Preparing AI-Ready Teachers for the Future of Education in Nigeria: A Critical Position on Competence, Ethics and Sustainable Pedagogical Innovation

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DOI: https://doi.org/10.47772/IJRISS.2026.101000352

Received: 15 October 2026; Accepted: 21 October 2026; Published: 02 November 2026

ABSTRACT

The rapid development of artificial intelligence (AI) is changing the way education is delivered and creating new expectations for teachers in the twenty-first century. In Nigeria, however, the adoption of AI in education is taking place amid inadequate digital infrastructure, limited teacher preparedness, ethical concerns, and unequal access to technology. This position paper argues that preparing AI-ready teachers should be a major priority in Nigeria's educational transformation. AI readiness should not be limited to the ability to operate digital tools; it should also include pedagogical competence, critical understanding of AI, ethical judgement, digital responsibility, and the ability to use AI appropriately to support teaching and learning. The paper examines the changing demands of teacher competence in the AI era, the current level of AI readiness among Nigerian teachers and teacher educators, and the ethical and institutional challenges affecting effective AI integration. It advocates a shift from simply adopting new technologies to an approach that places teachers, learners, and educational purposes at the centre of AI integration. The paper further argues for curriculum reform, continuous professional development, clear ethical guidelines, improved digital infrastructure, and stronger institutional support. It concludes that developing AI-ready teachers is essential to ensuring that AI contributes meaningfully to Nigerian education and supports the development of an inclusive, ethical, resilient, and future-oriented education system.

Keywords: Artificial Intelligence; Teacher Education; AI Readiness; Teacher Competence; Pedagogical Innovation

INTRODUCTION

Artificial intelligence (AI) is no longer a distant idea in education. It has become part of ongoing discussions about how teaching and learning are changing. Adaptive learning systems, intelligent tutoring platforms, automated assessment tools, and generative AI applications such as ChatGPT are increasingly being used in classrooms, lecture halls, and teacher education programmes around the world (Sanusi et al., 2024). In just a few years, AI has moved from being an experimental technology to becoming an important part of instructional planning, learner support, assessment, and educational administration. This development is also forcing governments, professional organisations, and educational institutions to rethink what teachers and learners need to know and be able to do in the twenty-first century.

Nigeria is also experiencing this shift, although the situation is different from that of many developed countries. Some universities and colleges of education have begun experimenting with AI, but the wider education system continues to face serious challenges, including unreliable digital infrastructure, unstable electricity supply, inadequate funding, and differences in access between urban and rural institutions as well as between public and

private schools (Olubiyi, 2022; Adewale & Oduwole, 2024). These challenges make it difficult to assume that the benefits associated with AI will be experienced equally across the country. The success of AI in Nigerian education will depend largely on the conditions in which teachers and learners work and learn.

Government attention to the issue is gradually increasing. Recent initiatives, including reported large-scale teacher training programmes on AI pedagogy, indicate that policymakers are beginning to recognise the need to prepare teachers for the changing educational environment (The Guardian Nigeria, 2025). However, policy statements and occasional training programmes are unlikely to be enough. Teachers need continuous opportunities to develop the knowledge, skills, and confidence required to use AI appropriately in their everyday practice.

Teachers have a particularly important role to play in this process. They are expected not only to use AI tools to support teaching but also to help learners understand how to use such technologies responsibly. At the same time, teachers must ensure that the use of AI does not undermine sound pedagogy, independent thinking, or the ethical responsibilities of education. In this sense, teachers are central to determining whether the growing interest in AI will result in meaningful changes in Nigerian classrooms or remain largely a policy aspiration.

Recent Nigerian studies suggest that many teachers and teacher educators are interested in AI but are not yet fully prepared to integrate it into their professional practice. Their level of readiness differs across institutions, disciplines, and levels of exposure to AI tools (Eke, 2024; Asongo et al., 2024). Similarly, evidence from tertiary institutions in Anambra State indicates that lecturers may have limited readiness to use AI for instructional purposes, irrespective of their years of teaching experience (Onwu, 2025). This suggests that access to appropriate training and practical exposure may be more important than seniority alone.

AI readiness should therefore not be understood simply as the ability to operate an AI application. A teacher may know how to use ChatGPT or another AI tool and still lack the professional judgement needed to determine whether the information produced is accurate, appropriate, ethical, or useful for a particular group of learners. Genuine AI readiness involves a combination of digital competence, pedagogical knowledge, critical evaluation, ethical awareness, and an understanding of the realities of the Nigerian classroom.

