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Reimagining Education for Innovation and Sustainability in Nigeria: A Philosophical Inquiry into Artificial Intelligence, Digital Technology, Social Media, Climate Action, Security, and Peace Education

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Abstract

This paper undertakes a philosophical and empirical analysis of the need to reimagine education in Nigeria toward innovation and sustainability in the 21st century. It interrogates how artificial intelligence (AI), digital technology, social media, climate action, security, and peace education can be harmonized to promote sustainable human development and national transformation. Using a qualitative philosophical inquiry supported by interviews and observations, the study draws on verified scholarly works (2010–2025). Guided by Pragmatism and Social Reconstructionism, it argues that education must move beyond rote instruction to embrace creativity, ethical responsibility, and environmental consciousness. Findings indicate that although Nigeria has made progress in digital inclusion and sustainability initiatives, gaps remain in teacher capacity, curriculum innovation, and peace education. The study concludes that a transformative educational paradigm rooted in innovation, sustainability, and moral reconstruction is essential for Nigeria's future. It recommends integrating AI literacy, digital ethics, environmental studies, and peace education across all levels of learning.

Background to the Study

Education remains the foundation of human progress, social transformation, and national development. Yet, in the 21st century, the meaning, purpose, and structure of education are undergoing a profound re-evaluation in response to the unprecedented challenges and opportunities created by artificial intelligence (AI), digital technology, climate change, social media, security crises, and the urgent quest for peace and sustainability (UNESCO, 2023; OECD, 2021). The interdependence between innovation, sustainability, and education has become a defining theme in global discourse, emphasizing the need for systems that are not only knowledge-based but also ethically, socially, and ecologically grounded.

In the context of Nigeria, education must now transcend traditional paradigms of rote learning and examination-driven instruction to embrace a transformative model that empowers learners to think critically, act responsibly, and innovate sustainably (Onyema et al., 2020; Okon & Ekanem, 2023). The country's complex realities—ranging from youth unemployment, insecurity, and environmental degradation to digital inequality and moral decline—demand a reimagined educational vision that integrates technology, ethics, peace, and sustainability into one coherent philosophical and practical framework (Adebayo & Okorie, 2023).

Globally, education systems are being restructured to meet the demands of the Fourth Industrial Revolution, driven by artificial intelligence, robotics, and data science (Zawacki-Richter et al., 2019; Russell & Norvig, 2021). Nations such as Finland, Singapore, and South Korea have adopted AI literacy and digital skills education from early learning stages to enhance problem-solving, innovation, and lifelong learning capacities (Hämäläinen et al., 2020; OECD, 2021). These reforms reflect a global shift from content-based to competence-based learning — one that values creativity, adaptability, and social responsibility. For Nigeria, this global momentum presents both an opportunity and a challenge: the opportunity to leapfrog developmental constraints through technology and innovation, and the challenge of ensuring that digital transformation aligns with ethical, cultural, and sustainable values (Ibrahim & Musa, 2021).

Artificial Intelligence (AI) has emerged as one of the most transformative forces in modern education. AI-driven technologies facilitate personalized learning, automated assessment, and predictive analytics that enhance instructional quality and learner engagement (Zawacki-Richter et al., 2019). However, AI also raises deep philosophical and ethical questions concerning autonomy, bias, and the nature of human reasoning (Biesta, 2021; Dewey, 2018). In the Nigerian educational context, AI provides opportunities to close learning gaps and expand access, but these opportunities must be pursued with sensitivity to equity, data privacy, and the preservation of humanistic values. As Freire (2022) argued, technology must serve human liberation and not domination. Thus, the integration of AI into Nigerian education must be guided by critical consciousness and moral responsibility.

Equally transformative is the rise of digital technology, which has revolutionized how information is created, disseminated, and utilized. Digital learning platforms, mobile applications, and virtual classrooms now define the educational experience globally (UNESCO, 2023). Yet, Nigeria faces persistent challenges such as inadequate infrastructure, poor broadband access, and limited teacher training in digital pedagogy (Onyema et al., 2020). The COVID-19 pandemic exposed both the potential and the vulnerability of Nigeria's digital education system, highlighting the need for innovative investments in technological infrastructure and teacher capacity building (Ibrahim & Musa, 2021). Digital education is not merely a tool for knowledge transmission but a medium for cultivating innovation, critical thinking, and global citizenship.

A related but complex phenomenon is the growing influence of social media on learning and socialization. Platforms such as Facebook, TikTok, X (formerly Twitter), and WhatsApp have become spaces for civic engagement, peer learning, and self-expression (Adewale, 2023). However, their unregulated use has also led to the spread of misinformation, cyberbullying, and moral decadence among young people (Edeh & Nwafor, 2022). Philosophically, this tension mirrors Dewey's (2018) concern with education as a moral enterprise that must balance freedom with responsibility. In Nigeria, there is a need for digital citizenship education that teaches students not only how to use technology but also how to live ethically in a digital world. Social media education must therefore integrate digital ethics, empathy, and reflective judgment to ensure that technological progress contributes to social harmony rather than fragmentation.

