



Leveraging Artificial Intelligence Technology for an effective Curriculum at ... Augustine, W. S. (2026)

Leveraging Artificial Intelligence Technology for an effective Curriculum at Secondary School Level of Education in Nigeria: Applications, Challenges and Policy Imperatives

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Abstract

The integration of Artificial Intelligence (AI) into secondary education represents one of the most consequential technological shifts in contemporary educational practice. Nigeria as a nation with the world's largest out-of-school population, a teacher–student ratio averaging 1:55 in public schools, and a secondary school curriculum under active revision by the Nigerian Educational Research and Development Council (NERDC) confronts both the transformative potential and the structural constraints of AI-mediated curriculum delivery with particular urgency. This article pursues three analytical objectives: to examine the documented applications of AI technologies within Nigerian secondary school curriculum contexts; to identify and theorise the structural challenges limiting effective AI integration; and to advance a framework of evidence-based policy imperatives for the responsible and equitable incorporation of AI into the Nigerian secondary school curriculum. The study employs a systematic qualitative synthesis drawing on peer-reviewed scholarship, inter-governmental data, experimental evidence from the Edo State randomised controlled trial (2024), policy documents including Nigeria's National Artificial Intelligence Strategy (2024) and the NERDC curriculum revision (2023), and documented initiatives by government agencies, EdTech platforms, and development partners. AI technologies encompassing intelligent tutoring systems, adaptive learning platforms, automated assessment, generative AI tools, and predictive analytics hold demonstrable potential to address the systemic learning crisis afflicting Nigerian secondary education. The World Bank-supported Edo State randomised controlled trial demonstrated learning gains of 0.3 standard deviations in English, equivalent to approximately two academic years' progress in six weeks, through structured generative AI tutoring. However, seven structural challenges constrain the generalisation of these gains: digital infrastructure deficits affecting 43.3% of communities; inadequate teacher readiness; entrenched equity disparities; misalignment between existing NERDC curriculum frameworks and AI pedagogical models; data privacy governance gaps; AI-induced academic dishonesty risks; and an insufficient longitudinal empirical evidence base. The Nigerian secondary school curriculum stands at a technological inflection point. Realising AI's transformative potential requires not the uncritical adoption of globally developed tools but a structurally grounded, equity-centred, and pedagogically coherent integration framework one in which NERDC curriculum revision, teacher professional development, infrastructure investment, and regulatory governance are pursued as a coordinated national programme rather than as isolated initiatives.

Keywords: artificial intelligence; Nigerian secondary school curriculum; intelligent tutoring systems; adaptive learning

Introduction

The emergence of artificial intelligence as a practical instrument of educational delivery has prompted a fundamental reassessment of how curriculum is designed, mediated, and assessed across education systems globally. Within a decade, AI technologies encompassing machine learning algorithms, natural language processing models, computer vision systems, and the generative AI architectures exemplified by large language models have transitioned from research laboratory novelties to classroom-deployable tools with documented, measurable impacts on learner outcomes (Selwyn, 2022; Popenici & Kerr, 2017). The pace of this transition has, in many situations, outrun both the regulatory frameworks required to govern it and the pedagogical frameworks required to deploy it responsibly. Within Nigeria, this transition unfolds against an educational backdrop characterised by acute systemic challenges. The public secondary school system operates at an average teacher–student ratio of 1:55 (NERDC, 2023, as cited in Spursmedia, 2025), with 60 per cent of students estimated to lack foundational literacy (World Bank, 2022) and the national out-of-school population standing at 18.3 million the highest globally (Save the Children, 2026). The secondary school curriculum, administered by the Nigerian Educational Research and Development Council and most recently revised through a twelve-state consultative process in 2023 (NERDC, 2023), faces implementation challenges that are simultaneously structural (inadequate infrastructure), human (teacher qualification and training deficits), and institutional (misalignment between curriculum design and assessment architecture). It is within this context that the prospect of AI-mediated curriculum delivery acquires particular significance not as an optional technological supplement to an otherwise functional educational system but as a potential structural instrument for addressing learning crises of a scale that conventional pedagogical approaches have demonstrably



