**Journal of Research and Education for Development in Africa (JOREDEA)**
**Volume 1, Issue 1, February, 2025**

# Ethical Considerations in Promoting Gender Equity: Empowering African Girls Through Digital Education in Southeast Nigeria

**Uzondu Chikodiri Scholastica [1] and Nwankwo Ekene Ezinwa [2]**

## Abstract

Gender equity remains a significant challenge in Africa, where socio-cultural, economic, and educational barriers impede the progress of girls. This paper explores the ethical considerations in promoting gender equity through digital education in Southeast Nigeria, focusing on empowering girls through the use of digital platforms. A sample of 600 girls in some selected secondary schools across five states in Southeast Nigeria: Abuia, Anambra, Ebonyi, Enugu, and Imo, were drawn. Three research questions that severed as the study's compass were examined using quantitative and qualitative data from ongoing digital education initiatives in the region, the study analyzes the access, engagement, and outcomes for girls participating in these programs. Ethical challenges such as the digital divide, privacy, cultural norms, and inclusivity are examined. Statistical analyses are presented to highlight the effectiveness and gaps in digital education for girls. The findings underscore the need for ethical frameworks to address existing challenges and promote equitable education for girls in Southeast Nigeria.

**Keywords:** Ethical, Gender Equity, Digital Education

## Introduction

Education is widely recognized as a key driver of socio-economic development, but access to education remains uneven, particularly for girls in Africa. Digital education has emerged as a solution to bridge this gap. Digital education refers to the use and sophistication of digital technologies for teaching and learning in formal and non-formal education within a community, and the infrastructure required to support such provision (Lynn *et al*, 2022). It is the creative use of digital resources and innovations while teaching and learning (Suleiman & Danmuchikwali, 2020). Digital education is also referred to as Technology Enhanced Learning (TEL) or e-learning. However, the digital divide, cultural norms, and infrastructural deficits raise significant ethical concerns when implementing digital education programs. Digital divide as conceived by Nafiz and Rowshon (2011) is a phenomenon that results from the unequal application of, and access to, information and communication technologies leading to a global knowledge gap between information haves and have nots. It is the gap between

those who can effectively use new information and communication tools, such as the Internet, and those who cannot. Barron *et al* (2021) explained that the digital divide is not between countries only; it also exists within a country, and even within cities.

There are disparities within countries based on race, income, geographical location, educational levels, age, disabilities and gender. Gender gaps in education access and achievement is a key factor impeding development in Nigeria (Yusuf, 2005). Gender gaps refer to disparities and inequalities between males and females in accessing, participating in, and benefiting from educational opportunities. Barriers for young girls include poverty, cultural norms, poor learning environments, and lack of infrastructure (Onyishi *et al*., 2012). Proactive policies and targeted interventions can reduce these disparities and empower girls through digital literacy and education (Mtega *et al*., 2012). The digital divide in African education is a well-documented challenge, disproportionately affecting girls. While technology can enhance educational access, it often replicates existing gender inequalities if ethical considerations are not integrated into its development and deployment.

Ethical considerations in digital education encompass a spectrum of issues that touch upon the core values of education like intellectual property, equity and privacy. Kumar (2024) explained that at the heart of these considerations lies the need to balance technological innovation with a commitment to foster an inclusive, secure and ethically sound educational environment. This is to say that technological innovations in education must ensure equal access to education for all, regardless of gender, socioeconomic status, ability or location. It must also protect students' personal data and ensure the integrity of online environment. Technological innovations ought to also align digital education with values like fairness, transparency and respect for diversity. This research seeks to explore the ethical dimensions of digital education and its role in promoting gender equity for girls in Africa in southeast Nigeria. Specifically, this study intends to:

## Objective of the study

1. To investigate the socio-economics factors influencing access to digital education
2. To analyze the level of engagement in digital education for African girls in study area.
3. To identify the outcome of digital education programs to empower African girls in the study area.

## Research Questions

1. What are the socio-economics factors influencing access to digital education in the study area?
2. What are the levels of engagement in the digital education for African girls in the study area?
3. What are the outcomes for digital education programs to empower African girls in the study area?

## Review of Related Literature

Research shows that digital education can offer flexible, accessible, and personalized learning experiences that can benefit marginalized groups, including girls. Research highlights the pronounced education gap for girls, particularly those from low income and rural backgrounds (Ouma *et al*., 2015). Barriers such as poverty, cultural norms, poor learning environments and lack of infrastructure disproportionately affect girls' enrollment and retention in school (Onyishi *et al*., 2012). The advent of technology and proliferation of ICT resources has further exacerbated the gender digital divide in many contexts (Yusuf, 2005).

