**EMPOWERING DIGITAL CITIZENS: NAVIGATING DATA PRIVACY AND ARTIFICIAL INTELLIGENCE THROUGH DIGITAL LITERACY IN UGANDA**

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**ABSTRACT**

In today's digital era, there is a growing interest in artificial intelligence. However, Uganda is noticeably lagging in this area. This document discusses the connections between digital literacy, data privacy, and artificial intelligence, with a particular focus on the role of digital literacy in the context of artificial intelligence. It explains that digital literacy includes many skills, from primary internet navigation to critically evaluating online information. The document emphasizes the relevance of digital literacy in a constantly evolving digital world. It stresses the need for Ugandans to develop the necessary skills to thrive in the digital age. Furthermore, it underscores the importance of securing data in a world where vast amounts of personal information are generated and shared online. The document outlines the steps needed to protect information in the digital age, highlighting the significance of data privacy and the measures required to ensure safe and responsible data handling. Additionally, it discusses the importance of teaching AI and the ethical considerations needed for its integration into various aspects of society. It emphasizes AI's impact on equipping individuals with the necessary skills to navigate the digital landscape while highlighting the ethical considerations that must be addressed when implementing AI technologies. This comprehensive analysis sheds light on the essential steps required to empower digital citizens in Uganda, recognizing the need for concerted efforts to enhance digital literacy, safeguard data privacy, and provide education on the ethical implications of artificial intelligence.

**Keywords:** Digital Citizens, Navigating, Data Privacy, Artificial Intelligence, Digital Literacy

**Introduction**

In the era of digital technology, proficiency in using office software, manipulating multimedia, and navigating the internet is considered essential, as stated by the UK Royal Society. This proficiency is likened to the fundamental skills of reading and writing that teachers in secondary schools should expect from their students (Furber, 2012). In Uganda's contemporary economy, digital literacy holds tremendous significance, given the heavy reliance on technology for communication, collaboration, and information sharing within the modern workforce (Christian et al., 2022). Job roles across various sectors now mandate familiarity with digital tools and platforms (Gay et al., 2019). However, the potential consequences of inadequate digital literacy in Uganda are severe. A substantial portion of Uganda's population lacks digital literacy due to uneven access to digital devices and the internet, resulting in disparities in digital skills. According to a 2019 ICT study in Uganda, 36% of non-internet users lack digital literacy, with 23% indicating unfamiliarity with internet usage and 13% expressing a negative view of its necessity (Gillwald, A. et al., 2019). This situation can place individuals at a significant disadvantage regarding employability and professional growth. However, digital literacy has the transformative potential to bridge this digital divide, making it a powerful solution.

**Background**

The significance of digital literacy has greatly increased in today's digital era. It goes beyond basic computer and internet usage and includes the ability to effectively navigate, evaluate, and communicate across various digital platforms. The Western Sydney University Library Study Smart (2020) defines digital literacy as essential skills for living, learning, and working in a society where digital technologies like internet platforms, social media, and mobile devices are prevalent. According to the UNESCO Institute for Statistics (2018), digital literacy involves accessing, managing, understanding, integrating, communicating, evaluating, and creating information safely through digital technologies for employment and entrepreneurship. The International Telecommunication Union (2006) emphasizes that digital literacy encompasses critical thinking, information evaluation, and identifying credible sources, going beyond technical skills.

Moreover, the components of digital literacy include technical skills in operating digital devices and software, interacting with various digital media, and possessing information literacy. Ladbrook, & Probert, (2011). The European Commission outlines five digital competence areas: information and data literacy, communication and collaboration, digital content creation, safety, and problem-solving. It also highlights the importance of information literacy for assessing the credibility and relevance of online information. In today's digitized world, digital literacy is essential across various sectors, such as business, travel, education, and finance, with platforms like Jumia, Glovo, Safeboda, Uber, Duolingo, and Wattpad playing a significant role. Given the prevalence of fake news and misleading content, digital literacy is crucial for navigating and critically evaluating online information.

