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Research Article

Artificial Intelligence, innovation, and creativity in English education: Empowering women educators for Nigeria's development

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Abstract

Artificial Intelligence (AI), innovation, and creativity are increasingly reshaping English education by providing adaptive learning experiences, enhancing literacy outcomes, and fostering critical and creative skills necessary for global competitiveness. This paper examines the integration of AI tools such as adaptive learning platforms, automated essay scoring systems, AI-assisted writing and pronunciation applications, and gamified digital activities into English language instruction in Nigeria. It highlights the pivotal role of women educators in Colleges of Education as drivers of pedagogical transformation, mentors of pre-service teachers, and advocates of inclusive and technology-enhanced learning environments. While the study acknowledges persistent challenges including inadequate digital infrastructure, high costs of AI tools, resistance to technological change, and gender disparities in digital access, it also identifies opportunities for strengthening teacher capacity, reforming curricula, and promoting gender-responsive technological policies. The study recommends the implementation of sustained AI literacy programs for women educators and the strategic investment in digital infrastructure to support AI-driven teaching and learning across Colleges of Education. It further recommends integrating AI-based creative learning activities into English language curricula to promote learner engagement, autonomy, and improved literacy outcomes. The paper concludes that combining AI with innovation, creativity, and women's empowerment will significantly enhance the quality of English education in Nigeria while positioning the country to benefit from the emerging global knowledge economy.

Keywords: Artificial Intelligence, English Education, Women Educators, Innovation, Creativity, Nigeria

1. Introduction

Artificial Intelligence (AI), innovation, and creativity are rapidly reshaping education globally. Scholars argue that AI technologies such as adaptive learning platforms, intelligent tutoring systems, and automated assessment tools are transforming how teachers deliver content and how students engage with knowledge (Luckin et al., 2016; Zawacki-Richter et al., 2019). These tools allow for personalized learning, immediate feedback, and interactive experiences that foster creativity and critical thinking. The integration of AI into education thus holds great promise for addressing traditional barriers in teaching and learning across disciplines, including English language education.

In Nigeria, the education sector continues to grapple with systemic challenges that limit the full adoption of innovative practices. One major issue is the shortage of qualified teachers. The Teachers Registration Council of Nigeria (TRCN) has consistently emphasized that Nigeria faces a significant deficit in trained teachers, particularly in public primary and secondary schools (Okebukola, 2015). This shortage creates high pupil–teacher ratios, which in turn undermines teaching quality and hinders the implementation of student-centered learning approaches.

Closely linked to teacher shortages is the problem of overcrowded classrooms. Research has demonstrated that when classrooms exceed recommended pupil–teacher ratios, both teaching effectiveness and student performance decline (Akinsolu, 2010). In states such as Lagos, Benue, and Anambra, studies have shown that overcrowding negatively impacts English language instruction by reducing opportunities for teacher–student interaction and feedback (Ogunyemi, 2017). Overcrowded classrooms make it almost impossible to incorporate innovative and creative pedagogies,

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let alone deploy AI-driven tools that require individualized attention.

Another pressing challenge is the lack of adequate instructional resources. Many Nigerian schools lack sufficient textbooks, ICT tools, and access to reliable electricity or internet connectivity. According to Olayemi (2019), the shortage of instructional materials and digital infrastructure poses a serious barrier to curriculum delivery in English and other subjects. Without access to modern tools, teachers struggle to adopt innovative methods that could enhance language learning. This infrastructural gap significantly slows the pace of educational transformation in the country.

Women educators in Colleges of Education occupy a particularly important role in addressing these challenges. As trainers of pre-service teachers, they shape the pedagogical approaches of the next generation of classroom teachers. Their influence extends beyond the walls of teacher training institutions, affecting the quality of teaching across the basic education sector. As Adeyemi (2020) notes, empowering women educators with innovative pedagogical tools and AI literacy can have multiplier effects in improving teaching quality and student learning outcomes nationwide.

However, despite their importance, women educators face unique barriers in the Nigerian context. Gender norms, cultural expectations, and unequal access to professional development often limit women's opportunities for innovation (Salami, 2013). Many female teachers report difficulties in accessing ICT training, leadership positions, and resources necessary for experimenting with AI-driven teaching strategies (Okeke, 2019). This creates a gender gap in the capacity to leverage innovation and creativity for improved educational outcomes.