Ethical considerations in education revolve around principles of fairness, equity, and access. When applied to digital education, these principles emphasize the need for inclusivity in design, deployment, and content. Digital education must ensure that gender, socio-economic status, and geographic location do not become barriers to

learning. Gender-sensitive ethical frameworks should be integrated into the design and implementation of digital education initiatives.

Cultural norms in many African communities prioritize boys' education over girls', reinforcing stereotypes that limit girls' access to technology. Research by the World Bank (2023) reveals that only 25% of girls in sub-Saharan Africa have access to the internet compared to 42% of boys. Moreover, in rural areas, girls face additional constraints such as household responsibilities and early marriage, which further restrict their ability to engage with digital learning platforms. The digital divide in Africa disproportionately affects girls, particularly in rural areas where access to internet connectivity and digital devices is limited. Ethical considerations must address how digital education can be made accessible to all girls, regardless of their socio-economic background. This includes providing affordable devices, internet access, and culturally relevant digital content.

Mtega *et al*. (2012) presented a counterpoint, demonstrating the potential for mobiles phones to enhance teaching and learning for female students in Tanzania. Phones expanded access to educational materials and information despite infrastructure limitations. Asongu and Odhiambo (2018) found that increased mobile and internet penetration in Africa disproportionately benefited women by facilitating financial inclusion and economic participation.

**Ethical Challenges in Promoting Gender Equity**

The study identified several ethical challenges in promoting gender equity through digital education:

- **Digital Divide**: The rural-urban divide presents a significant ethical concern, as girls in rural areas remain disadvantaged (Lumat, 2023). This disparity raises questions about the fairness and inclusivity of digital education programs.

- **Cultural Norms**: In many parts of Southeast Nigeria, traditional gender roles limit girls' participation in education. Cultural biases against female education, particularly in STEM fields, remain strong, particularly in rural areas.
- **Privacy and Security**: Digital education platforms often require personal information, raising concerns about privacy, especially in communities where digital literacy is low (Gonzales, 2020). Ensuring the protection of girls' data is a critical ethical issue.
- **Inclusivity**: Digital education programs must ensure that girls from marginalized and economically disadvantaged backgrounds are included. Programs must cater to the diverse needs of these girls, ensuring they have access to the necessary tools and support to succeed.

## Methodology

This study employed a cross-sectional survey design to examine ethical considerations in promoting gender equity through digital education among African girls in Southeast Nigeria. This design was chosen because it allows for the collection of data at a single point in time, providing a snapshot of the current state of digital education access, academic performance, and ethical challenges in the region. The study was conducted in the Southeast geopolitical zone of Nigeria, which consists of Abia, Anambra, Ebonyi, Enugu, and Imo States. The region is known for its strong educational values, yet challenges such as cultural norms, socio-economic barriers, and gender-related disparities affect the participation of girls in digital education. Additionally, internet penetration and digital infrastructure vary across states, influencing access to online learning resources. The target population comprised secondary school girls, teachers, program administrators, and community leaders in Southeast Nigeria. The study focused on girls in secondary schools because they are at a critical stage where digital education can significantly impact their academic and professional futures. Teachers, program administrators, and community leaders were

included to provide insights into the ethical concerns associated with digital education initiatives. A multi-stage sampling technique was employed to select the study participants. The sample consisted of 600 secondary school girls from selected schools across the five states in the region. The sampling procedure involved (i) purposive selection where the states were purposively selected based on their involvement in digital education initiatives (ii) stratified sampling where schools were categorized based on urban and rural locations to ensure inclusivity (iii) simple random sampling where within each stratum, students were randomly selected to participate in the survey and (iv) purposive sampling where for qualitative data, 30 teachers, program administrators, and community leaders were selected based on their roles and experience with digital education programs. The study utilized both quantitative and qualitative data collection instrument. A structured questionnaire was used to collect data from students on their access to digital education tools, academic performance before and after program implementation, and engagement levels. In-depth interviews were conducted with teachers, program administrators, and community leaders to explore ethical concerns, including cultural norms, privacy, inclusivity, and challenges in digital education implementation. To ensure the reliability of the questionnaire, a pilot study was conducted with 50 students outside the selected sample. The Cronbach's alpha method was used to determine internal consistency, and a reliability coefficient of 0.78 was obtained, indicating a high level of reliability. For validity, the questionnaire and interview guide were reviewed by experts in educational research, gender studies, and ethics to ensure that the questions effectively captured the intended variables. Face and content validity were established through expert validation.

