



Artificial Intelligence in Digital Literacy: Ethical Concerns of Cultural Sensitivity in Katsina State, Nigeria

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ABSTRACT

This study explores the intersection of Artificial Intelligence (AI) and digital literacy initiatives within the culturally diverse context of Katsina State, Nigeria. As digital literacy programs increasingly rely on AI-driven tools to enhance learning outcomes, concerns arise about the ethical implications of using these technologies in regions with rich cultural heritages. This paper investigates how AI-driven digital literacy programs can impact local knowledge preservation and cultural norms, presenting an ethical framework that ensures cultural sensitivity. Through qualitative and quantitative analyses, this paper offers insights into the challenges of aligning digital literacy with cultural preservation, while proposing practical recommendations for ethical AI deployment. In order to develop an AI education program to cultivate digital and AI literacy capabilities of the people in the state, we first looked at the concept of digital and AI literacy and the current status of digital and AI literacy education at home and abroad. Due to the need for such education, many scholars around the world are making various attempts to overcome related limitations, recognizes the importance of ICT diffusion in reducing the digital gap and developing a knowledge society, but points out that no one specifically mentions ICT. As a countermeasure to this, the method of adopting ICT in higher education institutions and applying it to the curriculum was explained and analyzed, and then pointed out that in the digital world accelerated by COVID 19, the importance of education using online platforms is increasing, but its effectiveness is reduced due to an environment in which it is difficult for students to immerse themselves [1], Artificial Intelligence (AI) has witnessed remarkable advancements in recent years and has significantly impacted various domains, including cultural heritage. Indeed, AI technologies offer unprecedented capacities to analyze huge amounts of historical data, enabling researchers and art historians to uncover precious patterns, connections, and insights that might otherwise remain elusive. Also, the efficiency and accuracy of AI techniques play a pivotal role in many cultural heritage related tasks, such as cataloging and organizing extensive cultural collections, and streamlining the management of heritage resources for present and future generations [2].

Keywords: Artificial Intelligence, Digital Literacy, Ethical Concerns, Cultural Sensitivity, Local Knowledge Preservation, AI Ethics, Community-based Learning.

1. INTRODUCTION

The global shift towards digital literacy has led to the rapid integration of AI-driven tools in educational programs. While AI can potentially transform educational landscapes, its deployment in culturally diverse regions such as



Katsina State, Nigeria, raises significant ethical concerns. Katsina State, an area with deep cultural traditions and indigenous knowledge systems, faces the risk of cultural erosion and marginalization due to the introduction of AI technologies that may not be sensitive to local contexts, ICT literacy cannot be defined primarily as the mastery of technical skills [3]. The panel concludes that the concept of ICT literacy should be broadened to include both critical cognitive skills as well as the application of technical skills and knowledge. These cognitive skills include general literacy, such as reading and numeracy, as well as critical thinking and problem solving. Without such skills, the panel believes that true ICT literacy cannot be attained [4]. Traditional education systems have the prime objective of providing literacy skills to the students. The literacy skills denoted their proficiency in reading and writing and considered it as the fundamental skills for academic achievement. However, the digital era has catalyzed a redefinition of literacy, expanding its scope through the concept of digital literacy[5]. This evolution of digital literacy reflects the dynamic nature of technology and its pervasive impact on all aspects of life, it underscores the need for continuous learning and adaptation to stay relevant and competent in an ever-changing digital world. The future trajectory of digital literacy is likely to be influenced by ongoing technological innovations and societal shifts. It will possibly encompass emerging realms like virtual reality, augmented reality, and further advancements in AI and machine learning. As technology continues to evolve, as digital technologies permeated various sectors, digital literacy's definition has broadened to include not just the ability to use digital tools, but also the critical understanding of their impact, ethical use, and the ability to adapt to new technologies. This shift reflects the transition from a tool-centric to a holistic, cognitive, and critical approach to digital technologies, as we delve deeper into the evolution of digital literacy, it becomes evident that there have been significant shifts in the paradigm of how we view and understand it[6]. As the current education systems strives to keep pace with modern technological advancements, a nuanced understanding of the relationships among digital literacy, AI tool usage, and social engagement becomes imperative. This paper seeks to address the ethical challenges associated with the use of AI in digital literacy programs, particularly about cultural sensitivity and the preservation of local knowledge.