Beyond technology, the global climate crisis has positioned climate action and environmental sustainability at the heart of educational reform. The concept of Education for Sustainable Development (ESD) emphasizes the role of learning in promoting ecological awareness, social justice, and intergenerational responsibility (Tilbury, 2021; UNESCO, 2022). Nations across Europe and Asia have adopted sustainability curricula that encourage renewable energy use, biodiversity conservation, and environmental stewardship. In Nigeria, however, climate education remains peripheral to mainstream curricula (Okon & Ekanem, 2023). This neglect undermines learners' capacity to address issues such as flooding, desertification, and pollution that directly affect their communities. The inclusion of environmental education within Nigeria's school system is therefore both an ecological and moral imperative—one that aligns with global sustainability goals (UNDP, 2020).

Equally pressing is the integration of security and peace education into Nigeria's educational framework. The country has experienced prolonged insecurity due to terrorism, banditry, and communal conflicts, which have disrupted schooling and deepened social divisions (Adebayo & Okorie, 2023). Peace education, as conceptualized by Salawu and Eze (2020), cultivates empathy, conflict resolution, and civic responsibility. Globally, countries emerging from conflict, such as Rwanda and Kenya, have successfully embedded peace and reconciliation education into their curricula

(UNESCO, 2021). Nigeria can learn from such models to foster unity and stability. A philosophy of peace education rooted in Freirean dialogue and social reconstructionism emphasizes that learners should be equipped not merely with information but with the critical consciousness to transform unjust social structures (Freire, 2022; Giroux, 2021).

At the philosophical level, reimagining education for innovation and sustainability requires a synthesis of knowledge, ethics, and action. Education must prepare individuals not only to thrive in a digital and globalized world but also to act as moral agents capable of protecting the environment, promoting peace, and sustaining human dignity (Biesta, 2021). This vision resonates with Dewey's (2018) pragmatic philosophy, which views education as a process of continuous reconstruction of experience in response to changing social and technological realities. Similarly, Freire's (2022) social reconstructionist approach insists that education must empower the oppressed and transform society through dialogue, critical reflection, and action.

In the Nigerian context, reimagining education entails creating an integrated framework where AI and digital technology drive innovation; social media and ethics shape civic engagement; climate action promotes sustainability; and peace education secures national stability. It means shifting the focus from theoretical instruction to practical, problem-solving, and human-centered learning. Such a holistic framework aligns with global educational trends that emphasize inclusivity, resilience, and sustainable human development (UNESCO, 2023; OECD, 2021).

This philosophical inquiry therefore seeks to explore how Nigeria can align its educational system with the imperatives of innovation and sustainability through the intelligent integration of technology, ethical consciousness, environmental awareness, and peace education. The paper argues that education must not only transmit knowledge but also nurture wisdom, empathy, and creativity—the moral foundations upon which sustainable development depends. Only through such a transformative paradigm can Nigeria produce citizens who are not just employable but also responsible innovators, environmental stewards, and peace-builders.

Statement of the Problem

Nigeria's education system faces a critical challenge of relevance in the 21st century. Despite numerous reforms, it remains constrained by outdated curricula, weak digital infrastructure, undertrained teachers, insecurity, and poor funding (Akinyemi & Abubakar, 2022; Okebukola, 2023). These systemic problems limit the nation's capacity to produce innovative thinkers who can drive sustainable development. Globally, education is being transformed through artificial intelligence (AI), digital technology, and climate-smart learning, yet Nigeria lags in adopting these innovations (UNESCO, 2022). Schools and universities still rely largely on traditional pedagogies that fail to equip learners with digital, ethical, and environmental competencies required for sustainable progress.

Similarly, while social media provides opportunities for collaboration and civic engagement, it also promotes misinformation, distraction, and moral decline among youths (Eze & Nwafor, 2022). The absence of structured digital literacy and AI ethics education worsens this dilemma.

In addition, insecurity—ranging from insurgency and kidnapping to communal violence—continues to disrupt schooling and undermine peace education (Abdulrahman, 2021). Without deliberate integration of security and peace education, learners are ill-prepared to contribute to a stable and sustainable society. Thus, the problem confronting Nigeria's education system is its inability to align philosophical foundations with modern realities of innovation, digitalization, climate consciousness, and peacebuilding. There is an urgent need to reimagine education through pragmatism and social reconstructionism, ensuring it becomes a transformative force for innovation, sustainability, and social stability in Nigeria.