This paper examines the changing expectations of teacher competence in the age of AI and considers the current state of AI readiness among Nigerian teachers and teacher educators. It also discusses the ethical issues associated with AI use and argues for an approach that places educational purpose and professional judgement ahead of technological novelty. The paper further examines the institutional and curriculum changes required to support teachers and concludes with recommendations for teacher education institutions, policymakers, and professional organisations.

The Changing Landscape of Teacher Competence in the AI Era

The growing use of AI is changing the skills expected of teachers. In the past, teacher competence was largely associated with subject knowledge, lesson planning, classroom management, assessment, and the ability to communicate effectively with learners. These competencies remain important, but they are no longer sufficient on their own. Teachers now need to understand how AI systems work at a basic level, evaluate the information they produce, incorporate appropriate AI tools into teaching, and help learners use such technologies critically and responsibly (Olatunde-Aiyedun & Hamma, 2023; Okwudinma, 2024).

The emergence of AI has consequently introduced additional areas of competence, including AI literacy, awareness of algorithmic processes, data ethics, and the ability to combine technological support with professional judgement. These skills are particularly important because AI-generated information is not always accurate or suitable for a particular educational context.

Studies in Nigerian higher education institutions indicate that lecturers who use AI for activities such as preparing teaching materials, generating content, and planning instruction may save time and improve efficiency. At the same time, concerns have been raised about excessive dependence on AI and the possible weakening of teachers' independent planning and decision-making abilities (Olatunde-Aiyedun & Hamma, 2023). The issue, therefore, is not whether AI can make some teaching tasks easier. The more important question is whether teachers can use it without losing the professional judgement needed to evaluate and adapt what it produces.

Research on AI-related innovation in Nigerian public universities also points to gaps in digital competence, concerns about algorithmic bias, and inadequate infrastructure (Manafa, 2025). These challenges are interconnected. Where teachers have limited access to digital technologies or lack basic digital skills, it becomes even more difficult for them to develop more advanced competencies such as prompt design, verification of AI-generated information, and ethical use of AI. Research on pre-service teacher preparation has similarly identified weaknesses in digital skills and AI integration, suggesting that the problem begins partly during initial teacher education rather than only after teachers enter the profession (Olalekan & Salami, 2022).

Teacher competence in the AI era can therefore be viewed as developing in stages. Teachers first need basic digital literacy. They then need practical knowledge of relevant AI tools and, beyond that, the ability to judge when the use of AI is appropriate and when it is not. Research on AI-supported mathematics instruction, for example, shows that AI can assist with differentiated learning, but its effectiveness still depends greatly on the teacher's ability to guide and manage its use (Olusegun & Honmane, 2024).

The central point is that AI does not make pedagogical competence less important. If anything, it makes professional judgement even more important. An AI-ready teacher is not simply a teacher who knows how to use technology. Rather, such a teacher understands the strengths and limitations of AI and can decide how it can best support learning within the realities of the Nigerian classroom.

The State of AI Readiness among Nigerian Teachers: Evidence from Recent Studies

Research on AI readiness among Nigerian teachers and teacher educators is still developing, but existing studies provide useful insight into the current situation. Overall, the findings suggest that many educators have positive attitudes towards AI, while their actual level of preparedness remains uneven.

Eke (2024), for example, found that teacher educators generally viewed AI positively, but their practical readiness and access to institutional support were only moderate. Many respondents were uncertain about how AI could be incorporated meaningfully into their teaching. This distinction between having a positive attitude and having the ability to use AI effectively is important because willingness alone does not guarantee successful integration.

At the pre-service teacher level, Asongo et al. (2024) reported that student-teachers in Nigerian colleges of education had high awareness of and frequent exposure to popular generative AI applications, particularly ChatGPT. However, their use of more specialised educational AI tools was relatively limited. Cost and access were identified as major barriers, suggesting that the issue is not necessarily a lack of interest but the practical difficulty of gaining access to appropriate technologies.

The situation is similar in higher education. A case study of a Nigerian university found that institutional readiness for AI integration remained limited because of inadequate infrastructure, insufficient training opportunities, and uncertainty about institutional policies on AI use (Mmaduka & Albe, 2025). In another study involving lecturers in tertiary institutions in Anambra State, Onwu (2025) reported generally low levels of AI readiness and integration in instructional delivery. Years of teaching experience and gender did not significantly predict readiness, again pointing to the importance of training and exposure rather than seniority alone.