Data analysis was conducted using both quantitative and qualitative methods. Responses from the questionnaire were coded and analyzed using descriptive statistics (mean, frequency, and percentages) and inferential statistics (t-tests and ANOVA) to compare academic performance before and after program implementation. Thematic

analysis was used to interpret interview responses. Recurring themes related to ethical concerns in digital education, cultural barriers, and gender inclusivity were identified and discussed. Ethical approval was obtained from the relevant educational authorities. Informed consent was sought from all participants, ensuring confidentiality and voluntary participation. Special attention was given to privacy concerns, particularly regarding students' digital footprints and the potential risks associated with online learning platform.

## DATA PRESENTATION AND INTERPRETATION

**Table 1: Urban-Rural Disparity in Access to Digital Education across Southeast Nigeria**

| State | Urban Access (%) | Rural Access (%) | Overall Access (%) |
|---|---|---|---|
| Abia | 78% | 34% | 56% |
| Anambra | 82% | 40% | 61% |
| Ebonyi | 69% | 28% | 48% |
| Enugu | 80% | 33% | 57% |
| Imo | 85% | 36% | 62% |
| **Average** | **79%** | **34%** | **57%** |

From table 1, one of the major barriers identified was unequal access to digital education resources. Girls from rural areas reported significantly lower access to digital tools compared to those in urban centers. As shown in Table 1, an average of 79% of urban girls have access to digital education, compared to only 34% in rural areas. The disparity is particularly evident in Ebonyi State, where only 28% of rural girls have access, compared to 69% in urban areas. This digital divide highlights socio-economic barriers such as limited infrastructure, poor internet connectivity, and financial constraints that affect digital education access in rural communities.

**Table 2: Urban-Rural Differences in Digital Education Engagement among African Girls in Southeast Nigeria**

| State | Urban Engagement (Hours/Week) | Rural Engagement (Hours/Week) | Overall Engagement (Hours/Week) |
|---|---|---|---|
| Abia | 15 | 5 | 10 |
| Anambra | 18 | 7 | 12.5 |
| Ebonyi | 12 | 4 | 8 |
| Enugu | 16 | 6 | 11 |
| Imo | 19 | 6 | 12.5 |
| **Average** | **16** | **5.6** | **10.8** |

Engagement levels in digital education vary across different geographical locations. As shown in Table 2, girls in urban areas spend an average of 16 hours per week engaging with digital education platforms, while their rural counterparts engage for only 5.6 hours per week. The highest engagement is recorded in Imo State (19 hours in urban areas), while the lowest engagement is found in Ebonyi rural areas (4 hours per week). This disparity is largely influenced by internet connectivity, access to digital devices, and infrastructural challenges.

Urban students, particularly those in schools with established STEM programs, demonstrated higher engagement levels, benefiting from well-equipped learning environments and better teacher support. In contrast, rural students face significant obstacles such as unreliable electricity and limited availability of digital resources

**Table 3: Academic Performance Outcomes of Digital Education Programs for African Girls in Southeast Nigeria**

| State | Maths Scores (Before) | Maths Scores (After) | Science Scores (Before) | Science Scores (After) |
|---|---|---|---|---|
| Abia | 45% | 70% | 48% | 72% |
| Anambra | 50% | 75% | 52% | 78% |

| State | Maths Scores (Before) | Maths Scores (After) | Science Scores (Before) | Science Scores (After) |
|---|---|---|---|---|
| Ebonyi | 40% | 65% | 42% | 66% |
| Enugu | 47% | 73% | 50% | 76% |
| Imo | 48% | 72% | 51% | 74% |
| **Average** | **46%** | **71%** | **49%** | **73%** |

The academic performance of girls who participated in digital education programs improved significantly in core subjects such as mathematics and science. As shown in Table 3, the average math scores increased from 46% before the intervention to 71% after, while science scores improved from 49% to 73%. The most significant improvement was observed in Anambra State, where math scores rose from 50% to 75%, and science scores increased from 52% to 78%. The least improvement was recorded in Ebonyi State, where science scores increased from 42% to 66%.