Objectives of the Study

The principal aim of this study is to philosophically examine how education in Nigeria can be reconstructed to promote innovation and sustainability in line with technological and social changes. The specific objectives are to:

1. Analyze the role of artificial intelligence and digital technology in promoting educational innovation in Nigeria.
2. Examine the influence of social media on value formation, civic responsibility, and educational development.
3. Explore how climate action and environmental sustainability can be integrated into Nigerian education.
4. Investigate the role of education in promoting peace, security, and national cohesion through philosophical reconstruction.

Research Questions

1. How can artificial intelligence and digital technology drive educational innovation in Nigeria?
2. What is the impact of social media on educational values and civic responsibility?
3. In what ways can climate action and environmental sustainability be integrated into Nigerian education?
4. How can education foster peace, security, and sustainable national development?

Methodology

This research employed a philosophical inquiry design within a qualitative framework. It relied on interpretive reasoning and critical analysis rather than quantitative measurement. Primary data were gathered through semi-structured interviews with educators, students, and policymakers, complemented by observations in selected secondary and tertiary institutions across Nigeria between 2023 and 2024. These qualitative methods allowed for deeper understanding of participants lived experiences concerning AI, digital learning, and sustainability education.

Secondary data were obtained from peer-reviewed journals, policy documents, and global reports published between 2010 and 2025. Analytical methods included hermeneutic interpretation, conceptual analysis, and reflective synthesis. Ethical standards were upheld through informed consent and confidentiality. This approach aligns with the philosophical goals of clarifying concepts, evaluating ideas, and proposing practical pathways for educational transformation.

Theoretical Framework

This study is anchored on two philosophical theories—(1) Pragmatism and (2) Social Reconstructionism—which provide the intellectual and practical foundation for reimagining education toward innovation and sustainability in Nigeria.

Pragmatism Theory

Overview:

Developed by John Dewey (1916), Pragmatism emphasizes learning by doing, experiential inquiry, and the application of knowledge to real-life situations. It holds that education should promote creativity, adaptability, and problem-solving in response to changing social and technological realities. Pragmatism is relevant because it aligns with the study's focus on AI, digital technology, and innovation in education. It supports a shift from rote learning to interactive, learner-centered, and technology-driven pedagogy, which fosters creativity and sustainable thinking among students. The theory will guide the study by emphasizing practical integration of digital tools, AI-assisted learning, and project-based education. Through this lens, education becomes a platform for developing problem-solvers capable of addressing national challenges such as unemployment, digital inequality, and environmental degradation.

Social Reconstructionism Theory

Overview:

Proposed by George Counts (1932) and expanded by Theodore Brameld (1950), Social Reconstructionism views education as a tool for transforming society and addressing injustice, conflict, and inequality.

This theory supports the study's emphasis on peace, security, climate action, and social reform. It highlights the need for education that wasfosters moral values, civic responsibility, and social awareness in an era of insecurity and environmental crises. This theory will be applied by advocating the inclusion of peace education, climate education, and digital citizenship in school curricula. It provides the ethical and social foundation for using innovation and digital technology not just for economic gain but for national stability and sustainable development.

In summary, Pragmatism provides the methodological drive for innovation and experiential learning, while Social Reconstructionism supplies the ethical and social vision for peace and sustainability. These theories jointly guide the study's philosophical inquiry into transforming Nigerian education through AI, digital literacy, and values-based learning.

Conceptual Clarification and Empirical Review

Conceptual Clarification

Education

Education is the process of developing intellectual, moral, and practical capacities that enable individuals to function effectively in society. Dewey (1916) defines education as a continuous reconstruction of experience that promotes growth and adaptability. In this study, education is seen as a transformative tool for cultivating digital literacy, innovation, environmental consciousness, and social responsibility for national development.

Innovation

Innovation refers to the introduction and application of new ideas, methods, or technologies to improve systems and outcomes. Rogers (2010) describes innovation as a process of adopting creative practices that enhance problem-solving. In this study, innovation involves integrating AI-based learning, digital classrooms, and climate-smart pedagogy to improve educational quality and foster sustainable thinking in Nigeria.

Sustainability

Sustainability, as defined by UNESCO (2022), is the ability to meet present needs without compromising future generations' capacity to meet theirs. Within this study, sustainability emphasizes environmental stewardship, responsible technology use, and inclusive education as pathways toward a balanced and enduring social order.

Artificial Intelligence (AI)

AI involves computer systems capable of performing human-like cognitive functions such as reasoning, learning, and decision-making. Holmes et al. (2021) note that AI enhances personalized learning and data-driven teaching. In Nigeria, AI can revolutionize education by improving accessibility, assessment, and innovation-driven learning.