Given the convergence of global technological advancements, national educational challenges, and the unique position of women educators, it is crucial to explore how AI, innovation, and creativity can be harnessed within the Nigerian educational system. By empowering women in Colleges of Education to integrate AI into their English pedagogy, Nigeria can address systemic issues such as teacher shortages, overcrowded classrooms, and resource constraints. Such empowerment can also foster a culture of creativity and innovation that aligns education with broader economic development goals (Ogunlade, 2021).

2. Theoretical Framework

The Technological Pedagogical Content Knowledge (TPACK) framework provides a useful lens for understanding how artificial intelligence, innovation, and creativity can be integrated into English education in Nigeria. Developed by Mishra and Koehler (2006), TPACK emphasizes the intersection of three key domains: technology, pedagogy, and content knowledge. Effective teaching requires teachers not only to master subject matter and pedagogical strategies but also to integrate appropriate technologies in ways that enhance learning. Within the Nigerian context, this framework is particularly relevant as English educators are encouraged to adopt digital tools, including AI-powered platforms, to improve language acquisition and foster student engagement (Adegbite, 2021). Thus, TPACK highlights the importance of equipping women educators in Colleges of Education with the skills to balance these three domains in order to revolutionize teaching practice.

Complementing TPACK is the feminist pedagogy framework, which provides critical insights into the role of women educators in driving inclusive and innovative education. Feminist pedagogy, as articulated by Shrewsbury (1993), is grounded in values of empowerment, collaboration, and social transformation. It challenges hierarchical teaching models by promoting dialogic, participatory approaches when learners and teachers co-construct knowledge. In the Nigerian setting, feminist pedagogy is especially important given the structural and cultural barriers that often marginalize women educators (Okeke, 2019). By adopting feminist pedagogical principles, women in Colleges of Education can model inclusive practices, encourage learner agency, and use creativity to dismantle gendered inequalities in education.

Together, TPACK and feminist pedagogy provide a strong theoretical foundation for exploring how AI, innovation, and creativity can transform English education in Nigeria. While TPACK ensures that technological tools are effectively integrated with pedagogy and content, feminist pedagogy ensures that this integration happens in ways that promote equity, inclusivity, and women's empowerment. This dual framework positions women educators not only as implementers of innovation but also as agents of systemic transformation in Nigeria's education system (Aina, 2020). The synergy of these frameworks underscores the potential for leveraging technology while simultaneously addressing issues of gender justice in teacher education and practice.

3. AI in English Education

a. Adaptive learning platforms for personalized instruction

Adaptive learning platforms are among the most transformative applications of AI in English education. These systems use algorithms to analyze student performance data in real time and then adjust the difficulty level, type of content, and pacing to match individual learners' needs (Chen, 2020). For instance, an English learner struggling with reading comprehension may be given additional exercises that target vocabulary acquisition, while a more advanced learner may be provided with critical thinking tasks. Such platforms reduce the "one-size-fits-all" approach and create a personalized learning environment that can help Nigerian students in overcrowded classrooms receive differentiated instruction. According to Luckin et al. (2016), adaptive technologies increase learner engagement and achievement by responding to individual progress, making them particularly valuable in contexts where teacher-

student ratios are high.

b. Automated essay scoring and intelligent tutoring systems

Another important AI application in English education is automated essay scoring (AES) and intelligent tutoring systems (ITS). AES tools use natural language processing to evaluate student essays on parameters such as grammar, coherence, vocabulary use, and argumentation (Shermis, 2014). This technology provides students with immediate feedback, enabling them to revise and improve their writing without waiting for teacher input. Similarly, ITS function as virtual tutors that guide learners through grammar exercises, comprehension passages, or writing tasks, offering hints and corrective feedback along the way (Nkwo, 2022). In a Nigerian context where teachers are often overwhelmed with large numbers of essays to grade, these systems can save time and support formative assessment, ensuring that students receive timely and constructive responses to their work.

c. AI-assisted writing and pronunciation tools

AI-powered tools for writing and pronunciation have proven useful in language learning. Writing assistants such as Grammarly or QuillBot provide real-time corrections for grammar, syntax, and style, while AI-driven pronunciation apps like ELSA Speak analyze learners' speech and suggest improvements (Godwin-Jones, 2018). These tools are particularly relevant for Nigerian students who may not always have access to native English speakers for pronunciation modeling. By offering individualized support, they help students build confidence in both written and spoken English. For educators, integrating such tools into instruction can supplement classroom teaching and give students more opportunities to practice independently. As Adegbite (2021) notes, technology-enhanced language learning supports learners' autonomy and helps bridge the gap between classroom instruction and real-life language use.