These findings are closely related to the broader digital challenges facing Nigeria. Poor internet access, inadequate ICT facilities, and infrastructure shortages continue to affect many public and rural institutions (Olubiyi, 2022; Bello & Olanrewaju, 2022). For practising lecturers who have begun experimenting with AI, the technology can improve creativity and efficiency, but structured training remains necessary to address skill gaps (Akinbo et al., 2023).

Taken together, the studies suggest that Nigerian teachers are not necessarily unwilling to use AI. The greater problem is that many are working without adequate training, infrastructure, institutional guidance, and sustained professional support. This pattern appears across pre-service teacher education, colleges of education, universities, and other tertiary institutions. The readiness challenge should therefore be treated as a system-wide issue rather than simply as an individual weakness among teachers.

Ethical Imperatives in AI Integration into Teacher Education

The discussion of AI in education cannot be limited to technical skills and access. The technology also raises

important ethical questions that teacher education programmes need to address. Donatus et al. (2024) identify concerns relating to academic integrity, informed consent, and learner autonomy, particularly when AI systems are allowed to influence educational decisions without sufficient human supervision. Adedefolu and Ezeani (2023) similarly argue that weak accountability structures around algorithmic decision-making can expose teachers and learners to AI outputs that may be difficult to understand, challenge, or verify.

Data privacy is another major concern. Some AI-supported educational technologies collect information about learners' behaviour and performance. Malasowe et al. (2024) point to concerns about surveillance, emotional stress, and the possible misuse of learner data. Similar concerns apply to the use of AI in educational administration, where institutional and student information must be protected from inappropriate access or use (Igbokwe, 2023).

These concerns are particularly important in a context where comprehensive guidance on the ethical use of AI in education is still developing. In the absence of clear institutional and national guidelines, teachers and individual institutions may be left to make difficult ethical decisions on their own. Many may not have received sufficient preparation to do so.

Ethical reasoning should therefore form part of teacher preparation rather than being treated as an optional topic. Teachers need to understand issues such as privacy, academic integrity, bias, transparency, accountability, and responsible use of AI-generated content. Knowing how to use an AI tool is not enough; teachers also need to understand when its use may be inappropriate and what safeguards are necessary.

From Technology-Centred Adoption to Human-Centred, Pedagogically Grounded Integration

One of the major concerns surrounding AI in education is the tendency to adopt technology simply because it is new or fashionable. An AI tool should not be introduced into a classroom merely because other institutions are using it. Its value should be judged by the educational problem it is intended to address.

Omidiora et al. (2022) caution against transferring AI models developed in other settings into African classrooms without considering local circumstances. Nigerian schools and teacher education institutions have their own languages, curricula, infrastructure limitations, student characteristics, and educational priorities. AI solutions that ignore these realities may not produce the expected benefits.

Sanusi et al. (2024) also show that teachers, learners, and policymakers may have different expectations about what AI should accomplish in education. This makes it important for institutions to develop a clear and shared understanding of the purpose of AI integration. Without such direction, AI projects may remain isolated experiments that generate initial excitement but fail to become part of normal teaching practice.

Examples of personalised learning interventions in Nigerian colleges of education provide some evidence of what a more context-sensitive approach might look like. AI-supported systems that take account of large classes, differences in students' preparedness, and limited instructional resources can support more inclusive learning when they are designed around actual educational needs (Advance Journal of Education and Social Sciences, 2025). This suggests that the usefulness of AI depends less on how sophisticated the technology appears and more on how well it fits the teaching problem being addressed.

AI integration in Nigerian teacher education should therefore begin with educational objectives. Institutions should first identify learning or teaching challenges and then consider whether AI can provide an appropriate solution. Decisions about AI tools should be informed by curriculum requirements, learners' needs, available infrastructure, and teachers' professional judgement. Cost and technological prestige should not be the main reasons for adopting a particular system.

A human-centred approach also means that teachers should remain responsible for important pedagogical decisions. AI can assist with lesson preparation, assessment, feedback, and other activities, but AI-generated

materials should be reviewed and adapted before they are given to learners. The final decision about what learners receive should remain with the teacher, who understands the learners, curriculum, and local context.