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been unable to resolve. The Nigerian government's policy posture toward AI in education has accelerated substantially since 2023. The National Artificial Intelligence Strategy (NAIS), published in 2024, articulates five strategic pillars for AI integration across sectors, with education identified as a priority domain (Jenna, 2024). The National Centre for Artificial Intelligence and Robotics (NCAIR) has been strengthened as the institutional vehicle for national AI capability development (Nucamp, 2025). In October 2025, the Minister of Education, Dr Tunji Alausa, launched the Digitalisation of Public Schools Initiative and announced the embedding of AI, educational technology, robotics, coding, and digital literacy across school curricula (Guardian Nigeria, 2025). The federal government has further mandated the West African Examinations Council (WAEC) and the National Examinations Council (NECO) to adopt computer-based testing by 2026 (Guardian Nigeria, 2025), and the 2026 federal budget earmarks ₦7 billion for online learning platforms in secondary schools (Guardian Nigeria, 2026). These are, by any measure, ambitious commitments and their effective realisation depends entirely on the resolution of structural challenges that the policy documents themselves only partially acknowledge. The most consequential and methodologically rigorous evidence for AI's educational potential in Nigeria emerged from a 2024 randomised controlled trial conducted in nine public senior secondary schools in Edo State by World Bank researchers (De Simone et al., 2024). The trial, involving 800 first-year senior secondary students over six weeks, demonstrated that students who participated in structured, teacher-supervised generative AI tutoring sessions achieved learning gains of approximately 0.3 standard deviations in English, equivalent to roughly two academic years' progress, compared with peers in the control condition (World Bank, 2025; VoxDev, 2026). These results are significant not merely as evidence of AI's potential but as a model of the conditions under which that potential can be realised: structured pedagogical guardrails, active teacher facilitation, and deliberate prompting designed to promote reasoning rather than answer retrieval. This article situates these developments within a comprehensive analytical framework. Its central argument is that AI's potential contribution to the Nigerian secondary school curriculum is real, evidenced, and structurally significant but that realising it requires confronting a set of structural constraints that the current policy discourse consistently underweights. The article proceeds through the following structure: Section 2 reviews the policy and curriculum context; Section 3 maps the documented applications of AI in Nigerian secondary education; Section 4 analyses seven structural challenges; Section 5 presents an evidence-based policy framework; and Section 6 draws conclusions and identifies future research directions.

Policy and Curriculum Perspective

The NERDC Secondary School Curriculum and its 2023 Revision

The Nigerian secondary school curriculum is governed by the Nigerian Educational Research and Development Council (NERDC, 2023) under the *National Policy on Education* (Federal Republic of Nigeria, 2013). The Post-Basic Education and Career Development (PBECD) curriculum encompasses Senior Secondary School levels 1 through 3, providing the framework within which the West African Senior School Certificate Examination (WASSCE) and NECO Senior School Certificate Examination (SSCE) are designed. The 2023 curriculum revision introduced significant structural reforms: a competency-based orientation, the mandating of digital literacy and ICT as cross-curricular themes, the introduction of STEM integration across subject domains, and greater alignment with the knowledge and skills demands of a digital labour market (NERDC, 2023; Scholarclopedia, 2025). Critically, the 2023 revision acknowledges the role of educational technology in curriculum delivery without providing a systematic framework for AI-specific integration. The curriculum's digital literacy provisions while substantively more detailed than its predecessors do not yet specify AI literacy competencies as learning objectives, do not articulate pedagogical frameworks for teacher-supervised AI use, and do not establish protocols for assessment integrity in the context of generative AI accessibility (Mohammed et al., 2024). This lacuna creates what the present study designates an AI-curriculum alignment deficit: the condition in which AI tools are proliferating in the educational environment faster than the curriculum frameworks required to govern their pedagogical use are being developed.

Nigeria's National Artificial Intelligence Strategy (2024)

The National Artificial Intelligence Strategy (NAIS), published in 2024, represents Nigeria's most comprehensive governmental commitment to AI development to date. The strategy articulates five pillars: infrastructure development, AI governance and ethics, talent and skills development, research and innovation, and sector transformation (Jenna, 2024). Education is identified as a priority transformation domain, and the strategy acknowledges the potential of AI to address teacher shortages, personalise learning, and improve assessment systems.



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However, independent analysis of the NAIS has identified significant implementation gaps. Jenna (2024) concludes that the strategy 'is more optimistic, out of touch, and inadequate for the tasks ahead' specifically because it lacks actionable, time-bound implementation plans, sustainable funding mechanisms insulated from electoral cycles, and institutional design capable of coordinating AI deployment across the fragmented Nigerian educational governance landscape. The establishment of the National Centre for Artificial Intelligence and Robotics (NCAIR) (Nucamp, 2025) provides an institutional vehicle currently equipped with approximately 2,500 virtual CPUs and approximately one petabyte of storage capacity but its mandate and resources remain significantly below what systematic secondary school AI integration would require.