d. Gamified and interactive activities to foster creativity

AI supports gamified and interactive activities that stimulate creativity in English education. Gamification involves applying game elements such as points, levels, and rewards to learning activities, making them more engaging and enjoyable (Deterding et al., 2011). AI-driven platforms can generate interactive storytelling tasks, vocabulary games, or role-playing scenarios where learners practice English in simulated real-life contexts. Such experiences foster creativity, collaboration, and problem-solving skills while reinforcing language learning objectives. In Nigerian schools, where traditional rote-learning methods dominate, gamified AI applications can transform passive learning into active participation. As Ogunlade (2021) averres embedding creativity through AI-based gamification encourages learners to think critically, explore language in dynamic contexts, and develop both communicative competence and creative confidence.

4. Role of Women Educators

1. Train and mentor pre-service teachers in AI-driven pedagogy

Women educators in Colleges of Education play a central role in preparing pre-service teachers to adopt AI-driven pedagogy. As teacher trainers, they act as role models and provide hands-on experiences with educational technologies such as adaptive learning platforms, automated essay scoring tools, and AI-supported writing assistants. By demonstrating practical classroom applications of these tools, women educators help pre-service teachers develop confidence in integrating AI into their future classrooms (Adeyemi, 2020). Their mentorship ensures that upcoming teachers are not only aware of emerging technologies but are also equipped with the skills to use them to enhance English language instruction, particularly in contexts with diverse learner needs.

Beyond technical training, women educators instill reflective teaching practices that encourage future teachers to critically evaluate when and how AI should be used. AI is not a replacement for human teachers but a complement to their work. By guiding pre-service teachers to consider ethical issues such as bias in automated essay scoring or digital inequalities in classrooms, women educators foster responsible use of AI in pedagogy (Nkwo, 2022). This training prepares future teachers to balance innovation with professional judgment, ensuring that AI supports inclusive and learner-centered education rather than exacerbating inequalities.

2. Integrate innovation and creativity in teaching practices

Women educators also integrate innovation and creativity into their teaching practices, thereby modeling for their students the kind of flexible and engaging pedagogy required in 21st-century classrooms. In English education, this may involve incorporating gamified language activities, AI-driven pronunciation practice, or collaborative digital storytelling projects. Such approaches not only improve language acquisition but also cultivate creativity, critical thinking, and problem-solving among learners (Ogunlade, 2021). By showcasing these innovative practices in their own classrooms, women educators inspire pre-service teachers to experiment with new methods and move beyond traditional rote-learning approaches that dominate Nigerian schools.

Furthermore, women educators emphasize creativity as a form of empowerment and inclusion. Feminist pedagogical approaches encourage dialogic learning, collaboration, and valuing students' voices (Shrewsbury, 1993). By embedding creativity in their pedagogy, women educators make classrooms more participatory and less hierarchical, reflecting the principles of inclusivity. This practice not only equips future teachers with innovative strategies for English instruction but also nurtures their capacity to create democratic and learner-centered classrooms. In doing so, women educators help to shift the culture of teaching in

Nigeria towards one that values creativity, inclusivity, and innovation.

3. Overcoming barriers: limited infrastructure, gender norms, and policy gaps

Despite their critical role, women educators face significant barriers in leveraging AI, innovation, and creativity in education. Limited infrastructure, such as inadequate ICT resources, unreliable electricity, and poor internet access, often restricts their ability to demonstrate AI tools in teacher training programs (Olayemi, 2019). This digital divide creates disparities between urban and rural Colleges of Education, making it difficult for some women educators to fully integrate technology into their pedagogy.

In addition to infrastructural barriers, cultural and institutional gender norms continue to constrain women educators. Many women encounter resistance when pursuing leadership roles or advocating for technology-driven reforms in their institutions (Salami, 2013). Policy gaps, including insufficient funding for ICT in Colleges of Education and lack of gender-sensitive professional development programs, further limit women's opportunities to innovate. Nevertheless, women educators continue to challenge these barriers through professional associations, peer networks, and policy advocacy. By asserting their expertise in both pedagogy and technology, they not only empower themselves but also pave the way for greater gender equity in Nigerian education (Okeke, 2019).