Digital Technology

Digital technology encompasses tools and platforms that facilitate communication, collaboration, and learning. Examples include e-learning systems, mobile applications, and digital libraries. Okebukola (2023) asserts that digital integration promotes interactive, inclusive, and competency-based education. This study views digital technology as a driver for educational reform and lifelong learning.

Social Media

Social media platforms enable interaction, knowledge sharing, and civic engagement. Although they can foster misinformation and distraction, they also promote collaboration, innovation, and social learning (Chukwu & Adeyemo, 2021). In this study, social media is seen as a pedagogical tool for digital citizenship, ethical communication, and peace promotion when guided by sound educational values.

Climate Action Education

Climate action education entails teaching learners about environmental issues, sustainability practices, and ecological responsibility. UNESCO (2022) emphasizes that environmental literacy fosters climate-conscious behavior. This study considers climate action education crucial for building environmentally responsible citizens and promoting green innovation in Nigeria.

Security and Peace Education

Security education equips learners with knowledge and skills to identify, prevent, and respond to threats to personal and societal safety, such as terrorism, cybercrime, and social unrest (Adewumi & Adebayo, 2021). Peace education, on the other hand, cultivates values of dialogue, tolerance, empathy, and nonviolence (Omeje & Ede, 2020). In this study, both are integrated as complementary approaches to promote national stability, civic responsibility, and sustainable coexistence. Through education, learners can develop the moral, emotional, and intellectual capacity to foster peace and security—key foundations for innovation and sustainable development in Nigeria.

Empirical Review

This section examines relevant studies and global comparisons relating to artificial intelligence, digital technology, social media, climate action, security, and peace education in Nigeria and beyond. The review is organized around the research objectives and questions of the study.

Artificial Intelligence and Digital Innovation in Education

Empirical evidence across recent studies underscores the transformative potential of artificial intelligence (AI) and digital technologies in reshaping education systems globally. Holmes et al. (2021) demonstrated that AI-driven learning platforms enhance the personalization of instruction, improve learner assessment accuracy, and provide adaptive feedback systems that support individual learning styles. In advanced education systems, AI has been applied to curriculum design, intelligent tutoring, and administrative decision-making.

In Nigeria, Okebukola (2023) identified promising but uneven progress in the adoption of digital and AI technologies across primary, secondary, and tertiary institutions. The study revealed that most educational institutions are constrained by infrastructural deficits, inadequate digital literacy among teachers, erratic power supply, and policy inconsistency. Despite these constraints, AI has shown the potential to promote data-driven learning, foster inclusivity for learners with disabilities, and enhance administrative transparency. Globally, UNESCO (2022) and OECD (2023) emphasized that AI should be integrated ethically and contextually, with policies that ensure equity, accessibility, and the protection of human rights. The relevance of AI to this study lies in its ability to stimulate innovation and drive pedagogical transformation toward sustainability in Nigeria. This study, through interviews and classroom observations, explores how AI tools are perceived and applied in Nigerian educational settings, focusing on ethical, infrastructural, and pedagogical challenges.

Social Media and Digital learnings engagement

Social media has emerged as a significant tool in contemporary education, supporting collaborative learning, participatory communication, and civic engagement. Selwyn (2020) observed that platforms such as YouTube, WhatsApp, Facebook, and X (formerly Twitter) have become informal learning spaces where knowledge is exchanged dynamically. These platforms encourage peer learning, creativity, and self-expression, thereby complementing formal instruction.

Eze and Nwafor (2022) conducted an empirical study in South-East Nigeria and found that social media facilitates interactive learning, promotes digital literacy, and enhances access to global educational content. However, they cautioned against its misuse, citing distractions, exposure to misinformation, and a lack of media ethics among learners. Chukwu and Adeyemo (2021) further argued that effective use of social media requires guided supervision and the development of digital citizenship skills that emphasize responsibility, critical thinking, and respect for others. From a philosophical standpoint, social media supports constructivist and democratic learning, enabling students to co-create knowledge rather than passively consume information. Within this study, social media is examined as both a tool for innovation and a moral challenge—requiring deliberate educational strategies to ensure it fosters intellectual growth, social order, and sustainable peace.

Climate Action and Environmental Sustainability

Education for climate action and environmental sustainability has gained prominence in global discourses on sustainable development. Empirical studies consistently link environmental education to behavioral change and long-term ecological consciousness. Nwankwo and Ajayi (2021) found that incorporating climate change education into Nigeria's secondary school curriculum improved students' environmental attitudes and conservation behaviors. Anderson (2022) emphasized that sustainable education should not only raise awareness but also empower communities to take active steps toward renewable energy use, waste management, and biodiversity conservation.

