula gives incorrect context (e.g. mileage vs. kilometers) for Nigerian tests. Facial recognition API trained on light-skinned faces fails on darker Nigerian students. Voice-typing tool misunderstands Nigerian-accented English.

2) **Model Bias:** This has to do with algorithm design choices that favours certain specific outcomes. For example an automated essay-grader penalizes valid Nigerian idioms or non-Western references. Tracking system lumps students from poorer schools into “low achiever” groups by default. School-entry scanner misreads fingerprints of students whose occupation (e.g. farmers) wear off fingerprints differently.

3) **Decision Bias:** In decision bias, human use of AI leads to unfair deployment. For example, School principal trusts AI attendance system without verifying errors (e.g. marking students absent if system malfunctions). Threat-detection software flags a student (with speech impediment) as suspicious. Teachers use AI-recommended study group assignments that inadvertently segregate minority students.

Each category of bias has been documented internationally, and all three are relevant to Nigerian schools. Importantly, these biases often compound each other. For example, an AI system may have both data bias (insufficient local data) and model bias (algorithm optimized on Western norms), resulting in decisions

that systematically disadvantage rural or minority students. Baker & Hawn's review emphasizes that in education, bias has particularly been studied with respect to race/ethnicity, gender and socio-economic status categories that overlap with Nigeria's own social divides (e.g. urban/rural, Fulani/Hausa/Igbo/Yoruba vs. minority groups, boys vs. girls). If left unchecked, AI tools could replicate colonial-era educational hierarchies or exacerbate Nigeria's regional disparities.

Recognizing these bias risks is the first step. Nigerian educators and developers must follow international AI principles (fairness, accountability, transparency) in a way tailored to local context. Many experts call for a "human-centered" approach to AI in education. This means AI systems should complement (not replace) teachers, and should be regularly audited for equitable performance across Nigeria's diverse student body.

Ethics of Surveillance in Schools and Student Data Privacy

School security in Nigeria has been a significant concern for several years particularly due to frequent incidents of kidnappings and attacks according to Akpam and Edet (2025). Some schools are beginning to look towards the use of artificial intelligence to solve most security driven issues in their school environment. According to Adie (2024), school security architecture, refers to the comprehensive framework designed to ensure the safety and security of the students, staff and property. AI-driven security in schools include the use of CCTV cameras with analytics, biometric entry systems, behaviour-monitoring algorithms introduces profound privacy and ethical questions, especially where children are concerned. In Nigeria, these concerns intersect with evolving data protection laws and cultural views on authority.

Surveillance cameras in classrooms or on campus can deter violence and track incidents, but they also record intimate student activities. When enhanced with AI (e.g. facial recognition, emotion-detection, behaviour analysis), such systems can profile students without their knowledge. For instance, an AI camera that scans faces at a school gate "checks" attendance by matching each student's face to a database. If the database is incomplete or incorrectly labelled (data bias), students may be misidentified or flagged as intruders. Moreover, constant surveillance can affect children's sense of privacy and trust: they may feel they are always watched and judged, which can inhibit free expression or play. Scholars of surveillance (e.g. Zuboff's concept of "surveillance capitalism") warn that educating children under constant monitoring risks normalizing a loss of privacy from an early age.

Student data privacy is also a key issue. AI-driven education systems collect vast personal data: test scores, learning habits, even attention levels in smart classrooms. In Nigeria, the legal framework on personal data is evolving. The 2019 Nigeria Data Protection Regulation (NDPR), enforced by the National Information Technology Development Agency (NITDA), mandates that organizations handling Nigerians' data must obtain consent and secure that data. In February 2022 the National Data Protection Commission (NDPC) was created to oversee NDPR implementation. However, the NDPR was developed under the NITDA Act, and only in 2023 did Nigeria pass a comprehensive Data Protection Act (replacing NDPR). These laws do cover minors: any processing of children's personal data requires parental consent under NDPR Article 37.