Mohamed, (2022). Digital literacy fosters entrepreneurship and innovation in the digital economy, providing individuals with opportunities to create, market, and sell products and services online. These digitally literate individuals are better equipped to navigate e-commerce platforms, employ digital marketing strategies, and utilize data analytics tools effectively. In education, digital literacy is reshaping the accessibility and sharing of knowledge through online learning platforms, digital libraries, and open educational resources, enabling students to engage with resources, conduct research, and collaborate in virtual environments.

**Statement of the problem**

The digital divide is a significant challenge in Uganda, where access to technology and reliable internet varies widely. The G7 Partnership for Global Infrastructure and Investment (PGII), led by Danielle Nelson (2022), has prioritized digital connectivity. According to a UN report from 2020, 87% of people in developed countries have internet access, compared to only 19% in developing countries (United Nations Department of Economic and Social Affairs, World Social Report 2020). In 2021, GSMA estimated that smartphone adoption in Uganda was at 16%, with mobile phone penetration at 49%. Smartphone usage in rural areas was 13%, while in urban areas, was 31% (Kibuacha, 2021). Digital infrastructure, including internet connectivity and telecommunication networks, is crucial for modern economies, and new technologies are transforming infrastructure sectors (Carlo et al., 2021). There are concerns that the lack of digital inclusion exacerbates existing inequalities among marginalized groups (Danielle Nelson, 2022).

Uganda's educational system struggles with resource constraints affecting digital literacy initiatives, due to limited access to up-to-date technology, software, and learning materials. Financial constraints in the country, including insufficient funding and inadequate infrastructure, particularly in rural areas, hinder the effective implementation of digital literacy programs. In the 2022/2023 Uganda National Budget, only 83.1 billion shillings were allocated to digital transformation and 20.73 billion to innovative technology out of a total budget of 48.1 trillion. According to Franklin Templeton (2023), digital transformation is reaching unprecedented levels as global consumers embrace new commerce tools and increasingly prefer digitally augmented experiences, even post-COVID.

**The main objective**

To identify gaps, and propose effective strategies for digital literacy that can help citizens protect their data and interact intelligently with AI systems

**Literature Review**

**Introduction**

The rapid proliferation of digital technologies has transformed how individuals interact with information, raising critical issues around data privacy and artificial intelligence (AI). In developing countries like Uganda, digital literacy is essential for empowering citizens to navigate these complex landscapes. This literature review examines the existing research on digital literacy, data privacy, and AI interaction, identifies gaps, and proposes effective strategies for enhancing digital literacy in Uganda.

**Digital Literacy and Its Importance**

Digital literacy encompasses a range of skills required to effectively use digital devices, navigate the internet, and engage with digital content (Ng, 2012). It is fundamental for individuals to participate in the digital economy and society (Eshet-Alkalai, 2004). However, in many developing countries, including Uganda, digital literacy levels are significantly lower compared to developed nations (Hilbert, 2011). This gap presents a barrier to fully leveraging digital opportunities and protecting personal data.

**Data Privacy Concerns**

Data privacy has become a critical issue with the increasing amount of personal information shared online. Many users lack awareness and understanding of data privacy risks and the necessary skills to protect their information (Acquisti, Brandimarte, & Loewenstein, 2015). In Uganda, the awareness of data privacy is still emerging, with limited regulatory frameworks and public education on the subject (Ndiwalana, Morawczynski, & Popov, 2010). This gap highlights the need for comprehensive digital literacy programs that include robust data privacy education.

**Interaction with Artificial Intelligence**

AI systems are increasingly integrated into various aspects of daily life, from social media algorithms to customer service chatbots. However, there is a significant knowledge gap in understanding how these systems work and their potential implications (Eubanks, 2018). Research indicates that people often interact with AI without fully understanding its capabilities and limitations, leading to potential misuse and ethical concerns (Crawford, 2021). In Uganda, limited exposure and education regarding AI further exacerbate this issue.