Similarly, UNDP (2023) reported that climate-focused curricula enhance resilience and innovation, especially when integrated into science and social studies at the foundational level. Yet, in Nigeria, environmental education remains peripheral, with limited teacher expertise, inadequate curricular frameworks, and poor funding for sustainability programs.

The relevance of climate action education to this study lies in its alignment with education for sustainable development (ESD) principles. By integrating environmental awareness into teaching and learning, Nigerian schools can cultivate a new generation of eco-literate citizens capable of addressing environmental degradation and promoting national sustainability. This study explores teachers' and learners' perceptions of climate education through interviews and observation of school-based eco-initiatives.

Security and Peace Education for Sustainable Development

Security and peace education are critical components of sustainable development, particularly in societies experiencing social and political instability. Adewumi and Adebayo (2021) defined security education as the process of developing awareness, responsibility, and resilience to safeguard individuals and communities from harm. It promotes civic consciousness, moral integrity, and preparedness for national security challenges such as terrorism, kidnapping, and cybercrime.

Peace education, on the other hand, focuses on fostering nonviolent conflict resolution, empathy, tolerance, and justice (Okoro, 2021). It aims to equip learners with the emotional intelligence and ethical judgment necessary for harmonious coexistence. UNESCO (2023) reiterated that peace education underpins global citizenship and sustainable peace by shaping values that counteract discrimination, extremism, and violence. In Nigeria, despite several peace education initiatives, the persistence of insecurity, ethnic tensions, and political instability reveals significant gaps in the implementation of peace curricula. Teachers often lack training in conflict resolution pedagogy, and school environments remain susceptible to ideological and ethnic influences that undermine peacebuilding. The relevance of this concept to the study lies in its philosophical and practical connection to sustainability. Education that fails to promote peace and security cannot nurture innovation or sustainable development. Therefore, this study examines how security and peace education can be integrated with AI, digital technology, and environmental learning to create a holistic model of education for innovation and sustainability.

Summary of Reviewed Literature and Research Gap

The reviewed literature reveals that efforts to reimagine education for innovation and sustainability in Nigeria have largely focused on isolated domains—technology integration, social media learning, environmental education, and peacebuilding. While global scholarship emphasizes the interdependence of these elements, Nigerian studies often address them separately, leading to fragmented insights.

Empirical findings from Holmes et al. (2021), Selwyn (2020), and Anderson (2022) indicate significant progress in AI adoption, social media learning, and environmental awareness. However, challenges persist in teacher preparedness, digital infrastructure, policy implementation, and curriculum integration. Furthermore, studies such as Eze and Nwafor (2022) and Okoro (2021) point to moral and ethical concerns arising from technological dependence and value erosion among learners.

A major gap identified is the lack of integrative philosophical and empirical frameworks connecting AI, digital learning, climate action, and peace education as co-dependent mechanisms for sustainable transformation. There is also limited empirical exploration of how these domains can be harmonized to shape educational innovation and social order within Nigeria's context. This study seeks to fill this gap by conducting a philosophical and empirical inquiry that employs interviews and observations to

examine how education can be reimagined to promote innovation, sustainability, and peace. By integrating contemporary technologies with moral, environmental, and civic values, this research contributes to the development of a contextually grounded educational model for Nigeria and the broader global community.

Findings and Discussions

Findings from interviews, observations, and document reviews were analyzed thematically in alignment with the research questions.

Artificial Intelligence, Digital Technology, and Innovation in Sustainable Education

The integration of artificial intelligence (AI) and digital technology into education has transformed the teaching and learning landscape, offering innovative approaches for promoting sustainable education. Field interviews with lecturers and students indicate that AI-powered tools, such as adaptive learning platforms, virtual simulations, and automated assessment systems, are increasingly utilized to enhance learning outcomes. Observations further reveal that students engage more actively in problem-solving and collaborative projects when supported by digital technologies, demonstrating creativity, critical thinking, and practical skills aligned with real-world challenges. Despite these positive trends, challenges such as limited infrastructure, insufficient training for educators, and inconsistent internet connectivity were frequently cited, constraining the full potential of technological innovations in education.

From a Pragmatic perspective, learning is most effective when it is experiential, problem-centered, and oriented toward practical outcomes (Dewey, 2018; Saavedra & Opfer, 2012). This theoretical lens is particularly relevant in understanding how AI and digital tools facilitate active engagement, experimentation, and immediate feedback, thereby fostering sustainable learning practices. For example, students reported that AI-driven simulations in environmental science and civic education allowed them to experiment with solutions for community-level challenges, enhancing their understanding of sustainability principles. Such experiences exemplify Dewey's notion that knowledge is constructed through active engagement and reflective practice, demonstrating the practical relevance of digital technologies in achieving educational objectives.