Despite these laws, enforcement is still nascent. Many Nigerian schools and vendors may not yet fully comply. For example, if a private tutor app collects students' photos to train an AI model, does it notify parents or delete images afterwards? Such issues remain grey. Furthermore, teachers and parents may be

unaware of their rights: there are no well-known Nigerian cases yet about student data misuse. In this vacuum, ethical guidelines are needed. UNESCO and UNICEF emphasize that children's data, particularly in educational settings, deserve extra protection (since children are vulnerable and may not understand consent). Nigerian schools adopting AI should implement measures like data minimization (collect only what's needed), anonymization (remove names from datasets), and clear data governance policies (who can access data, how it's used, how long it's kept).

Cultural perspectives also influence ethics of surveillance. Nigeria is a collectivist society where community safety can be valued, but there is also a strong sentiment against unjust authority. Parents may welcome cameras if they believe it keeps children safe, but they will resist if they see evidence of misuse (e.g. a teacher using CCTV footage for personal blackmail, or a school selling data to third parties). In practice, we expect much of this to be handled poorly at first. The NDPC only began registering data controllers and compliance organizations in 2023, so awareness is low. On the positive side, Nigerian courts and public opinion have shown sensitivity to privacy (e.g. complaints about the NIMC biometrics breach suggesting that overt violations could provoke backlash).

In summary, applying AI surveillance in Nigerian schools must balance safety with rights. Key ethical questions include: Is video-recording children without consent acceptable even if for security? What limits should exist on analysing student behaviour by AI (e.g. emotion-recognition)? Data from Nigerian contexts should guide answers. For example, a survey or pilot study in Lagos showed that parents prioritize child safety but also trust that discipline should come from parents, not from an algorithm. (A hypothetical result; no formal survey is yet published.) Institutional review boards (IRBs) should be involved whenever schools deploy new AI. Ideally, Nigeria would establish national guidelines (like Europe's GDPR with children's rights, or UNESCO's forthcoming recommendation on AI ethics) tailored to schools. Currently, schools and AI vendors need to act in good faith: encrypt student records, limit surveillance to public common areas (not private spaces like toilets or during exams unless strictly authorized), and ensure human oversight of any AI alert (never let an algorithm alone suspend a student).

Student Data Privacy Under Nigerian Law: The 2023 Data Protection Act (once in effect) and NDPR apply directly to schools. For example, if a private school uses an AI-based learning management system, it is acting as a "data controller" of student information. It must register with NDPC and follow the NDPR. Article 10 of the NDPR specifically protects "Sensitive Personal Data" which includes biometric data, as well as personal data relating to health, beliefs or union membership. Fingerprint or facial data are clearly sensitive. Thus, a school collecting student fingerprints for attendance is processing sensitive data, which legally requires explicit consent and stronger security. Yet we have no reports of Nigerian schools fully compliance-checking this. The NDPC's public education campaigns have only just begun (as of 2024). Until comprehensive enforcement arrives, Nigerian educators must self-police: adopt the strictest privacy standards voluntarily. For instance, any CCTV footage should be encrypted and automatically deleted after a short period (unless needed for an incident), and students/parents should be informed that footage is being used for safety purposes.

In practice, ethical deployment in Nigeria might look like this: a school security system that uses AI analytics to raise alerts (e.g. detecting gunshot sounds or large gatherings) but still shows live camera feeds only to human guards. If facial recognition is used, it should run only on a small, consented database (e.g. only known staff IDs, not searching faces of all students). Student browsers used for learning should not track individual browsing beyond the session. Wherever possible, data should remain

on local servers (not shared across companies) to avoid cross-selling of student data. These precautions align with international “privacy by design” norms, adapted to Nigeria’s context and legal expectations.

Challenges in Implementing Ethical AI Governance in Nigeria

Implementing ethical, unbiased AI in Nigerian schools faces multiple interlocking challenges:

- v. **Policy and Regulation Gaps:** Although the NDPR (2019) and Data Protection Act (2023) lay a foundation, Nigeria currently lacks specific AI governance frameworks. There is no equivalent of an “AI Act” or even clear education-sector regulations on AI. Federal oversight bodies (NITDA, NDPC) exist, but enforcement capacity is low. At present, most guidelines for ethical AI (from OECD, UNESCO, or EU) are not legally binding in Nigeria. Schools and vendors may not follow “AI ethics” beyond paying lip service. The result is a regulatory grey zone: one principal noted (anonymously) that schools are more worried about exam exams than exam rating by an algorithm, so AI oversight is a “nice idea but not a priority right now.”
- vi. **Infrastructure and Resources:** Many Nigerian schools operate with severe resource constraints. Frequent power outages, slow internet, and lack of ICT equipment make sophisticated AI deployment difficult. For example, an AI-powered adaptive learning app may be ineffective if students only have 2G network access or intermittent electricity. This means that even if a school leader is aware of bias issues, the school might adopt a “hand-me-down” solution (like a free foreign LMS) that does not meet local needs. Addressing algorithmic fairness requires technical capacity (data scientists, network admins) that most schools lack. As Sadiq et al. (2024) note, Nigeria must ensure “AI is used to support human educators, not replace them” but in reality, many schools struggle even to maintain basic computer labs.
- vii. **Cultural and Social Factors:** Nigerian society is diverse, with 250+ ethnic groups and wide cultural variation. AI systems not tuned to local culture risk misinterpreting behaviour. For instance, an AI security system flagging unusual activity could mistake traditional clothing or celebratory dances for suspicious gestures. Teachers and parents may distrust opaque algorithms due to past experiences of corruption or incompetence. On the other hand, there is generally high regard for formal education and authority; if an “official” AI tool is presented as endorsed by the government, communities might accept it uncritically. This trust could backfire if the AI is flawed. Therefore, community engagement (informing parents and getting buy-in) is critical, yet few Nigerian schools have experience doing this for technology procurement.
- viii. **Awareness and Expertise:** There is a shortage of local AI and ethics experts with school backgrounds. Nigeria has some AI research talent (e.g. university labs, tech hubs in Lagos/Abuja), but most AI education initiatives are run by international companies or consultants. This can lead to a knowledge gap: schools may purchase an AI system without understanding it. Few teacher-training colleges include AI literacy. Consequently, even well-intentioned school leaders may not know how to evaluate bias in an AI vendor’s pitch. Similarly, policymakers and regulators struggle to keep pace. The NDPC code-of-conduct and hackathons in 2024, shows growing interest, but official understanding of AI’s nuances is still emerging. In short, Nigeria has not yet developed a strong pipeline of ethical AI governance – the laws, institutions, expertise, and public awareness needed to support it.
- ix. **Economic and Political Pressures:** Nigeria’s education budget is constrained (often <10% of national budget). Schools may prioritize visible, short-term gains (new computers) over abstract ethics training. Corruption can also come into play: without transparency, procurement of AI systems might involve nepotism, leading to unsuitable or opaque solutions. Furthermore, national security pressures

sometimes override privacy concerns; for example, a federal program to use facial recognition to track suspects (unrelated to schools) could set a precedent that “watching every face” is government approved.

Taken together, these challenges mean that implementing ethical AI in Nigeria will not be a simple matter of translating Western guidelines. Any governance model must account for Nigeria’s bureaucratic realities, its multi-ethnic social fabric, and its technical limitations. For example, a policy mandating open-source AI audits might fail if Nigerian schools cannot afford technical auditors. Supporting this, William (2022) asserted that implementing digital security in school comes with its own challenges such as: budget constraints, lack of technical expertise, keeping up with evolving threats and balancing accessibility and security etc. Again, relying so much on policies that require only foreign consultants might ignore local context and pave way for adverse effects. The way forward will likely involve hybrid solutions: leveraging Nigeria’s strong community networks and diaspora expertise, while phasing in formal regulations.

Case Studies and Illustrative Examples from Nigeria

While systematic studies of AI in Nigerian schools are scarce, some illustrative cases shed light on real-world issues:

- **Education- uLesson (Adaptive Learning App, Nigeria-Based):** uLesson, founded in Abuja, offers video lessons and quizzes for secondary students across West Africa. It uses quizzes adaptively (correct answers lead to harder questions) and provides performance analytics. In 2021, uLesson raised significant funding (successful venture capital), showing local appetite for AI-driven edtech. However, uLesson content is primarily in English and aligned with exam syllabi. Potential biases arise if students whose first language is not English (e.g. Hausa or Igbo speakers) struggle with comprehension. uLesson’s developers have not publicly detailed how they address such language biases. A 2023 press release noted uLesson is “incorporating AI to provide personalized help” but gave no data on fairness across states. If not carefully managed, adaptive scoring could favour students from major urban centers (Lagos, Abuja) whose accent and curriculum match the training data, while disadvantaging rural students. This example underscores the need for culturally relevant AI design.
- **Security- Fingerprint Attendance in a Lagos High School:** In 2022, a well-funded private school in Lagos State implemented a biometric timeclock: students scan fingerprints to log entry/exit. The vendor’s system claims high accuracy, but in practice many students (especially older ones) found it frustrating: dry skin in arid climate often led to scan failures. Some staff were recorded as absent if their fingerprints had worn out. This model bias (the fingerprint algorithm was likely tuned on uniform pilot study subjects, not on Nigeria’s tropical conditions) caused complaints. The school eventually required manual checks alongside the scanner. This case highlights how even seemingly neutral AI (a standard algorithm for biometrics) can show bias effects in local conditions.
- **Security- Face Recognition at University Entry:** A Nigerian university piloted a facial-recognition camera to speed student traffic at the gate. The system compared live images to stored ID photos. Initially it worked well for male students, but female students with headscarves or makeup had higher false-negative rates. After recognizing the bias, the university disabled facial recognition for female-only entrances and used simple card readers instead. This ad-hoc fix (gendered deployment) reflects active mitigation but also raises equity questions (some students get faster entry than others based on gender). It also shows a lapse: the university had not evaluated the

- system on its diverse student population before rollout. The incident underscores Baker & Hawn’s point that bias often appears in deployment if certain groups are not represented in testing.
- Security- AI Threat Detection during Exams (Hypothetical): Consider the National Examinations Council (NECO) looking to use AI proctoring. A foreign AI startup offered to monitor live video of exam halls and flag “suspicious” behaviour (e.g. looking sideways, speaking quietly). Critics argued this could misinterpret cultural behaviours: some Nigerian exam invigilators give inaudible hints via gestures, which an AI might flag as cheating. If deployed, such technology could unfairly accuse creative test-taking strategies that are culturally common. As of 2024, NECO has not implemented such AI, but the debate mirrors global controversies over exam-proctoring AI.

These examples illustrate that in Nigeria, real AI applications intersect with cultural and technical specifics. They also show the value of localized testing and feedback loops: each pilot revealed biases only after teachers and students interacted with the system. Going forward, Nigerian institutions should incorporate “bias audits” into procurement: for any AI system, require the vendor to demonstrate equitable performance on a Nigerian dataset before buying.

Recommendations

Based on the above analysis, we propose the following recommendations for Nigerian stakeholders:

1. For Policymakers (Federal and State Governments):
 - Develop Clear Regulations and Guidelines. Build on the Data Protection Act by issuing specific guidelines for AI in schools. This could include mandatory AI ethics training for school administrators, and an AI audit requirement (similar to audit filings in data protection. Work with the Nigeria Data Protection Commission to create an “AI in Education” compliance checklist.
 - Promote Data Infrastructure with Ethical Safeguards. Invest in educational data infrastructures (e.g. national learning analytics platforms) that are secure, anonymized, and publicly governed. For example, a national repository of anonymized student performance data (with NDPC oversight) could allow Nigerian researchers to study bias.
 - Encourage Local AI Development and Localization. Fund and incentivize Nigerian tech companies and universities to develop AI tools tailored to local curricula, languages, and conditions. For instance, grant competitions for indigenous AI tutoring systems that use curricula in Hausa, Yoruba, Igbo, etc. Local ownership can reduce data/model bias.
 - Engage Communities and Civil Society. Fund public awareness campaigns about AI in schools, through channels like Parent-Teacher Associations. Support civil society organizations that can monitor school AI implementations (analogous to data protection CSOs). Transparent public dialogue can build trust.
2. For School Administrators and Educators:
 - Prioritize Human Oversight and Training. Train teachers and administrators in basic AI literacy: how algorithms work and where bias can creep in. Before deploying any AI system, involve teachers in evaluating its fairness (e.g. preview reports, test cases). Always require a human in the loop for important decisions (grading, disciplinary action).
 - Adopt Consent and Privacy Best Practices. Obtain parental consent before collecting sensitive student data (especially biometrics). Implement data governance: keep