The Edo State Randomised Controlled Trial as Policy Evidence

The 2024 Edo State RCT constitutes the most methodologically rigorous empirical evidence currently available for AI's curriculum impact in Nigerian secondary schools and warrants extended discussion. Conducted by World Bank researchers, the trial enrolled 800 first-year senior secondary students in nine public schools and randomly assigned them to a treatment group, which attended structured after-school sessions twice weekly for six weeks using Microsoft Copilot (a GPT-4-based generative AI tool) under active teacher facilitation, or a control group (De Simone et al., 2024). The instructional design was deliberately structured to promote reasoning rather than answer retrieval. Students worked in pairs, engaged with carefully crafted prompts designed to scaffold analytical thinking, and operated under teacher supervision described as 'orchestration' rather than passive monitoring (De Simone et al., 2024). The treatment group outperformed the control group by 0.3 standard deviations overall and 0.24 standard deviations in English specifically (World Bank, 2025). Students also performed better on end-of-year examinations, suggesting durable rather than transient learning gains. VoxDev (2026) summarises the key finding: 'LLMs can deliver tutoring-like benefits at scale if embedded in structured routines with clear pedagogical guardrails, active facilitation, and monitoring to prevent over-reliance. The trial's limitations are as instructive as its findings. Frequent power and internet outages disrupted sessions throughout the six-week period, highlighting the foundational infrastructure requirements without which AI tools cannot operate reliably (De Simone et al., 2024). The after-school programme format bypassed the standard NERDC timetable, raising questions about how analogous results could be achieved within regular curriculum time. And the trial's geographic and school-type specificity nine public schools in one state limits the direct generalisability of its findings to Nigeria's diverse secondary school contexts.

Applications of AI in the Nigerian Secondary School Curriculum

The landscape of AI applications relevant to the Nigerian secondary school curriculum is both varied and rapidly evolving. Table 1 provides a structured mapping of the principal AI application categories, their functional descriptions, the Nigerian platforms and programmes through which they are currently deployed or being piloted, and their specific curriculum relevance. The analysis that follows examines each category with reference to the documented evidence of its application in the Nigerian secondary school setting.

Table 1. AI Application Categories in Nigerian Secondary Education: Platforms, Programmes, and Curriculum Relevance

AI Application Category	Functional Description	Nigerian Platforms / Programmes	Curriculum Relevance (with Citations)
Intelligent Tutoring Systems (ITS)	Provide individualised, adaptive instruction that responds to learner performance in real time; simulate one-to-one tutoring at scale	uLesson (Nigeria-based); Study AI; Photomath; Khan Academy AI; Microsoft Copilot (Edo State pilot, 2024)	Addresses 1:55 teacher–student ratio; potential to halve foundational literacy deficits (World Bank, 2025)
Automated and Adaptive Assessment	Machine-scored objective tests; personalised question sequencing based on mastery; real-time feedback	Study AI (WAEC/NECO/JAMB prep); NBTE's digital trade syllabuses; Springboard Digital (pending 2026 WAEC CBT mandate)	Reduces examination malpractice; generates disaggregated performance data for curriculum planning (Guardian Nigeria, 2025)
Personalised Learning Platforms	Analyse learner histories to generate customised study pathways, pacing,	Century Tech; uLesson; Prepclass; ScholarX (Nigeria)	Addresses 60% foundational literacy gap; compensates for under-qualified generalist teachers (Spursmedia, 2025)



AI-Supported Content Creation	and content recommendations Automated curriculum-aligned content generation; translation into local languages; accessibility features	NERDC e-Curriculum AI augmentation; multilingual LLM development (NCAIR)	Enables localised, culturally resonant curriculum delivery in Hausa, Yoruba, Igbo, and other Nigerian languages (Samuel et al., 2025)
Predictive Analytics and Learning Analytics	Early identification of at-risk students; teacher workload optimisation; resource allocation forecasting	UBEC-piloted analytics dashboards; tertiary sector platforms (National Open University of Nigeria)	Supports targeted intervention before failure; data-driven curriculum revision by NERDC (Ogunode & Ejike, 2023)
Generative AI as Virtual Tutor	Large language models deployed as structured conversational tutors under teacher supervision; reasoning-focused prompting	GPT-4/Microsoft Copilot (Edo State RCT, 2024); Study AI tutoring module	Demonstrated 0.3 standard deviation learning gains in English; two years' progress in six weeks (De Simone et al., 2024; World Bank, 2025)

Intelligent Tutoring Systems and Adaptive Learning Platforms

Intelligent tutoring systems (ITS) constitute the most extensively theorised category of AI educational application, providing individualised, adaptive instruction that responds dynamically to learner performance data (Woolf, 2009, as cited in Mohammed et al., 2024). Within the Nigerian context, ITS deployment has been driven primarily by the private and NGO sectors rather than by government-led curriculum integration. Lagos-based uLesson, founded in 2019, employs AI-driven content delivery to serve approximately two million learners with curriculum-aligned instructional materials (Spursmedia, 2025). The platform's AI architecture analyses individual learner performance to identify conceptual gaps and recommend targeted remediation a form of personalised curriculum delivery that the public school system's 1:55 teacher–student ratio structurally precludes. The curriculum relevance of ITS is particularly acute in the context of Nigeria's foundational learning crisis. World Bank (2022) estimates that 60 per cent of Nigerian secondary school students lack the foundational literacy and numeracy competencies that the NERDC curriculum presupposes at secondary entry level a deficit that conventional classroom instruction, constrained by large class sizes and resource scarcity, has been unable to address at scale. Adaptive ITS platforms have the theoretical and, in some contexts, demonstrated capacity to identify these foundational gaps at the individual student level and to provide the targeted, repeated practice that foundational skill development requires. The challenge of deploying this capacity equitably across Nigeria's 10,905 public secondary schools (Federal Ministry of Education, 2023) remains the central policy design problem.