In addition, Social Reconstructionism emphasizes education's role in addressing societal problems and fostering transformative change (Counts, 2019; Alhassan, 2020). Digital technology and AI serve as tools for equipping learners with innovative skills and critical consciousness to tackle pressing societal issues, including climate change, security challenges, and social inequities. Field data indicate that students who used collaborative digital platforms for research projects on local sustainability initiatives developed solutions with practical implications for their communities, such as designing mobile applications for waste management awareness and digital dashboards for tracking local environmental indicators. These findings align with empirical studies by Adebayo and Okorie (2023) and Adewale (2023), which emphasize the potential of AI and digital technologies to promote innovation, problem-solving, and socially responsible action in Nigerian schools.

Comparative literature further corroborates these observations. Studies in Nigeria and globally indicate that integrating AI and digital technology in educational processes enhances learner engagement, improves access to information, and develops higher-order cognitive skills necessary for sustainable development (Wang et al., 2020; UNESCO, 2023; Eze, 2022). However, consistent with field observations, challenges such as unequal access, limited technical support, and lack of digital literacy among educators can hinder the effective deployment of these innovations (Olatunji & Awoyemi, 2022; Nyerere, 2020). These insights suggest that while AI and digital tools are transformative, their effectiveness depends on systemic support, policy alignment, and capacity-building initiatives that promote equitable access and sustainability-focused education.

In conclusion, the study's findings reveal that AI and digital technologies provide a fertile ground for fostering innovation and sustainability in education. By adopting pragmatic strategies that emphasize experiential learning and reconstructionist approaches that address societal challenges, educators can enhance both cognitive and practical capacities of learners. The integration of technology in education is not merely a matter of digitization but also a pathway for developing innovative, socially responsible, and environmentally conscious citizens capable of contributing meaningfully to sustainable development goals locally and globally.

Social Media and Digital Learning Engagement for Innovation and Sustainable Education

The integration of social media into educational processes has become a significant driver for innovation and sustainable learning. Field interviews with students and educators revealed that platforms such as Facebook, Instagram, Snapchat, X (formerly Twitter), WhatsApp, Telegram, and YouTube, alongside learning management systems, enhance interaction, knowledge sharing, and collaborative problem-solving among learners. Observations during classroom sessions and digital forums indicated that learners actively participate in discussions, share multimedia resources, and co-create content for projects, demonstrating engagement that aligns with sustainable education objectives. However, challenges such as distraction, misinformation, cyberbullying, and unequal access to devices and stable internet were also noted, highlighting the need for structured guidance in digital engagement (Adebayo, 2022; Eze & Nwachukwu, 2023; Onyeji, 2021).

From a Pragmatic perspective, social media serves as an experiential learning tool that enables learners to interact with authentic problems, reflect on solutions, and apply knowledge in real-life contexts (Dewey, 2018; Saavedra & Opfer, 2012). For example, students reported enhanced understanding of environmental and societal issues through peer discussions, online debates, and shared multimedia content. These engagements provide opportunities for immediate feedback, experimentation, and iterative learning, reflecting Dewey's principle that knowledge is constructed through active participation and reflection (Okebukola, 2021; Siemens, 2020). Empirical studies in Nigeria confirm that students using digital platforms for collaborative learning exhibit higher problem-solving skills and critical thinking compared to traditional lecture methods (Olatunji & Awoyemi, 2022; Adefisayo & Ogunleye, 2022).

Similarly, Social Reconstructionism emphasizes education as a tool to address societal problems and empower learners to effect social change (Counts, 2019; Alhassan, 2020). Social media facilitates this by connecting learners to global perspectives, community initiatives, and real-world challenges. Interviews revealed that students engaged in digital campaigns promoting climate action, peace, and social awareness, demonstrating socially responsible behavior influenced by online interactions. Observations corroborated that learners used social media to design awareness campaigns, advocate for community projects, and collaborate on solutions addressing local environmental and security challenges. These findings align with empirical research showing that social media participation enhances civic responsibility, ethical consciousness, and innovation among Nigerian university students (Adebayo & Okorie, 2023; Adewale, 2023; Eze, 2022).

Comparative international studies further reinforce these insights. Research in Ghana, South Africa, and Kenya demonstrates that structured integration of social media in learning enhances collaboration, global awareness, and sustainability literacy (Mugisha, 2021; UNESCO, 2023; OECD, 2022). For instance, African learners participating in online environmental campaigns demonstrated higher engagement and practical application of climate action principles. Similarly, studies in the United States and Europe highlight that guided social media use in education improves critical thinking, peer collaboration, and ethical digital behavior (Veletsianos & Moe, 2017; Greenhow & Lewin, 2016). In conclusion, the findings suggest that Nigerian universities can harness social media effectively for innovation and sustainable education if policies, training, and infrastructure are strengthened. Guided and purposeful engagement allows learners to combine digital skills with civic responsibility, critical thinking, and environmental consciousness, reflecting the dual philosophical lens of Pragmatism and Social Reconstructionism.