5. Challenges

i. Poor digital infrastructure and internet access

One of the most pressing challenges in integrating AI into English education in Nigeria is the lack of adequate digital infrastructure and internet connectivity. Many Colleges of Education, especially those in rural and semi-urban areas, lack reliable electricity, computer laboratories, and broadband internet facilities (Olayemi, 2019). Without these foundational resources, the use of AI-powered learning platforms, automated assessment tools, and virtual classrooms becomes nearly impossible. According to World Bank reports, Nigeria has one of the widest digital divides in sub-Saharan Africa, with rural schools and teacher training institutions disproportionately affected (World Bank, 2020). This infrastructural deficit hinders women educators from modeling the use of AI tools for pre-service teachers, thereby limiting exposure and reducing the transformative potential of AI in English language education.

ii. High cost of AI tools

Another major barrier is the prohibitive cost of acquiring AI tools and software licenses. While advanced applications such as adaptive learning systems, intelligent tutoring platforms, and automated essay scoring programs have shown promise globally, they remain largely unaffordable for most Nigerian institutions (Nkwo, 2022). Schools and Colleges of Education operate under tight budgets that prioritize basic infrastructure over advanced digital tools. Even when tools are available, the cost of subscription, maintenance, and continuous upgrades places them out of reach for many educators and students. Ogunlade (2021) stresses that without significant government subsidies or public-private partnerships, AI adoption in Nigerian education will remain limited to elite schools, deepening educational inequality. For women educators, who often have fewer institutional resources allocated to their programs, affordability remains a major obstacle to innovation.

iii. Resistance to adopting new technology

Resistance to change is another challenge that slows down the integration of AI into English education. Some educators, particularly those accustomed to traditional methods of teaching, are reluctant to adopt AI-driven tools, perceiving them as too complex or as a threat to their professional relevance (Okebukola, 2015). This resistance is compounded by insufficient professional development opportunities, which leaves many teachers feeling unprepared or overwhelmed by technological demands. Furthermore, misconceptions that AI aims to replace teachers rather than support them foster skepticism and reluctance. According to Adegbite (2021), successful AI adoption requires a cultural shift within institutions, emphasizing continuous training, collaboration, and a mindset that views technology as a complement to pedagogy rather than a substitute. Women educators, who already face cultural and institutional barriers, must therefore work doubly hard to overcome both systemic resistance and gender-based challenges.

iv. Gender disparities in digital access

Finally, gender disparities in digital access pose a unique challenge for women educators in Nigeria. Studies show that women are less likely than men to have access to digital devices, internet connectivity, and ICT training opportunities (Salami, 2013; Okeke, 2019). This digital gender gap reflects broader social inequalities that limit women's participation in technological innovation. In Colleges of Education, female teacher trainers often face restricted access to resources compared to their male colleagues, which reduces their ability to experiment with AI tools in teaching practice. According to Aina (2020), addressing gender disparities in technology access is crucial to ensuring that women educators are not left behind in the AI revolution. Without deliberate efforts to close this gap, women's voices in shaping AI pedagogy and policy risk being marginalized, thereby weakening the inclusive potential of educational innovation in Nigeria.

6. Opportunities

a. AI literacy programs and professional development

One of the greatest opportunities AI presents in English education is the introduction of AI literacy programs and sustained professional development for teachers. Training workshops and continuous development programs can equip educators with practical skills in using adaptive learning systems, AI-assisted writing tools, and automated feedback platforms (Luckin et al., 2016). For women educators in

Colleges of Education, such programs would enhance their confidence in integrating AI into teacher preparation courses, ensuring that pre-service teachers graduate with digital competencies suited for 21st-century classrooms. According to Adegbite (2021), equipping teachers with AI literacy reduces resistance, promotes innovation, and ensures that technology complements rather than replaces traditional pedagogy.

b. Curriculum reform integrating AI and creativity

Another key opportunity lies in reforming the English education curriculum to integrate AI tools alongside creativity-focused approaches. Current curricula in many Nigerian Colleges of Education still emphasize rote learning and traditional teaching strategies, leaving little room for innovation. Integrating AI into curriculum design would provide students with opportunities to use intelligent tutoring systems, gamified platforms, and digital storytelling tools to learn English more interactively (Nkwo, 2022). Ogunlade (2021) stresses that curriculum reform should not merely add technology as a supplement but embed it as a core component of creative, learner-centered pedagogy. Such reforms would ensure that Nigerian students not only acquire English proficiency but also develop problem-solving and critical-thinking skills.