Generative AI as Curriculum Mediator

The emergence of generative AI tools large language models capable of generating coherent, contextually appropriate text in response to natural language prompts has introduced a qualitatively new category of AI educational application whose curriculum implications are simultaneously promising and deeply contested. The Edo State RCT's use of Microsoft Copilot as a structured after-school tutor provides the most rigorous Nigerian evidence for generative AI's curriculum potential (De Simone et al., 2024), while the launch of Study AI's WAEC/NECO/JAMB preparation platform (Edugist, 2026) exemplifies the rapid commercialisation of generative AI for curriculum-adjacent examination preparation purposes. The pedagogical distinction between productive and unproductive uses of generative AI in curriculum contexts is analytically critical. VoxDev (2026) emphasises that LLMs' educational value depends fundamentally on *how* they are used: tools designed with 'clear pedagogical guardrails, active facilitation, and monitoring to prevent over-reliance' produce measurable learning gains, while tools that facilitate answer retrieval without reasoning engagement may undermine the very learning objectives they purport to support. This distinction has direct implications for NERDC curriculum design: AI tool integration requires not merely technology provision but explicit specification of pedagogical models how AI tools should be used, by whom, under what supervision, and for what curricular purposes that the current NERDC framework does not yet provide (Mohammed et al., 2024).



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AI-Supported Assessment and Examination Preparation

The Nigerian secondary school assessment architecture organised primarily around the WAEC West African Senior School Certificate Examination and the NECO Senior School Certificate Examination has become an increasingly important site of AI application. Study AI, an AI-powered examination preparation platform explicitly designed around the Nigerian curriculum, provides senior secondary students with personalised study pathways, intelligent feedback, mock examination practice, and gamified motivation for WAEC, NECO, and JAMB preparation (Edugist, 2026). The platform analyses learner performance across subjects and topics to generate focused study plans directing attention to identified areas of weakness, providing immediate AI-generated explanations for incorrect responses. The federal government's mandate that WAEC and NECO adopt computer-based testing by 2026 (Guardian Nigeria, 2025) creates a structural opportunity for AI-enhanced assessment: computer-delivered examinations generate the digital performance data that adaptive AI systems require to personalise instruction and provide timely diagnostic feedback. The policy rationale — reducing examination malpractice and aligning Nigeria with international assessment practices — is complemented by an AI-integration rationale: disaggregated, digital examination data can, for the first time, provide NERDC curriculum planners with the granular evidence of learning achievement and curriculum coverage gaps that current assessment systems do not produce (Mohammed et al., 2024).

Content Localisation and Multilingual AI

A dimension of AI's curriculum potential that is frequently underweighted in the Nigerian educational technology literature is the capacity of AI tools specifically large language models and speech recognition systems to deliver curriculum content in Nigerian indigenous languages. Nigeria's secondary school curriculum is delivered primarily in English, a language that, for the majority of students in northern and rural areas, is a second or third language of instruction (Samuel et al., 2025). AI-powered translation and content generation tools offer the prospect of NERDC curriculum-aligned instructional materials delivered in Hausa, Yoruba, Igbo, Fulfulde, and other languages a form of curriculum personalisation that addresses a dimension of educational inequity that teacher-delivered instruction has been structurally unable to address at scale. The NCAIR has initiated multilingual large language model development as a component of Nigeria's NAIS implementation (Nucamp, 2025), and Samuel et al. (2025) recommend that NERDC and NCAIR support the creation of 'AI-powered adaptive learning platforms that respect local languages' as a condition of equitable AI integration. The curriculum implications of this recommendation are significant: a genuinely inclusive AI-curriculum integration framework must treat language accessibility as a first-order design requirement rather than a post-hoc adaptation.

Structural Challenges to AI Integration in the Nigerian Secondary School Curriculum

The applications documented in Section 3 are demonstrably promising. However, their translation from controlled pilots and private sector platforms into the lived curriculum experience of Nigeria's 10,905 public secondary schools confronts a set of structural challenges that neither the NAIS nor current NERDC curriculum frameworks adequately address. Table 2 presents a structured mapping of these challenges, their empirical basis, and their specific curriculum implications.