Background of AI technology

Artificial Intelligence is the intelligence demonstrated by machines imitating human cognitive functions. AI has transformed the global landscape since antiquity. It began taking shape in the 21st century, with devices like robot vacuum cleaners, smartphone assistants, self-driving cars, and recommendation systems. With big data, AI has revolutionized every industry. Integration of AI is now a matter of extent and utilization [7].

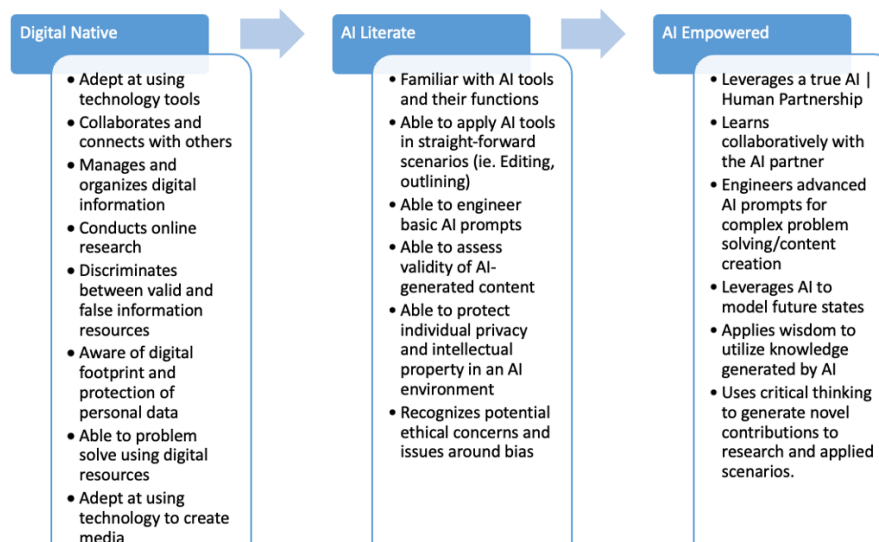
Background on Digital Literacy and AI in Katsina State

Katsina State, located in northern Nigeria, is a region with a blend of traditional and modern educational systems. With efforts to reduce the digital divide and enhance technological inclusion, various digital literacy programs have been introduced. For example, the National Information Technology Development Agency (NITDA) has implemented initiatives to build digital capacities among youth and women in rural communities. Community-based digital literacy initiatives are tailored to equip vulnerable populations with essential digital skills to navigate the internet and improve employment prospects. However, the use of AI in these programs is relatively new, and there are concerns about how AI might influence learning outcomes, cultural identity, and local knowledge. While AI has the potential to improve access to education and provide personalized learning experiences, its application without adequate cultural sensitivity could inadvertently harm cultural integrity [8]. The possibility for an

individual to use elearning facilities with ease depends on the individual's digital skills. Level of digital skills ranges from basic, intermediate, advance and highly specialized skills. However, to participate in eLearning, basic digital skills are required. Examples of such basic digital literacy skills are; the ability to connect an electronic device to the internet, the ability to download digital documents online, the ability to install software, also to navigate through e-learning platforms, and so on. Digital literacy has to do with our interactions with digital technology, hence, a digitally illiterate person, has the skills of using ICT, evaluate ICT, and adhere to the social rules of ICT [9].

Ethical Concerns in AI-Driven Digital Literacy

AI technologies often operate on globalized datasets and frameworks that may not account for local values, beliefs, or knowledge systems. In regions like Katsina State, where oral traditions and indigenous knowledge are key components of cultural identity, AI-driven digital literacy programs may fail to accommodate or preserve these aspects. Ethical concerns include [10]:



Accountability and Governance: Governance structures around AI are underdeveloped in many African countries, including Nigeria. This raises concerns about who is accountable when AI systems malfunction or cause harm in digital literacy programs. African countries are facing challenges of regulating artificial intelligence technology with significant steps being made towards data protection and privacy legislation. According to Onuoha's African AI policy survey for the 2019 Global Information Society Watch, only 17 of the 55 African Union (AU) Member States have enacted comprehensive data protection and privacy laws. These include Angola, Benin, Burkina Faso, Cape Verd, Cote Devore, Gabon, Lesotho, Mali, Mauritius, Morocco, Senegal, Seychelles, South Africa, Tunisia, and Ghana. These countries are not only recognizing the importance of safeguarding citizens' privacy in the digital age but are also laying the foundation for responsible AI usage (Onuoha, 2019) [11].