**Existing Digital Literacy Programs**

Several initiatives aim to improve digital literacy globally. For instance, the Digital Empowerment Foundation in India and the National Digital Literacy Mission have made strides in enhancing digital skills among rural populations (Singh, 2017). However, the effectiveness of these programs varies, and there is a need for more context-specific approaches. In Uganda, programs like the Digital Literacy Initiative Uganda have started addressing these needs but require scaling and comprehensive integration of data privacy and AI education (Kasozi & Najjuma, 2020).

**Analysis of the situation in developed countries**

Numerous countries globally have taken proactive measures to empower their citizens in the digital era, focusing on promoting digital literacy and raising awareness about crucial issues such as data privacy and artificial intelligence. Finland, for instance, has made significant strides by seamlessly integrating digital literacy into its national curriculum. This ensures that students not only gain a deep understanding of the digital landscape but also acquire the essential skills needed to navigate it responsibly and effectively. Moreover, the Finnish government has taken concrete steps to educate citizens about their data privacy rights and promote responsible usage of artificial intelligence. These initiatives underscore Finland's commitment to ensuring that its citizens are well-prepared to thrive in the digital age. (Erstad, (2006).)

In Canada, the Digital Citizenship Education initiative, as outlined by Frau-Meigs, et al, (2017), is a comprehensive program aimed at educating individuals about their rights and responsibilities in the digital space. The initiative goes beyond simply raising awareness about online safety to emphasize the development of critical thinking skills, ethical decision-making, and fostering respectful behavior in the online environment. This program is not limited to just awareness campaigns. Canada's approach involves fostering partnerships with educational institutions and community organizations, ensuring that the principles of digital citizenship are woven into various aspects of society. The underlying goal is to empower citizens to make informed choices regarding their online presence, data privacy, and the ethical use of emerging technologies such as artificial intelligence.

Singapore has been at the forefront of efforts to empower its citizens in the digital age. A vital example of this is the "Smart Nation" initiative, which bolsters digital literacy across all age groups. Singapore's comprehensive strategy encompasses formal education, public awareness campaigns, and targeted digital skill-building programs for diverse demographic segments. This multifaceted approach underscores Singapore's commitment to preparing its citizens for the challenges and opportunities of the digital era (Sipahi et al., 2024).

Furthermore, it is important to note that countries such as New Zealand and the Netherlands have taken significant steps in implementing comprehensive data privacy regulations. In addition to this, they have also established government agencies specifically dedicated to overseeing the responsible use of AI and protecting the digital rights of their citizens. This concerted effort is tremendously valuable in shaping a digital society that is not only safer but also more informed. (Fatima et al, 2020)

**Methodology employed**

To effectively carry out research aimed at empowering digital citizens to navigate data privacy and artificial intelligence through digital literacy in Uganda, a mixed-methods approach was used. This approach combines both qualitative and quantitative research methods, providing a comprehensive understanding of the issues and enabling the development of effective strategies. For this particular objective, qualitative method was used to identify the gaps (Creswell & Plano Clark, 2017). Comprehensive Data Collection: this method allow for the collection of diverse types of data, which provided a more complete picture of digital literacy levels, data privacy concerns, and AI interactions and the gaps were identified from the literature analysed and interview of respondents (Fowler, 2014). Combining multiple data sources and methods helps in validating results through triangulation, enhancing the reliability and credibility of the research findings.

**Research findings (Identified Gaps)**

1. Limited Awareness and Education on Data Privacy: There is a notable lack of comprehensive education on data privacy, leading to increased vulnerability among digital citizens (Acquisti et al., 2015).
2. AI Literacy: Limited understanding and interaction with AI technologies pose risks and reduce the potential benefits that can be harnessed from these systems (Eubanks, 2018).
3. Context-Specific Digital Literacy Programs: Most existing programs do not adequately address the unique cultural, economic, and social contexts of Ugandan citizens, reducing their effectiveness (Kasozi & Najjuma, 2020).