Table 2. Structural Challenges to AI Integration in the Nigerian Secondary School Curriculum: Empirical Basis and Curriculum Implications

Challenge	Empirical Basis (with Citations)	Curriculum Implication
Digital infrastructure deficit	Only 40% internet penetration nationally; rural schools lack electricity and connectivity; 43.3% of communities remain offline (NCC, 2023; Edugist, 2025)	Frequent power and internet outages disrupted the Edo State AI pilot despite its otherwise successful outcomes (De Simone et al., 2024). AI tools that presuppose connectivity are structurally inaccessible to the majority of public secondary schools.
Teacher readiness and capacity	Most secondary school teachers lack training in AI tool integration; readiness encompasses technical, pedagogical, ethical, and confidence dimensions (Eke, 2024)	Without structured teacher development, AI risks reinforcing rote learning rather than transforming it. The Edo pilot succeeded only when teachers functioned as 'orchestra conductors' rather than passive observers (De Simone et al., 2024).
Equity and digital divide	AI tools currently benefit urban, private, and well-resourced schools disproportionately; the poorest 40% of	Unless equity is designed into deployment, AI could widen existing educational inequality



	learners have the greatest learning deficits and the least access to AI (World Bank, 2022)	rather than narrow it — advantaging those already advantaged.
NERDC curriculum misalignment	The 2023 NERDC curriculum revision does not yet incorporate systematic AI literacy standards or pedagogical frameworks for AI-assisted learning at secondary level	Without explicit curriculum frameworks, AI integration remains ad hoc and externally driven, disconnected from NERDC's mandated learning objectives and terminal examination requirements (Mohammed et al., 2024).
Data privacy and ethics	Absence of enforceable data governance frameworks for AI in education; student data processed by commercial platforms outside Nigerian regulatory jurisdiction (Samuel et al., 2025)	Learner data collected by AI platforms is subject to commercial use policies inconsistent with educational ethics; Nigeria's regulatory capacity for AI oversight remains nascent (ResearchGate, 2024).
AI-induced academic dishonesty	Proliferation of generative AI tools creates structural conditions for academic dishonesty in assessment-oriented secondary school culture	Where AI is used for answer generation rather than reasoning development, it undermines the assessment integrity that WAEC and NECO examination systems depend upon.
Insufficient empirical evidence base	A large-scale, longitudinal, disaggregated evidence base for AI's impact on Nigerian secondary school curriculum outcomes does not yet exist (Samuel et al., 2025)	Policy decisions and large-scale investments are being made without the evidence quality required to identify which AI applications produce durable learning gains across diverse school contexts.

Digital Infrastructure as the Foundational Constraint

The most fundamental and least tractable challenge to AI integration in Nigerian secondary schools is the state of the digital infrastructure upon which all AI applications depend. NCC (2023) reports national internet penetration at approximately 40 per cent, with Edugist (2025) estimating that 43.3 per cent of communities remain offline and rural communities disproportionately affected. Electricity supply is unreliable nationally, with public secondary schools in many states experiencing load-shedding patterns that render sustained digital learning sessions operationally impossible. The Edo State RCT provides the most direct evidence of how this infrastructure deficit constrains even well-designed AI educational programmes: despite the programme's otherwise successful outcomes, De Simone et al. (2024) report that 'frequent power and internet outages disrupted sessions,' highlighting 'the foundational requirements necessary for successful AI integration.' This finding is particularly sobering when considered against the scale of the federal government's ambitions: the distribution of interactive smart boards beginning at Queens College, Lagos (Guardian Nigeria, 2025) a well-resourced urban school cannot straightforwardly serve as a model for AI deployment in the more than 7,000 public secondary schools estimated to lack reliable electricity or internet connectivity.

Teacher Readiness as the Pedagogical Constraint

The Edo State trial's finding that teacher functioning as 'orchestra conductors' actively structuring, monitoring, and facilitating AI interactions was essential to the programme's effectiveness (De Simone et al., 2024) has direct implications for the Nigerian teaching workforce's current preparedness for AI-mediated curriculum delivery. Eke (2024) identifies four dimensions of teacher readiness for AI integration: technical skills, pedagogical integration capacity, ethical understanding, and self-confidence in AI use and documents that 'existing literature within Nigeria demonstrates' significant deficits across all four dimensions in the secondary school teaching workforce. The structural cause of this readiness deficit is clear: pre-service teacher education programmes in Nigeria do not systematically prepare graduates for AI-mediated instruction, and in-service professional development in AI pedagogy is neither mandated nor systematically provided (Education International, 2025). The National Commission for Colleges of Education (NCCE) and the Teachers Registration Council of Nigeria (TRCN) have not, as of the time of writing, incorporated AI literacy standards into their professional qualification frameworks (Samuel et al., 2025). Without this curricular and professional development infrastructure, the human capacity required to deploy AI as the Edo State trial deployed it with structured pedagogical guardrails and active facilitation does not exist at the scale that national curriculum integration would require.