Regulatory Gaps: The lack of a robust legal framework governing AI in Nigeria leaves room for exploitation and harm without proper recourse for affected communities. AI governance and legal frameworks when designed are to help strike a balance between the benefits of these inventions and manage the risks occasioned



by their operation. Significantly, these frameworks will import and draw in to consideration the various ethical and legal dilemmas associated with the use of AI [3].

Cultural Homogenization: AI tools, often developed in Western contexts, may promote standardized educational content, marginalizing local languages, traditions, and learning methods. Artificial Intelligence (AI) has the potential to revolutionize education, transforming it from a system focused on memorizing facts into one that helps students unlock their full potential and learn necessary skills through more personalized learning [12]. AI in education is applied to improve learning outcomes and supports teachers in developing better educational practices. From automatic assignment grading to tailored curriculums, there are many ways AI consultants can help educational institutions make use of the technology. AI-based platforms can collect and analyze student data on interaction with educational materials, exercise completion time, test results, and overall performance to understand each student's attitudes and needs. Drawing on this data, AI tools can design personalized training pathways and adapt them in real-time to the learner's progress [13]. AI can also predict student performance and identify students who may be at risk of falling behind. AI can automate mundane teacher tasks, such as grading assignments, freeing up time for teachers to focus on more important tasks. AI can also help teachers identify areas where students need extra help and provide them with the necessary resources. AI can also help students with special needs by providing them with personalized learning experiences. AI can also help educational institutions with resource planning, curriculum design, and ongoing assistance during learning [14].

Bias in AI Algorithms: If AI models are trained on datasets that do not reflect the diversity of the local population, they may reinforce stereotypes or exclude important cultural elements. The AI-generated patterns, predictions, and recommended actions reflect the accuracy and reliability of the datasets used for training, as well as the assumptions and biases of the developers of the algorithms employed [15]. Therefore, algorithms and devices have the potential of spreading and reinforcing harmful stereotypes. In the past few years, many researches unambiguously showed that gender biases, as well as racial biases, are found in Artificial Intelligence (AI), in light of the explosive growth of digital voice assistants like Amazon's Alexa or Apple's Siri—often designed as feminine characters with subservient attitudes—recommendations concerning AI's gender biases appear extremely urgent [16]. Today, the answer of Apple's AI assistant has been updated with a more neutral "I don't know how to respond to that", but despite the many efforts made so far, the rising problem of human-like biases in technological products still remains unsolved on both a practical and theoretical level. As the UNESCO report explains, these biases are rooted in gender imbalances in digital skills education, and thus in the gender imbalances of technical teams developing AI technologies for companies with significant gender disparities [17].

Loss of Local Knowledge: The emphasis on digital literacy might inadvertently prioritize global or urban knowledge over indigenous knowledge systems, leading to cultural erosion.

The emphasis on technical digital ability tends to overshadow the purpose of engaging more deeply with the complexities of digital cultures [18]. Traditional leaders, knowledge keepers, and community members should be involved in the development and implementation of digital literacy programs to ensure that local knowledge is preserved and valued, also developing digital content in local languages and creating platforms that allow for the preservation and sharing of indigenous knowledge are crucial steps, digital literacy programs should be adapted to local needs, whether in agriculture, education, or health, ensuring that they reflect the realities of Katsina communities [19].



2. LITERATURE REVIEW

2.1 AI and Digital Literacy: Global Perspectives

Research on AI's role in education suggests that AI technologies can significantly enhance digital literacy by providing personalized learning experiences and automating administrative tasks. Studies indicate that AI can help bridge literacy gaps by adapting content to the learner's pace, needs, and preferences. However, the literature also highlights the challenges of cultural insensitivity in the design and deployment of AI systems, particularly in non-Western contexts.