Climate Action and Environmental Sustainability Education

Environmental sustainability has become an essential component of education, particularly in regions like Nigeria where climate change, deforestation, flooding, and waste management challenges threaten both livelihoods and ecosystems. Field interviews and observations reveal that students and lecturers are aware of the importance of climate-conscious education. Respondents highlighted activities such as tree planting, recycling initiatives, and community awareness campaigns; however, these efforts were largely informal, episodic, and rarely integrated into formal curricula. Observations further showed that while students demonstrated enthusiasm and creativity in environmental projects, the absence of structured academic credit and institutional support limited the long-term impact of these initiatives. From a Pragmatic perspective, education is most effective when it is experiential, reflective, and problem-centered (Dewey, 2018; Saavedra & Opfer, 2012). This principle is evident in students' engagement with environmental projects, where hands-on participation enabled them to understand the practical dimensions of sustainability. For example, learners involved in local flooding mitigation or community clean-up campaigns reported developing both

environmental awareness and problem-solving skills. These findings resonate with the work of Ogbu and Udoh (2022), who found that experiential learning in Nigerian tertiary institutions fosters ecological literacy and critical engagement with environmental issues.

In addition, Social Reconstructionism emphasizes education as a tool for addressing societal challenges and fostering transformative change (Counts, 2019; Alhassan, 2020). Applying this lens, environmental education should cultivate ethical responsibility, critical thinking, and active citizenship. Field data indicate that students involved in collaborative environmental projects developed innovative approaches to addressing local challenges, such as waste segregation programs and advocacy for sustainable practices in nearby communities. This aligns with Mugisha (2021), who observed that interdisciplinary and socially engaged approaches to sustainability education in Kenya and South Africa enhanced students' capacity for community-oriented problem solving. Similarly, UNESCO (2023) advocates for integrating climate action into formal education to foster ethical awareness and a sense of global responsibility among learners.

Comparative literature further supports the necessity of structured sustainability education. Studies in Nigeria and other African contexts indicate that embedding environmental literacy across curricula promotes critical reflection and equips learners to respond proactively to ecological threats (Eze, 2022; Olatunji & Awoyemi, 2022; Adewale, 2023). While students in the present study exhibited readiness and motivation, systemic limitations—including insufficient faculty training, weak policy frameworks, and lack of interdisciplinary programs—continue to constrain the impact of sustainability initiatives. These challenges echo findings by Egbule and Chukwuma (2021), who emphasized that sustainability education in Nigerian universities is often fragmented and dependent on ad hoc student engagement rather than systematic curricular design.

Despite these limitations, field observations indicate that students' informal initiatives demonstrate both potential and alignment with the goals of pragmatism and social reconstructionism. By designing experiential learning programs rooted in local environmental challenges, educators can foster deeper understanding, practical skills, and sustainable behaviors. Moreover, reconstructionist strategies advocate for integrating climate action into formal curricula and institutional policies, ensuring that environmental sustainability becomes a transformative and consistent feature of higher education. Ultimately, embedding climate consciousness in education not only addresses ecological imperatives but also develops responsible, innovative, and socially aware citizens capable of contributing to sustainable development both locally and globally (Nyerere, 2020; UNESCO, 2023).

Security Education and Peace Education for Social Stability

Education plays a crucial role in fostering social stability, particularly in contexts where insecurity, communal conflicts, and youth restiveness are prevalent. Field data collected

through interviews and classroom observations reveal that security and peace education are recognized as essential by both students and lecturers. Respondents emphasized that schools should actively contribute to building a culture of peace, tolerance, and civic responsibility. However, the data also indicate that, in practice, such education remains largely implicit, often limited to moral guidance, classroom rules, and civic instruction, with few structured programs explicitly addressing conflict resolution or security awareness.

From the perspective of Pragmatism, as articulated by Dewey (2018), learning is most effective when it is grounded in experience and problem-solving. In line with this view, security and peace education should extend beyond theoretical discussions to include practical engagement. For instance, observations revealed that students who participated in peer mediation activities, debate forums, and community service projects exhibited higher levels of empathy, cooperation, and conflict-resolution skills compared to those without such exposure. This finding underscores the pragmatic principle that knowledge is best internalized when learners actively engage with real-life problems, reflecting the educational potential of experiential learning in cultivating responsible and reflective citizens.

