



Artificial Intelligence as a Pedagogical and Psychosocial Intervention: Contextualizing Personalized Learning and Support for Nigerian Higher Education

¹Muhammad Sani Umar, ²Shamsuddeen Ibrahim Umar

¹Department of Educational Psychology and Counselling, Federal University Dutsin-Ma, Katsina State,

²Department of Crime Management, Katsina State Institute of Technology and Management (KSITM), Nigeria

ABSTRACT

The Nigerian higher education system is characterized by a dual deficit: the pedagogical limitations of massified, instructor-centric models and a critical shortage of accessible psychosocial support for students. This review paper argues that Artificial Intelligence (AI) presents a unique opportunity to address these challenges synergistically, but its implementation must be critically adapted to Nigeria's specific socio-technical realities. Moving beyond techno-optimist narratives, the review paper analyzes AI applications—such as Adaptive Learning Systems and AI-powered counseling Chabot—through the lenses of educational psychology and critical policy studies. It explores how these tools can operationalize theories of mastery learning and scaffolded instruction while providing scalable, first-tier psychosocial support. However, the review paper foregrounds significant impediments, including infrastructural fragility, algorithmic bias, data privacy concerns, and cultural acceptability. It concludes by proposing a phased, ethically-grounded implementation roadmap, positing that a context-sensitive approach to AI integration is not merely additive but essential for fostering a more equitable, effective, and supportive learning environment in Nigerian higher institutions of learning.

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INTRODUCTION

The Nigerian higher education system, is one of the largest and most influential in Africa, stands at a critical juncture. For decades, its universities have been engines of social mobility and national development. Yet, this vital institution is beleaguered by a triad of persistent challenges: the relentless pressure of mystification, chronic underfunding, and increasingly outmoded pedagogical methodologies (Okebukola, 2018). Lecture halls are overcrowded, resources are stretched thin, and the prevailing model of instruction remains a one-size-fits-all, teacher-centric approach that struggles to meet the diverse needs of a vast student population (Fabunmi, 2018). The consequence is a dilution of educational quality, high dropout rates, and graduates who may not be fully equipped with the

critical thinking and adaptive skills required by a rapidly evolving global economy (Nwadiani, 2020). Concurrently, and often exacerbated by these systemic failures, a silent crisis simmers beneath the surface: the psychosocial well-being of the student body. Nigerian students navigate a complex web of academic pressure, financial anxiety, and immense societal expectations, often with limited access to adequate counselling and support services (Otu et al., 2022).

The stigma associated with mental health issues further compounds this problem, leaving many students to struggle in isolation (Giddieu et al., 2021). This creates a vicious cycle where psychological distress impedes academic performance, which in turn heightens anxiety and stress (Ezeah, 2023). Therefore, the central problem this review paper addresses is the dual

Corresponding author: Muhammad Sani Umar

kankiya26@gmail.com

Department of Educational Psychology and Counselling, Federal University Dutsin-Ma, Katsina State.

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deficit in Nigerian higher education: the lack of personalized, adaptive pedagogical frameworks and the critical shortage of accessible, scalable psychosocial support systems. Traditional solutions, while valuable, are inherently constrained by human resources, funding, and physical infrastructure (Adewale et al., 2021). It is within this context of constraint and need that the potential of Artificial Intelligence (AI) demands serious academic and policy consideration.

Globally, AI is transforming educational paradigms, offering tools for personalized learning pathways, automated assessment, and data-driven student support (Baker, 2016; Selwyn, 2019). The promise for Nigeria is profound: AI could act as a **force multiplier**, augmenting the capabilities of lecturers and counsellors. However, the uncritical transplantation of global EdTech models into the Nigerian context is fraught with peril. The discourse is often dominated by Western perspectives, technologies, and datasets, which risk being culturally misaligned or practically inoperable given Nigeria's unique socio-technical realities (Bello & Adegbenro, 2022).

Issues of unstable electricity, unreliable internet connectivity, data affordability, and digital literacy represent significant impediments (Adesina, 2020). Furthermore, profound ethical questions regarding data privacy, algorithmic bias, and the dehumanization of education must be confronted with a context-specific lens (Zembylas, 2021; Akinrinmade et al., 2023). This review paper argues that for AI to be a meaningful and equitable intervention, it must be contextualized, critically examined, and carefully integrated. It posits that AI can serve as a powerful synergistic tool to address both pedagogical and psychosocial challenges, but its implementation must be preceded by a rigorous analysis of its suitability, a firm commitment to ethical governance, and a strategic plan that acknowledges local constraints. This paper moves beyond techno-optimist rhetoric to provide a realistic, evidence-based exploration of AI's potential, firmly grounded in the Nigerian reality.