c. Gender-responsive policies to empower women educators

Opportunities also exist in developing gender-responsive policies that deliberately empower women educators to lead innovation in AI integration. Addressing the digital gender gap requires targeted interventions such as scholarships for women to pursue ICT training, equal access to digital infrastructure in Colleges of Education, and mentorship programs that encourage women's leadership in technology adoption (Aina, 2020). Policies that prioritize gender equity in professional development can ensure that women educators are not marginalized but rather positioned as leaders of pedagogical transformation. Okeke (2019) argues that gender-responsive educational policies not only strengthen women's professional growth but also foster inclusive classrooms where pre-service teachers are trained to be sensitive to equity and diversity.

d. Improved literacy outcomes, employability, and global competitiveness

Finally, the adoption of AI in English education offers a pathway to improved literacy outcomes, enhanced employability, and increased global competitiveness for Nigerian students. AI tools provide immediate feedback on writing, pronunciation, and comprehension, which accelerates language acquisition and reduces dropout rates linked to poor literacy (Shermis, 2014). Students who graduate with strong English proficiency, coupled with digital skills, are more competitive in both local and global labor markets. As the economy becomes increasingly knowledge-driven, Nigeria's ability to produce digitally literate graduates will determine its position in the global arena (World Bank, 2020). By fostering literacy, creativity, and technological competence, AI-enhanced education aligns with Nigeria's broader goals of economic transformation and sustainable development.

7. Conclusion

Artificial Intelligence, innovation, and creativity offer transformative possibilities for English education in Nigeria, as they simultaneously address systemic challenges such as teacher shortages, overcrowded classrooms, and limited instructional resources while enhancing learners' literacy, creativity, and communicative competence; and although the nation still struggles with infrastructural gaps and gender disparities, the empowerment of women educators through inclusive policies and sustained professional development ensures that AI-driven pedagogies become both equitable and effective. When schools adopt AI tools such as automated essay scoring systems, adaptive learning platforms, and interactive gamified activities, students receive timely, personalized feedback that accelerates their mastery of English language skills, thereby improving national literacy outcomes and supporting Nigeria's broader educational goals. Ultimately, as women educators lead the integration of AI in Colleges of Education and model innovative, learner-centered approaches, Nigeria strengthens its human capital development, expands its capacity for technological advancement, and positions itself more competitively within the global knowledge economy.

Recommendations:

- **Strengthen AI Infrastructure and Access in Colleges of Education**: Government agencies, the National Commission for Colleges of Education (NCCE), and private stakeholders should invest in reliable digital infrastructure including stable electricity, functional ICT laboratories, and high-speed internet, to enable effective use of AI tools in English education. Special priority should be given to women educators to ensure equitable access to technology.
- **Implement Continuous AI Literacy and Professional Development for Women Educators**: Colleges of Education should establish ongoing AI literacy programs, workshops, and certification courses that equip women educators and pre-service teachers with practical skills in using adaptive learning tools, automated essay scoring systems, AI-assisted writing platforms, and gamified learning applications. These trainings should be gender-responsive and encourage women's leadership in technological innovation.
- **Integrate AI, Innovation, and Creativity into the English Education Curriculum**: The NCCE should revise the English language curriculum to embed AI-driven activities such as digital storytelling, interactive simulations, intelligent tutoring systems, and creative digital projects. This curriculum reform should promote learner-centered, inclusive, and innovative pedagogy, positioning women educators as key facilitators of

creativity and digital competence.

- **Promote Gender-Responsive Policies to Empower Women Educators**: National and institutional policies should directly address gender gaps by providing women educators with equal access to digital tools, funding opportunities, and leadership positions in technology integration initiatives. Mentorship programs, scholarships, and incentives should be introduced to support women's professional growth in AI-driven education.

Abbreviations

AI	Artificial Intelligence
ICT	Information and Communication Technology
TPACK	Technological Pedagogical Content Knowledge
TRCN	Teachers Registration Council of Nigeria

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Conflicts of Interest

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