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Equity as the Ethical Constraint

A dimension of AI integration that receives insufficient analytical attention in the Nigerian policy discourse is its potential to exacerbate rather than reduce educational inequality. The pattern of AI adoption evident in Nigerian secondary education replicates a global phenomenon: AI tools are adopted first and most deeply by well-resourced urban schools, creating a new layer of educational advantage for learners who are already advantaged by their school's location, funding level, and infrastructure quality (Samuel et al., 2025). The 60 per cent of Nigerian secondary students who lack foundational literacy (World Bank, 2022) and who have the greatest educational need are, by virtue of their schools' resource constraints, the least likely to benefit from AI-mediated curriculum delivery in the absence of deliberate equity-by-design policy interventions. This equity dimension has a specific curriculum manifestation. If AI tools are deployed at scale in well-resourced schools but not in under-resourced ones, the effective curriculum delivered to learners the de facto curriculum will diverge further between advantaged and disadvantaged school types. The NERDC's de jure curriculum may formally apply to all secondary schools equally; but a curriculum mediated by AI-powered ITS, adaptive assessment, and generative AI tutoring produces qualitatively different learning experiences than one delivered by a single generalist teacher to a class of 80 pupils with no digital support. The curriculum equity implications of uneven AI adoption are thus structural and require structural policy responses (Samuel et al., 2025; Ogunode & Ejike, 2023).

Data Privacy and Algorithmic Ethics

The deployment of AI tools in educational settings necessarily involves the collection, processing, and analysis of substantial quantities of learner data performance records, interaction logs, assessment responses, and in some cases biometric data. Within the Nigerian secondary school context, the governance framework for such data collection is critically underdeveloped. Nigeria's Data Protection Act (2023) establishes a foundational regulatory framework but does not incorporate education-specific provisions for the governance of learner data processed by AI systems (Samuel et al., 2025). Many of the AI platforms currently deployed in Nigerian secondary schools including internationally developed tools such as Microsoft Copilot and ChatGPT process learner data under terms of service designed for commercial contexts that are inconsistent with the data protection principles applicable to children and to educational environments. The curriculum implications of this governance gap extend beyond data protection to questions of algorithmic fairness. AI systems trained on datasets that do not adequately represent Nigerian learner populations their linguistic diversity, cultural contexts, and curricular frameworks may produce pedagogical recommendations that systematically disadvantage learners whose learning profiles deviate from the datasets' modal cases (Samuel et al., 2025). The NCAIR's multilingual LLM development initiative (Nucamp, 2025) addresses part of this concern, but a comprehensive solution requires the development of Nigerian educational AI training datasets — a resource that does not currently exist at the scale or quality required for equitable AI-curriculum integration.

Policy Imperatives: An Evidence-Based Framework for AI-Curriculum Integration

The analytical framework developed in the preceding sections generates a set of policy imperatives whose implementation is a necessary condition for AI's educational potential to be realised equitably and sustainably within the Nigerian secondary school curriculum. These imperatives are organised below as a six-point framework, sequenced in order of structural priority. They are addressed simultaneously to the Nigerian federal and state ministries of education, NERDC, NCAIR, the TRCN, WAEC, NECO, and the National Universities Commission reflecting the institutional complexity of a policy domain that spans curriculum design, professional development, infrastructure governance, regulatory oversight, and research investment.

Revise the NERDC Curriculum to Incorporate AI Literacy as a Core Competency

The most structurally fundamental policy imperative is the revision of the NERDC secondary school curriculum to incorporate AI literacy as a formally specified, assessed learning competency rather than an implicit aspiration subsumed within digital literacy provisions. This revision should establish, as minimum curriculum requirements: conceptual understanding of how AI systems function and how their outputs are generated; practical competence in the use of AI tools for curriculum-aligned learning tasks; critical evaluation skills for assessing AI-generated content; and ethical reasoning capacities for navigating the implications of AI use in academic contexts (Samuel et al., 2025; Mohammed et al., 2024). The pedagogical framework for teacher-supervised AI use specifying how AI tools should be integrated into lesson design, how AI-mediated learning should be structured to promote reasoning rather than answer retrieval, and how assessment integrity should be maintained should be developed as a NERDC implementation guide accompanying the curriculum



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revision. The Edo State trial's instructional design (De Simone et al., 2024) provides an evidence-based model for this pedagogical specification, adapted for integration within standard NERDC timetabling rather than supplementary after-school arrangement.