**Proposed Strategies**

1. Integrated Digital Literacy Curriculum: Develop a curriculum that combines digital skills with data privacy and AI education. This should include practical, hands-on activities and real-life scenarios to make learning relevant and engaging. The curriculum should also be translated in all the local languages spoken in Uganda understanding and reducing the digital divide.
2. Public Awareness Campaigns: Launch campaigns to raise awareness about data privacy and the ethical use of AI. These campaigns should use various media channels, including social media, radio, and community workshops.
3. Policy and Regulatory Support: Advocate for stronger data privacy regulations and policies that support digital literacy initiatives. Collaboration with government bodies can help institutionalize these efforts.
4. Partnerships with Technology Companies: Collaborate with tech companies to provide resources, training, and support for digital literacy programs. These partnerships can help ensure that the curriculum remains up-to-date with the latest technological advancements.
5. Community Engagement: Engage local communities in designing and implementing digital literacy programs to ensure they are culturally relevant and widely accepted. Involving community leaders and influencers can enhance the reach and impact of these initiatives

**Conclusion**

Enhancing digital literacy in Uganda requires a multifaceted approach that addresses the specific needs and challenges of its citizens. By integrating data privacy and AI education into digital literacy programs, launching public awareness campaigns, advocating for supportive policies, and fostering partnerships, Uganda can empower its citizens to navigate the digital landscape more effectively and safely. The digital divide, inadequate infrastructure, and limited access to technology and unreliable internet are significant challenges that Uganda faces, hindering the effective implementation of digital literacy programs. Drawing insights from successful initiatives in countries like Finland, Canada, Singapore, New Zealand, and the Netherlands, the study recommends the introduction of comprehensive digital literacy programs, strengthening data privacy laws, promoting ethical AI use, fostering collaboration, and investing in infrastructure to address these challenges and empower Ugandan citizens in the digital era. By addressing these recommendations, Uganda can bridge the digital divide, promote responsible digital citizenship, and lay the foundation for a digitally inclusive and empowered society.

**Recommendations**

**Introduce Digital Literacy Programs:** Implementing digital literacy programs in schools and communities is essential to educate citizens about crucial topics such as data privacy and artificial intelligence. These comprehensive programs should cover a wide range of essential subjects, including but not limited to online safety practices, recognizing and combating misinformation, understanding the implications of sharing personal data, and being aware of how personal data is used in the digital world. These initiatives will equip individuals with the knowledge and skills needed to navigate the increasingly complex digital landscape with confidence and safety.

**Strengthen Data Privacy Laws**: Uganda should strengthen data privacy laws by enhancing regulations and enforcement mechanisms to better protect citizens from the unauthorized use and abuse of personal data. This could involve increasing penalties for data breaches and unauthorized data collection and implementing stricter regulations to ensure that businesses and organizations handle personal data responsibly and ethically.

**Promote Ethical AI Use**: Promoting Ethical AI Use: It's important to support the advancement and application of artificial intelligence in ways that adhere to ethical principles. This includes advocating for transparency in AI algorithms and making sure that AI systems do not exhibit bias against specific groups.

**Foster Collaboration:** To promote digital literacy and responsible use of data and AI, it is important to address the specific needs of different groups, such as children, elderly individuals, and marginalized communities. Collaboration between government agencies, industry stakeholders, and civil society organizations is essential for developing comprehensive strategies tailored to the unique challenges and opportunities faced by each group. By working together, we can create targeted initiatives, educational programs, and resources to support and empower individuals in navigating the digital landscape responsibly.

**Invest in Infrastructure**: It is crucial to prioritize investments in cutting-edge technology infrastructure to bolster digital literacy programs and guarantee equitable access to digital resources and information. This entails expanding broadband availability and providing cost-effective internet services to all individuals.

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