**Table 4: Regression Model Summary for the Impact of Digital Education on Academic Performance**

| Model | $R^2$ | Adjusted $R^2$ | F-Statistic | p-value |
|---|---|---|---|---|
| Digital Education Model | 0.72 | 0.71 | 50.35 | 0.00001 |

The regression model indicates that digital education explains 72% of the variation in academic performance ($R^2 = 0.72$). The F-statistic of 50.35 is statistically significant ($p < 0.05$), confirming that the independent variables—access to digital tools, engagement, and socio-economic status—collectively influence academic performance.

**Table 5: Regression Coefficients for Predictors of Academic Performance**

| Variable | B (coefficient) | t-value | p-value |
|---|---|---|---|
| Access to Digital Tools | 0.35 | 6.50 | 0.0001 |
| Engagement | 0.28 | 5.80 | 0.0001 |

| Variable | B (coefficient) | t-value | p-value |
|---|---|---|---|
| Socio-economic Status | 0.15 | 3.90 | 0.002 |

The regression analysis reveals that access to digital tools and engagement in digital education have the most significant impact on academic performance. Access to digital tools (B = 0.35, p = 0.0001) is the strongest predictor, indicating that students with better access to digital education resources perform significantly better. Engagement (B = 0.28, p = 0.0001) also plays a critical role, suggesting that the more time students spend engaging with digital learning, the higher their academic performance. Socio-economic status (B = 0.15, p = 0.002) has a weaker but still statistically significant influence, implying that financial background affects a student's ability to benefit from digital education.

## Discussion of Findings

The findings reveal significant socio-economic disparities in access to digital education among African girls in Southeast Nigeria. Urban students have substantially higher access to digital tools, with an average access rate of 79%, compared to only 34% for rural students. This finding is in tandem with Sharmila (2024) who submitted that rural women face unique barriers to digital inclusion. Again, the finding agrees with McCulloch, *et al* (2018) who noted that rural dweller are heavily impacted by the digital divide, with lower levels of digital access and use. This disparity is largely attributed to differences in economic background, availability of digital infrastructure, and internet connectivity. Students from low-income families struggle to afford essential digital devices such as smartphones, tablets, or laptops, limiting their ability to engage in online learning. Additionally, inadequate electricity supply and poor network coverage in rural areas further hinder access to digital education. These socio-economic barriers reinforce

existing educational inequalities, making it difficult for rural students to compete with their urban counterparts.

The study found that African girls in urban areas engage more with digital education platforms compared to their rural peers. On average, urban students spend 16 hours per week engaging with digital education resources, whereas rural students only engage for 5.6 hours weekly. This findings conform to the submission of Kormos and Kendra (2021) that students in rural schools were less likely to have computer access and slower Internet speed than urban students. This implies that they are likely to engage less with digital education platforms. This discrepancy is influenced by factors such as availability of internet services, school policies on technology use, and parental support. In urban areas, schools are more likely to integrate digital learning into their curriculum, providing students with structured opportunities to engage with online educational resources. Conversely, rural students face multiple challenges, including limited access to digital tools and a lack of digital literacy skills, which restrict their ability to fully participate in digital learning. The disparity in engagement suggests that while digital education holds great potential, targeted interventions are needed to bridge the urban-rural divide.

The impact of digital education on academic performance is evident in the improved test scores of students who participated in digital education programs. On average, math scores increased from 46% before the intervention to 71% after, while science scores improved from 49% to 73%. The highest improvements were recorded in Anambra State, where math scores rose from 50% to 75%, and science scores increased from 52% to 78%. This indicates that digital education enhances students' comprehension and problem-solving abilities, particularly in STEM subjects. This finding is in line with Salmeron *et al* (2022) as well as El Haddadd and Tendai (2024) who submitted that usage of digital tools are favourably associated with students' comprehension. However, the study also found that these benefits were more

pronounced among urban students, who had greater access to digital resources and more opportunities for engagement. The findings suggest that while digital education is an effective tool for academic empowerment, equitable access must be ensured to maximize its impact across different socio-economic backgrounds.

## Conclusion

This paper has explored the ethical considerations in promoting gender equity through digital education in Southeast Nigeria. While digital education has the potential to empower girls and improve academic outcomes, ethical challenges such as the digital divide, cultural norms, and privacy concerns must be addressed to ensure equitable access and participation. The findings highlight the importance of adopting ethical frameworks that prioritize inclusivity, fairness, and protection of girls' rights in digital education initiatives.