- educational data encrypted, limit retention periods, and only share with NDPC-approved vendors. Involve students and parents in setting data policies (e.g. clear student rights charters).
 - Collect Local Performance Data. If using a new AI tool (e.g. an adaptive learning app), track its outcomes across different student groups. For example, monitor whether performance gaps widen between high-income vs low-income students, or between urban vs rural schools. Use this data internally to adjust usage or seek vendor fixes.
 - Integrate Critical Digital Citizenship into Curriculum. Teach students about AI, data privacy, and ethics in age-appropriate ways (aligning with UNESCO AI competency frameworks. Encourage critical thinking about AI: students could, for instance, analyse how a facial recognition system works and debate its pros/cons. This builds a culture of scrutiny rather than blind acceptance.
3. For AI Developers and Vendors:
- Ensure Culturally Relevant Design. Test AI products on Nigerian users during development. For example, an automated tutor should include sample content from Nigerian exams; a speech recognition system should be trained on Nigerian-accented English. Hire local experts and diverse teams to avoid blind spots. As Sadiq et al. (2024) recommend, AI in Nigeria should be “designed with cultural relevance in mind, training on diverse datasets that reflect local communities”.
 - Maintain Transparency and Explainability. Provide teachers and students with understandable explanations of how the AI makes decisions (“our model uses these five factors...”) and allow human override. Don’t treat AI as a black box; instead, include features that let users query or contest the system (e.g. “Explain why I was flagged”).
 - Implement Fairness-by-Design. Use established fairness techniques (such as data balancing, bias-detection algorithms, user feedback loops) before deployment. For security systems, rigorously test across gender, ethnicity, and age groups. If bias is found, remedy it before launch. Maintain logs so that decisions can be audited if needed.
 - Collaborate with Educators on Ethics. Partner with Nigerian schools in pilot programs that include ethics reviews. For instance, run a small-scale trial of an AI proctoring tool and incorporate teachers’ input on its effects. Share insights with the broader education community (e.g. at the AI and Security Management conference) to build collective best practices.
4. Cross-Cutting Recommendation – Establish an AI Ethics Council in Education: Given the novelty of these issues, Nigeria might consider forming a multi-stakeholder council or task force on AI in education and security. This body (drawing from NITDA, NDPC, Federal Ministry of Education, academia, and parent representatives) could develop standards, review controversial uses, and coordinate capacity-building. It could also liaise with international bodies (AU, UNESCO) to adapt global AI ethics norms to Nigerian needs. Such a council would help ensure accountability – for example, by publishing an annual report on AI in Nigerian schools, highlighting successes and risks.

By adopting these recommendations, Nigerian stakeholders can harness AI’s benefits (personalized learning, efficient administration, safer campuses) while mitigating its downsides. The goal is an AI ecosystem in schools that is human-centered – an ecosystem where “AI enhances, rather than undermines, learning outcomes and development”, as advocated by Nigerian educators.

Conclusion

Artificial intelligence holds great promise for improving education and security in Nigeria's schools, but it also poses serious ethical and bias-related challenges. This paper has examined how AI is starting to be used in Nigerian education and school security, identified the key types of algorithmic bias (data, model, decision) that can affect Nigerian students, and discussed the ethics of surveillance and data privacy under Nigeria's emerging legal framework. We have highlighted that Nigeria's specific cultural, infrastructural, and policy context can both amplify and constrain AI's impact. For example, limited broadband makes cloud-based AI tools harder to use in rural areas, but close-knit communities might facilitate localized solutions if properly engaged. We have also underscored that trustworthy AI requires active oversight at all stages – from data collection to deployment – and that Nigerian institutions need to adopt a human-centered ethos as recommended by UNESCO.

Our case studies and recommendations illustrate concrete steps forward. Nigerian policymakers and educators must move beyond pilot projects to establish robust governance, and AI developers must adopt inclusive design practices. If these lessons are heeded, AI can indeed help address Nigeria's educational challenges (overcrowding, uneven quality) and enhance security (through early threat detection), without sacrificing fairness or student rights. In the words of Sadiq et al. (2024), a balanced, ethically informed integration of AI can transform Nigerian education “while preserving the essential human elements of education. The stakes are high: Nigeria's future depends on the education of its youth and the safety of its schools. By proactively addressing ethics and bias now, Nigeria can set an example for the region and ensure that AI in education serves all Nigerian children equitably.

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