Establish a Conflict-Sensitive, Equity-Centred Infrastructure Deployment Sequence

The infrastructure prerequisite for AI-curriculum integration reliable electricity and internet connectivity cannot be wished away by policy ambition. The Digitalisation of Public Schools Initiative (Guardian Nigeria, 2025) and the 2026 budget's ₦7 billion allocation for online learning platforms (Guardian Nigeria, 2026) must be implemented through a deployment sequence that prioritises the schools with the greatest learning deficits and the most acute infrastructure needs rather than the schools already best positioned to absorb digital tools. This is an equity-by-design principle: infrastructure investment that follows the path of least resistance will deepen the digital divide rather than address it. Practically, this requires UBEC and the Federal Ministry of Education to deploy solar power systems, connectivity infrastructure, and device provision to underserved rural and conflict-affected secondary schools as a precondition for not a sequel to curriculum-based AI integration. The ₦7 billion online learning allocation should be evaluated against this sequencing principle, with an independent assessment of what proportion of target schools have the power and connectivity infrastructure required to use the funded platforms before deployment proceeds.

Professionalise AI Pedagogy through Mandatory Teacher Development

The evidence from the Edo State RCT (De Simone et al., 2024) and from the broader literature on AI in education (Eke, 2024; Education International, 2025) converges on a single finding: AI tools do not produce educational value autonomously. They produce it when teachers possess the pedagogical competence to structure, facilitate, and critically oversee their use. The TRCN and NCCE should, as a matter of regulatory priority, incorporate AI literacy and AI pedagogy into the professional qualification standards for secondary school teachers specifying minimum competencies in AI tool use, AI-assisted lesson design, and assessment integrity management in AI-accessible environments. At the in-service level, the 3 Million Technical Talents (3MTT) programme and the NAIS skills development pillar provide existing infrastructure that should be explicitly extended to secondary school teacher professional development in AI pedagogy. Microsoft's \$1 million commitment to train Nigerian educators in AI (Nucamp, 2025) and analogous private sector commitments should be aligned to NERDC curriculum frameworks and TRCN competency standards rather than deployed as standalone corporate social responsibility initiatives disconnected from the national curriculum architecture.

Develop a Regulatory Framework for AI Data Governance in Secondary Education

The governance vacuum for learner data in AI-mediated secondary education requires a specific regulatory response that the Nigeria Data Protection Commission should develop in collaboration with the Federal Ministry of Education, NERDC, and NCAIR. A Secondary Education AI Data Governance Framework should establish: mandatory data protection impact assessments for AI platforms deployed in secondary schools; standards for the local storage and processing of learner data generated by AI educational tools; requirements for the audit and publication of the training datasets used by AI platforms providing curriculum services to Nigerian learners; and enforcement mechanisms with meaningful consequences for non-compliant providers (Samuel et al., 2025).

Fund a Longitudinal National Research Programme

The Edo State RCT, while providing important and rigorous evidence, is a six-week, single-state, single-subject intervention. The Nigerian evidence base for AI's long-term impacts on secondary school curriculum outcomes disaggregated by school type, geographic context, subject domain, teacher preparation level, and learner socioeconomic background does not yet exist. NERDC, TETFund, the National Universities Commission, and development partners should collectively fund a longitudinal national research programme on AI in secondary education, incorporating randomised controlled trials across multiple states and school types, quasi-experimental studies of naturally occurring AI deployment variation, and qualitative research with learners, teachers, and curriculum designers (Samuel et al., 2025; Ogunode & Ejike, 2023). This research programme should have a specific sub-focus on equity: documenting the differential impacts of AI integration on learners from different socioeconomic, geographic, gender, and linguistic backgrounds, and generating the evidence required to ensure that AI integration policy does not systematically advantage those already advantaged within the Nigerian secondary education system.



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Establish a Multi-Stakeholder AI-Education Coordination Body

The institutional fragmentation of AI-education governance in Nigeria distributed across the Federal Ministry of Education, NERDC, NCAIR, NITDA, the National Communications Commission, WAEC, NECO, state ministries of education, teacher professional bodies, the EdTech sector, and development partners constitutes a governance coordination failure whose resolution is a precondition for effective national AI-curriculum integration. Samuel et al. (2025) and Adewale and Oduwole (2024) recommend a 'multi-sectoral task force' model: a standing coordination body with representatives from each of the institutional actors listed above, with a clear mandate for harmonising AI-education standards, aligning funding streams, preventing implementation duplication, and monitoring integration outcomes against agreed curriculum delivery metrics.