The paper proceeds as follows: Section 2 establishes the theoretical foundations, bridging educational psychology and AI. Section 3 details practical AI applications. Section 4 engages in a critical analysis of the challenges. Finally, Section 5 proposes a phased roadmap for implementation.

Theoretical Underpinnings: Bridging Educational Psychology and AI

To understand AI's potential, it must be framed not as a mere tool, but as a platform for enacting established educational and psychological theories.

Pedagogical Alignment for Personalization

The prevailing chalk-and-talk model in Nigerian universities is ill-suited for heterogeneous classes. AI-powered systems offer a path to operationalize proven theories:

1. **Mastery Learning (Bloom, 1968):** AI-driven **Adaptive Learning Systems (ALS)** are the technological embodiment of this principle. They can diagnose a student's understanding through continuous assessment and provide customized pathways of instruction and practice until mastery is achieved, directly addressing varied entry-levels in massified classrooms (Okebukola, 2018).
2. **Zone of Proximal Development - ZPD (Vygotsky, 1978):** A lecturer with hundreds of students cannot provide individual scaffolding. An AI tutor, however, can act as a perpetual scaffold. By analyzing responses, it can identify the point of struggle and offer calibrated support—a hint, a simpler problem, a relevant example—to guide the learner to solve the problem themselves, operating within their ZPD.
3. **Differentiated Instruction (Tomlinson, 2014):** AI can automate the core principles of differentiation by process and product. It can tailor the learning activities and methods of assessment to suit individual learner profiles, moving the system away from a monolithic curriculum.



Psychological Foundations for Support

AI can extend the reach of overburdened counselling units through evidence-based, scalable interventions.

1. Cognitive-Behavioral Theory

(CBT): AI-powered chatbots are not replacements for therapists but can be programmed to deliver basic CBT exercises to help students manage mild-to-moderate anxiety, stress, and negative thought patterns (Fitzpatrick et al., 2017). This provides an accessible, immediate, and stigma-free first line of defence.

2. Proactive and Preventive Support

Models: The current model is often reactive. AI analytics enable a shift to a **preventive model**. By analyzing patterns in academic performance and engagement, machine learning algorithms can flag students showing early signs of distress, enabling counsellors to initiate supportive contact proactively (Selingo et al., 2017).

A Synergistic Framework

The ultimate power of AI is multiplicative. By automating personalized instruction and initial psychosocial triage, AI augments human expertise. It frees lecturers to transition from dispensers of information to mentors and facilitators of deep learning. Similarly, it allows counsellors to focus their limited time on high-intensity cases, knowing that AI is providing baseline support to the wider student population. This synergy is crucial for tackling the dual deficit.

AI in Practice: Contextual Applications for Nigerian Universities

Theoretical potential must be translated into pragmatic use cases designed with Nigerian constraints in mind.

Personalized Adaptive Learning (PAL) Systems

1. **Implementation:** Focus on large, foundational courses (e.g., GST 101:

Use of English) where failure rates are high. A PAL system would break the course into micro-modules. Students who pass a diagnostic quiz skip ahead, while those who struggle are given additional practice problems, explanatory videos, and links to resources.

2. **Contextual Consideration:** The content must be developed by Nigerian educators to ensure alignment with the local curriculum and cultural context. Examples in problems must be relatable.

Automated Feedback and Assessment Tools

1. **Implementation:** Using Natural Language Processing (NLP) tools to provide instant feedback on essay structure, grammar, and argument strength. This is invaluable for improving student writing skills without overwhelming lecturers.
2. **Contextual Consideration:** The NLP model must be trained on a corpus of *Nigerian* student writing to accurately understand and critique the unique nuances of Nigerian English, avoiding misjudgment by models trained on Western dialects.

AI-Powered Psychosocial Tools

1. **Counseling Chatbots ("NaijaCares Bot"):** This must be a culturally competent agent. Its dialogue should be available in clear Nigerian English and incorporate common Pidgin phrases. Its knowledge base should include local resources (e.g., links to faith-based support systems, which are highly trusted, alongside traditional counselling).
2. **Predictive Analytics for Early Warning:** A simple dashboard for department heads and counsellors. A risk algorithm could use weightings like: (Number of missed assignments *



0.4) + (Decline in quiz average * 0.3) + (No LMS access for 14 days * 0.3). Students exceeding a threshold are flagged for a personal check-in.