2.2 Cultural Sensitivity in AI Systems

There is growing recognition of the need for AI systems to be culturally sensitive. AI ethics frameworks, such as the Asilomar AI Principles and the EU's Ethics Guidelines for Trustworthy AI, emphasize fairness, inclusivity, and transparency. However, these frameworks often fall short of addressing cultural specificity, especially in regions like Sub-Saharan Africa where local knowledge and traditions play a crucial role in community identity.

2.3 Ethical AI and Local Knowledge Preservation

Several scholars argue for the importance of preserving indigenous knowledge in the face of digital globalization. Ethical AI must consider how to incorporate and safeguard local knowledge systems, which are often passed down orally or through community-based learning structures. Research from African contexts has shown that digital literacy programs that are culturally insensitive can contribute to the erosion of local traditions and practices.

3. RESEARCH METHODOLOGY

3.1 Research Design

This study employs a mixed-methods approach, combining qualitative interviews with local stakeholders and quantitative surveys to gather data on the impact of AI in digital literacy programs in Katsina State. The research is divided into two phases:

- 1. Qualitative Phase:** Semi-structured interviews with local educators, community leaders, and digital literacy program facilitators to understand their views on the ethical implications of AI in education.
- 2. Quantitative Phase:** Surveys targeting students and participants in digital literacy programs, assessing their experiences with AI tools and their perceptions of cultural sensitivity.

3.2 Sampling

The sample includes participants from various educational institutions, including schools, community learning centers, and adult literacy programs in both urban and rural areas of Katsina State. A stratified sampling method ensures representation from different cultural and linguistic groups within the region.

3.3 Data Analysis

Qualitative data from interviews are analyzed using thematic analysis, focusing on recurring themes related to cultural preservation, ethical concerns, and AI's role in education. Quantitative data from surveys are analyzed using descriptive and inferential statistics to identify trends and correlations between AI use and perceptions of cultural sensitivity.



4. FINDINGS AND DISCUSSION

4.1 AI's Impact on Cultural Norms and Local Knowledge

Preliminary findings suggest that while AI tools have improved access to digital literacy resources in Katsina State, there is a growing concern about the homogenization of content. Many AI-driven educational platforms prioritize global or urban knowledge, often neglecting local traditions, languages, and teaching methods. For example, respondents noted that local proverbs, oral history, and religious teachings are not well integrated into AI-driven learning modules, leading to a disconnect between digital literacy and cultural relevance.

4.2 Ethical Challenges in Algorithmic Design

AI algorithms used in educational platforms often reflect biases inherent in the datasets they are trained on. In Katsina State, this has manifested in AI tools that fail to accommodate the linguistic diversity of the region. Hausa, the dominant language, is often prioritized over other local dialects, while indigenous cultural content is marginalized. This raises concerns about the inclusivity of AI in education and its ability to serve all members of the community.

4.3 Preserving Local Knowledge in Digital Literacy Programs

Participants emphasized the need for digital literacy programs to incorporate local knowledge systems, including oral traditions, Demonstration, and community-based learning practices. AI tools should be adapted to reflect the cultural and linguistic diversity of Katsina State, ensuring that digital literacy does not come at the cost of cultural erosion. There is a strong desire for educational content that promotes local languages, values, and customs, while also fostering digital literacy.

5. CONCLUSION AND RECOMMENDATIONS

This study highlights the ethical challenges of deploying AI in digital literacy programs in culturally diverse regions like Katsina State. While AI can enhance learning outcomes and bridge the digital divide, it also risks undermining local knowledge systems and cultural norms if not deployed with cultural sensitivity. To mitigate these risks, the following recommendations are proposed:

- 1. Culturally Sensitive AI Design:** AI tools used in digital literacy programs should be designed with input from local communities, ensuring that educational content reflects the cultural and linguistic diversity of the region.
- 2. Inclusive Datasets:** AI algorithms must be trained on datasets that are representative of the local population, incorporating local languages, traditions, and knowledge systems.
- 3. Ethical Frameworks for AI Deployment:** Policymakers and educators should develop ethical frameworks that prioritize cultural preservation alongside digital literacy, ensuring that AI tools contribute to, rather than detract from, cultural integrity.
- 4. Community-Based Approaches:** Digital literacy programs should be community-driven, incorporating local educators and cultural leaders to guide the integration of AI in ways that align with local values and knowledge systems.

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