## Recommendations

To address the ethical challenges identified, the following recommendations are proposed:

1. Governments, NGOs, and private sector stakeholders must invest in digital infrastructure in rural areas. Providing access to affordable internet and digital tools is critical to ensuring that girls in rural communities can benefit from digital education.
2. There is a need for community-based interventions that challenge traditional gender norms and encourage girls to pursue education, especially in STEM fields. Community leaders and educators should be engaged in promoting the value of education for girls.
3. Digital education platforms must adhere to strict data protection protocols to ensure that the personal information of girls is safeguarded. This includes providing training for students and educators on digital literacy and privacy.

4. Digital education programs must be inclusive, providing tailored support to girls from different socio-economic backgrounds. Special consideration should be given to marginalized groups to ensure that they are not left behind in the digital transformation.

## REFERENCES

Asongu, S. A., & Odhiambo, N. M. (2018). ICT, financial access and gender inclusion in the formal economic sector: Evidence from Africa. *African Finance Journal*, 20(2), 45–65.

Barron R. M., Cobo, C., Muñoz N., A., & Sánchez C. I. (2021). Remote learning during the global school lockdown: Multi-country lessons. World Bank Group.

El Haddad, R. & Tendai, C. (2024). Does digitalized reading enhance comprehension while reading for pleasure? *Creative Education*, 15(1), 367-382

Gonzales, J. E. (2020). The Effect of Video Presentation and Printed Reading Materials on Pupils' Comprehension Skills. Applied Science and Innovative Research, 4, 19-37. https://doi.org/10.22158/asir.v4n4p19P https://www.researchgate.net/publication/382017625

Kormos, E. & Kendra, W. (2021). Rural Schools and the Digital Divide: Technology in the Learning Experience and Challenges to Integration. Theory & Practice in Rural Education (TPRE), 11(1), 25-39

Kumar, S. (2024). Ethical considerations in digital education. Retrieved from

Lumat, Y. (2023). Understanding the Digital Transformation in SMEs during the COVID-19 Pandemic and the Effect on Their Business Model. *International Journal of Academic Research in Business and Social Sciences*, 13, 1-13. https://doi.org/10.6007/IJARBSS/v13-i4/16622

Lynn, T. G., Conway, E., Rosati, P., & Curran, D. (2022). Digital education. Retrieved from https://doi.org/10.1007/978-3-030-91247-5_7

McCulloch, A. W., Hollebrands, K., Lee, H., Harrison, T., & Mutlu, A. (2018). Factors that influence secondary mathematics teachers' integration of technology in mathematics lessons. Computers & Education, 123(4), 26- 40. http://doi.org/10.1016/j.compedu.2018.04.008

Mtega, W. P., Bernard, R., Msungu, A. C., & Sanare, R. (2012). Using mobile phones for teaching and learning purposes in higher learning institutions: The case of Sokoine University of Agriculture in Tanzania. *Proceedings and Report of the 5th UbuntuNet alliance Annual Conference*, 118–129.

Nafiz, Z. S. & Rowshon, A. (2011). Digital divide through public, school and college libraries: A case study of Bangladesh. *Journal of the Bangladesh Association of Young Researchers (JBAYR)*, 1(1), 23-34

Onyishi, C. N., Ogbodo, E., & Onyishi, I. E. (2012). Gender differences in computer literacy among clinical medical students in selected southern Nigerian universities. *Library Philosophy and Practice*, 2(1), 1–11.

Ouma, J. A., Olang, L. N., & Nyamboga, C. A. (2015). Factors influencing gender disparity in education and literacy levels: A case of selected counties in Kenya. *International Journal of Innovation and Applied Studies*, 10(4), 1326–1333.

Salmeron, L., Vargas, C., Delgado, P., & Baron, N. (2022). Relation between digital tool practices in the language arts classroom and reading comprehension scores. *Reading and Writing*, 36(1), 175-194

Sharmila, V. (2024). A study on digital literacy of rural women based on their educational qualification. *GRT Journal of Education, Science and Technology*, 2(2), 52-56

Suleiman, M. M. & Danmuchikwali, B. G. (2020). Digital education: Opportunities, threats and challenges. *Jurnal Evaluasi Pendidikan*, 11(2), 78-83

Yusuf, M. O. (2005). Information and communication technology and education: Analysing the Nigerian national policy for information technology. *International Education Journal*, 6(3), 316–321.