Navigating the Terrain: Critical Challenges and Ethical Imperatives

Successful implementation is contingent on overcoming significant non-technical barriers.

The Infrastructure Chasm

Proposals must be grounded in reality. AI solutions must be:

1. **Offline-First** or **Low-Bandwidth**: Capable of functioning with intermittent internet.
2. **Mobile-Centric**: Designed for smartphones rather than desktops.
3. **Power-Aware**: Optimized for low energy consumption (Adesina, 2020).

Decolonizing AI: Mitigating Bias and Ensuring Cultural Relevance

This is a paramount concern. Deploying a counselling bot trained on American data could be disastrous. It might misinterpret cultural expressions of distress or offer culturally inappropriate advice. The solution is to **build locally sourced datasets** and involve Nigerian psychologists, linguists, and educators in the training and design process to create Afro-centric AI models (Bello & Adegbenro, 2022).

Ethical Governance and Data Privacy

A robust framework must be established in line with the **Nigerian Data Protection Act (2023)**. Key questions must be addressed:

1. **Informed Consent**: How is consent obtained and managed transparently?
2. **Data Sovereignty**: Where is the student data stored? On servers within Nigeria?
3. **Algorithmic Transparency**: Can a student appeal a decision made by an AI system?
4. **Liability**: Who is responsible if an AI tool provides harmful advice?

(Akinrinmade et al., 2023; Zembylas, 2021).

Resistance and Change Management

Technophobia and scepticism are real barriers. A comprehensive strategy must include:

1. **Sensitization Workshops**: Showing lecturers how AI can reduce their administrative burden.
2. **Co-creation**: Involving staff and students in the design and testing to foster ownership.
3. **Highlighting Augmentation, Not Replacement**: Reinforcing that AI is a tool to empower humans.

A Pragmatic Roadmap for Implementation

A clear, actionable plan transforms this discussion into a practical guide.

Phase 1: Laying the Foundation (Months 0-6)

1. **Stakeholder Engagement**: Form a task force with academia, IT, student affairs, and the student union.
2. **Audit & Needs Assessment**: Audit IT infrastructure and digital literacy. Survey students and staff to identify priority pain points.
3. **Policy Drafting**: Develop a draft AI Ethics and Data Protection policy.

Phase 2: Piloting and Partnership (Months 6-18)

1. **Select a Pilot**: Choose one high-impact, manageable pilot (e.g., an NLP feedback tool in the English Department).
2. **Forge Local Partnerships**: Collaborate with Nigerian EdTech startups and universities (e.g., UNILAG, FUTA). Seek funding from TETFund and CSR initiatives.
3. **Train Champions**: Intensive training for a small group of lecturers and staff.



Phase 3: Scaling and Mainstreaming (Months 18-36+)

1. **Evaluate the Pilot:** Rigorously assess impact on learning outcomes, satisfaction, and workload.
2. **Refine and Scale:** Use lessons learned to refine the tool before rolling it out further.
3. **Integrate Systems:** Work towards integrating successful AI tools with the university's central LMS.
4. **Establish a Center of Excellence:** A dedicated unit to oversee ongoing evaluation, ethics, and expansion.

CONCLUSION AND FUTURE DIRECTIONS

This paper has argued that AI presents a transformative opportunity for Nigerian higher education, but its success hinges on contextually sensitive implementation. AI can simultaneously tackle the pedagogical inadequacies of mass instruction and the student mental health crisis by providing personalized learning and scalable support. However, this potential can only be realized by directly confronting the challenges of infrastructure, data bias, ethics, and cultural relevance.

The way forward is not through the importation of ready-made solutions but through the strategic development of home-grown, ethically-grounded innovations. Nigerian universities must lead research into developing Afro-centric AI models. Future studies should conduct longitudinal research on the efficacy of these tools in the Nigerian context and explore the development of AI capabilities in indigenous languages.

Ultimately, the goal is not to create an automated, impersonal education system. It is the opposite: to leverage AI to handle scalable tasks, thereby freeing the most valuable resource—human intellect and empathy—to do what it does best: mentor, inspire, and provide profound care and support. By doing so, Nigerian institutions can build a more resilient, responsive, and humane higher education system for the 21st century.

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