Institutional Capacity, Curriculum Reform, and Sustainable Pedagogical Innovation

Preparing teachers for AI requires more than individual effort. Teacher education institutions need the policies, infrastructure, training opportunities, and leadership support necessary to make responsible AI use possible. Adewale and Oduwole (2024) identify policy inconsistency, inadequate pedagogical support, and infrastructural limitations as important barriers to AI integration in Nigerian public education. These challenges cannot be solved through isolated interventions.

Curriculum reform is also necessary. Ogunode et al. (2024) note the growing relevance of AI to curriculum development and minimum academic standards in Nigerian universities. This indicates increasing recognition of the need to adjust existing educational structures, although the capacity to implement such changes remains a concern.

There are nevertheless reasons for optimism. Adigun and Folorunso (2023) reported promising results from AI-supported inclusive learning initiatives in low-income Nigerian schools. Their findings suggest that AI can support learning in resource-constrained environments when the technology is adapted to the needs of the context. Ewa (2024) similarly stresses the importance of investing in AI literacy among educators so that the potential benefits of AI are not limited to well-funded urban institutions.

Sustainable AI integration requires teacher development to move beyond occasional workshops. Teacher education institutions should provide continuous professional development through which teachers can learn, practise, evaluate, and update their AI-related skills. Pre-service programmes should include AI literacy and ethics as part of the core curriculum. Institutions should also establish clear guidelines for the use of AI-generated teaching and assessment materials.

Partnerships among colleges of education, universities, government agencies, and technology organisations could further support this process by providing access to expertise and current training opportunities. At the same time, issues of electricity, internet connectivity, and access to digital devices must be addressed. Without improvements in these areas, AI adoption could widen the existing gap between well-resourced and poorly resourced institutions (Olubiyi, 2022).

CONCLUSION

The growing influence of artificial intelligence is creating new opportunities for Nigerian education, but the success of this transformation will depend largely on the people expected to use the technology. Teachers need more than access to AI tools. They require the knowledge, skills, ethical awareness, and professional judgement needed to use these tools in ways that genuinely support teaching and learning.

The studies reviewed in this paper indicate that many Nigerian teachers and teacher educators are interested in AI, but their readiness is still affected by inadequate training, limited institutional support, weak infrastructure, and uncertainty about appropriate and ethical use. Without addressing these challenges, Nigeria may end up with teachers who have been exposed to AI technologies but are not sufficiently prepared to use them effectively.

AI readiness should therefore be understood as a combination of digital competence, knowledge of AI, pedagogical judgement, critical evaluation, and ethical responsibility. The goal should not be to replace teachers with technology but to equip teachers to use technology thoughtfully where it adds educational value.

For Nigeria, preparing AI-ready teachers is not simply a technological issue. It is an important part of building an education system that can respond to changing social, economic, and technological demands. Effective preparation will require coordinated action involving teacher education institutions, government agencies, professional bodies, and other stakeholders.

RECOMMENDATIONS

Based on the issues discussed in this paper, the following recommendations are proposed:

1. Curriculum Redesign in Teacher Education Institutions: Colleges of education and faculties of education should include AI literacy, critical evaluation of AI-generated information, and AI ethics in their core teacher education curricula. These areas should not be treated merely as optional or extracurricular topics.

2. Continuous Professional Development: Ministries of education, teaching service commissions, and professional organisations should provide regular training that enables practising teachers to develop and update their AI-related skills. Professional development should move beyond one-off workshops and become a continuous process.

3. Development of National and Institutional Ethical Guidelines: Relevant regulatory agencies, including the National Universities Commission, the National Commission for Colleges of Education, and federal and state education authorities, should develop clear guidelines for the responsible use of AI in education. Such guidelines should address data privacy, academic integrity, algorithmic accountability, and the use of AI-generated content.

4. Investment in Digital Infrastructure: Government and other stakeholders should improve electricity supply, internet connectivity, ICT facilities, and access to digital devices, particularly in rural and public institutions. Without these basic facilities, many teachers will remain unable to benefit from AI-related innovations.

5. Human-Centred Pedagogical Design: Institutions should select AI tools based on clearly identified teaching and learning needs rather than technological popularity. Teachers should retain responsibility for major instructional decisions, while AI should be used to support rather than replace professional judgement.

6. Institutional Monitoring and Evaluation: Teacher education institutions should regularly assess how AI is being used in teaching and learning. Such assessments should consider educational effectiveness, ethical concerns, learner outcomes, and equity so that AI practices can be improved over time.

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