Discussion of Findings

The evidence assembled in this article supports a nuanced position on AI and the Nigerian secondary school curriculum one that is neither the uncritical optimism of technology advocates nor the scepticism of those who regard AI as a distraction from the foundational resource investments Nigeria's educational system requires. AI tools, when deployed within carefully designed pedagogical frameworks, under active teacher facilitation, and with equity-by-design infrastructure sequencing, have demonstrated meaningful capacity to address Nigeria's learning crisis. The Edo State trial's results two years' English learning progress in six weeks are not an anomaly produced by exceptional circumstances. They are the measured consequence of a coherent pedagogical design that harnessed AI's capacity for individualised, responsive feedback within a structured curricular context. However, the conditions that produced those results structured prompts, teacher supervision, reasoning-focused rather than answer-retrieval-focused interaction are precisely the conditions that are absent from the majority of AI deployments in Nigerian secondary education. The proliferation of AI-powered examination preparation platforms, while addressing real student demand, operates primarily in the answer-retrieval mode that the Edo trial's design was deliberately constructed to avoid. The risk, which the evidence on generative AI in education globally documents, is that AI that facilitates the retrieval of correct answers without developing the reasoning processes that generate them undermines the curriculum objectives that examination preparation is supposed to serve (VoxDev, 2026). The policy implication is that the Nigerian secondary school curriculum's AI integration challenge is not primarily technological but pedagogical. The question is not whether AI tools can improve curriculum outcomes the evidence suggests they can, under appropriate conditions but whether Nigeria has the curriculum frameworks, teacher professional development infrastructure, regulatory governance capacity, and equity-centred deployment architecture to create those conditions at the scale of its 10,905 public secondary schools. On the current evidence, it does not but the institutional building blocks required to create those conditions exist, and the policy framework advanced in Section 5 is designed to activate them.

The AI-Curriculum Alignment Deficit: A Conceptual Summary

What the NERDC curriculum currently provides: Digital literacy as a cross-curricular theme; ICT as a subject; STEM integration; competency-based outcomes framework. No specific AI literacy competencies; no pedagogical frameworks for teacher-supervised AI use; no assessment integrity protocols for AI-accessible examination environments. What AI-curriculum integration requires: Explicit AI literacy learning objectives by level and subject; teacher professional qualification standards incorporating AI pedagogy; curriculum-aligned protocols for structured AI tool use; WAEC/NECO assessment design adapted for AI-accessible environments; NERDC curriculum framework for AI content localisation in indigenous languages. The deficit: AI tools are proliferating in the Nigerian secondary school environment faster than the curriculum frameworks required to govern their pedagogical use are being developed. Resolving this deficit is the central curriculum policy challenge of the present decade.

Conclusion

This article has examined the intersection of artificial intelligence and the Nigerian secondary school curriculum across the decade 2016–2026, advancing three substantive contributions to the scholarly literature. First, it has mapped the landscape of AI applications in Nigerian secondary education from intelligent tutoring systems and adaptive learning platforms to generative AI tutors and AI-powered examination preparation and established the documented evidence base for their curriculum relevance. Second, it has identified and analysed seven structural challenges constraining the effective and equitable integration of these applications: digital infrastructure deficits, teacher readiness gaps, equity disparities, the AI-curriculum alignment deficit, data governance failures, academic dishonesty risks, and an insufficient longitudinal evidence base. Third, it has advanced a six-point policy imperative framework addressing these challenges through curriculum



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revision, equity-centred infrastructure deployment, mandatory teacher professionalisation, AI data governance regulation, longitudinal research investment, and multi-stakeholder coordination. The conceptual contribution that the present analysis offers to the broader literature on AI in education is the identification of the AI-curriculum alignment deficit as a specific, analytically tractable policy problem: the condition in which AI tools proliferate in educational environments faster than the curriculum frameworks required to govern their pedagogical use are developed. This deficit is observable in the gap between Nigeria's accelerating AI-education investments and the NERDC curriculum's current silence on AI literacy competencies, pedagogical frameworks for AI use, and assessment integrity protocols. Resolving this deficit is, the analysis suggests, a prior condition for realising AI's educational potential rather than a consequence of its realisation. The decade ahead will determine whether Nigeria occupies the position of a late adopter — struggling to retrofit AI tools into a curriculum architecture designed for an earlier era — or of a pedagogical innovator that develops AI-curriculum integration frameworks appropriate to its own context, evidence base, and equity imperatives. The Edo State trial of 2024 demonstrates that the second path is available. The policy framework advanced in this article attempts to map it. The work of traversing it requires a sustained, coordinated institutional commitment that the present analysis has sought to both motivate and inform. Future research should prioritise the following directions: longitudinal evaluation of AI-integration interventions across diverse Nigerian secondary school contexts and subject domains; comparative analysis of AI-curriculum integration models from Sub-Saharan African systems with analogous infrastructure constraints and demographic profiles; participatory design research engaging secondary school students and teachers in the development of AI-curriculum frameworks appropriate to Nigerian pedagogical cultures; and quantitative modelling of the equity implications of different AI deployment sequences across Nigeria's heterogeneous school system.

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