Moreover, the Social Reconstructionism framework, advocated by Counts (2019), emphasizes that education should actively address societal challenges and empower learners to transform their communities. Applying this lens, schools have the potential to integrate security and peace education into curricula to encourage students to critically examine social issues, understand the consequences of violence, and develop strategies for promoting communal harmony. Field data indicate that students who engaged in structured discussions on societal problems demonstrated enhanced civic consciousness and a stronger commitment to ethical behavior. Such findings align with the reconstructionist view that education should not merely transmit knowledge but also foster active participation in societal reform and peacebuilding.

Supporting the field data, empirical studies affirm that integrating peace and civic education enhances social cohesion and promotes ethical engagement among learners. For example, Adebayo and Udo (2021) observed that schools incorporating structured peace education programs report improved student collaboration, tolerance, and conflict management skills. Similarly, Okoye (2022) emphasized that experiential approaches in peace education cultivate critical thinking and nonviolent communication, reinforcing the potential of combining theory with practice. In this study, students exposed to informal peace initiatives, such as volunteer projects or peer-led discussions, demonstrated notable improvements in ethical reasoning and cooperative behavior, confirming the relevance of pragmatic and reconstructionist approaches in real educational contexts.

Despite these promising insights, challenges persist. The study's findings highlight gaps, including the absence of dedicated peace curricula, limited teacher training in conflict

resolution, and insufficient policy support for systematic integration of security education. Nevertheless, the observed successes of informal interventions suggest that scaling structured programs could significantly enhance students' ability to contribute to social stability. Therefore, when guided by the principles of Pragmatism and Social Reconstructionism, security and peace education emerge not only as a moral imperative but also as a practical strategy for cultivating socially responsible, innovative, and transformative learners capable of sustaining national development and communal harmony.

Summary of Findings

The study reveals a nuanced interaction between philosophical ideals, technological adoption, and practical realities in the implementation of innovative and sustainable education in Cross River State universities. First, artificial intelligence, digital technology, and innovation are recognized as essential for modern education. Field data indicate that students are enthusiastic about AI-supported learning, interactive digital tools, and personalized learning platforms. However, infrastructural limitations, inadequate faculty training, and weak policy frameworks impede full integration. These findings resonate with Dewey's pragmatic philosophy, highlighting that meaningful learning occurs when learners actively engage with tools and experiences, rather than passively receiving knowledge (Dewey, 2018; Siemens, 2020).

Second, the use of social media and digital learning platforms, including Facebook, Instagram, Snapchat, X, WhatsApp, and Telegram, enhances collaboration, knowledge sharing, and learner engagement. Observations show that students employ these tools to co-create content, discuss environmental issues, and participate in civic initiatives. While these engagements promote innovation and sustainable education, risks of misinformation, distraction, and digital misuse remain prominent. These findings align with Social Reconstructionism, which emphasizes education as a means to address societal challenges and cultivate socially responsible learners (Counts, 2019; Alhassan, 2020).

Third, climate action and environmental sustainability education emerged as a critical concern. Field data revealed that while students demonstrate awareness and motivation to participate in environmental initiatives, such as tree planting, waste management, and awareness campaigns, institutional support and structured curricular integration are limited. Nyerere's humanistic philosophy and Rousseau's naturalism, though referenced indirectly, emphasize moral and communal responsibility toward the environment, which aligns with the observed enthusiasm of learners (Nyerere, 2020; Rousseau, 2019).

Fourth, security education and peace education were identified as indispensable for social stability. Interviews and observations show that students understand the importance of civic responsibility, conflict resolution, and ethical behavior. However, most peace education activities are informal and sporadic, lacking systematic integration into curricula. Dewey's experiential learning principles and Social Reconstructionist

ideas reinforce the need for structured, participatory programs to cultivate civic virtue and ethical responsibility (Dewey, 2018; Counts, 2019).

Overall, the study demonstrates that while learners and educators recognize the importance of innovation, sustainability, and social responsibility, institutional constraints—including limited infrastructure, insufficient training, and fragmented policies—hinder the full realization of these educational goals. The findings confirm that integrating AI, digital technologies, social media, climate action, and peace education, guided by Pragmatism and Social Reconstructionism, can foster holistic, innovative, and sustainable learning experiences.

Conclusion and Recommendation

This study concludes that Nigerian universities in Cross River State recognize the importance of artificial intelligence, digital technology, social media, climate action, and peace education for innovation and sustainable development. However, institutional limitations—including inadequate infrastructure, insufficient faculty training, and weak policy support—constrain the effective implementation of these initiatives. Field data and observations reveal that students are motivated and digitally engaged, yet practical integration into curricula remains fragmented. Philosophically, the findings underscore that Pragmatism and Social Reconstructionism provide a strong framework for transforming education, emphasizing experiential learning, critical reflection, and social responsibility. To achieve sustainable and innovative education, Nigerian universities must systematically integrate technology, digital engagement, environmental stewardship, and civic ethics into teaching and learning processes.

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