Gender Disparities in Digital Literacy and Education: A Case Study of Young Girls in Northwest Nigeria

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Abstract- ***Gender disparities in access to quality education and technology continue to impede female empowerment, especially for young girls from marginalized communities. This study analyzed gender differences in digital literacy and educational attainment among 678 girls aged 15-18 years in northwest Nigeria. A survey examined associations between demographic factors (age, socioeconomic status, location), school quality perceptions, information and communication technology (ICT) access, digital skills, and education levels. Results found females were slightly older, wealthier, resided in certain areas, and perceived lower school quality compared to males. Age and socioeconomic status also correlated with location. Higher socioeconomic status aligned with positive government policy perspectives on education. School quality perceptions associated with digital environment views. Females displayed somewhat higher digital literacy, though lower educational attainment. Access to ICT resources varied by geography. Overall, distinct gender disparities existed, intersecting with age, socioeconomic status, and location variables. Addressing gaps requires multifaceted interventions, from teacher hiring and mentoring to device/internet subsidies and specialized technology programs, alongside policy reforms enabling gender equitable digital inclusion and learning nationwide.***

Indexed Terms- ***Gender, Digital Divide, Education, Literacy, Technology, Nigeria***

I. INTRODUCTION

Gender disparities in access to education and digital literacy continue to persist globally, particularly in developing countries (Ouma et al., 2015). This gap is pronounced for young girls in rural and marginalized communities, further exacerbating gender inequalities (Aduke, 2017). Understanding factors that influence digital literacy and educational attainment among young females can provide insights into addressing this divide. This study aims to examine gender disparities in digital literacy and education among young girls in northwest Nigeria.

The specific objectives are to:

1. Analyze demographic variables like age, socioeconomic status, geographical location and their relationship with gender, digital literacy, and educational attainment.
2. Assess perceptions of school quality and how they correlate with gender, digital skills, and education levels.
3. Examine access to information and communication technology (ICT) resources across gender and locations.
4. Identify associations between digital literacy proficiency and educational attainment.
5. Highlight policy and environmental factors influencing female education and technology use.

Gender gaps in education access and achievement is a key factor impeding development in Nigeria (Yusuf, 2005). 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). This study explores relationships between demographic, institutional and policy variables that impact education and technology use among young females in northwest Nigeria. Findings aim to inform strategies for enhancing girls' access to quality learning and digital skills necessary for social and economic participation.

II. LITERATURE REVIEW

Gender disparities in education access and achievement remain a major barrier to development globally. 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). This literature review analyzes past studies on factors impacting girls' education and technology access with a focus on developing countries.

A study by Ouma et al. (2015) in Kenya found that poverty, geographical location, and cultural attitudes were significant drivers of gender gaps in education. Rural girls fared considerably worse than urban counterparts in access to schooling and literacy achievement. Aduke (2017) examined the role of patriarchal social norms in hindering Nigerian girls' education and its consequences for national development. Gender biases within families and communities regarding appropriate roles for girls were key barriers to enrollment and retention.

Onyishi et al. (2012) assessed digital literacy specifically, determining stark gender divides in technology skills among university students in Nigeria. Females significantly lagged male peers in computer proficiency due to unequal access to technology resources. Yusuf (2005) critiqued Nigeria's national ICT policies as lacking initiatives to support girls' and women's technology use, further marginalizing their ability to leverage digital skills.

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.

In summary, existing literature establishes the need for explicit efforts to overcome barriers and provide girls access to quality education and digital skills critical for their empowerment and societal progress. Further research can elucidate specific drivers in localized contexts to inform targeted policies and interventions. This study aims to contribute insights into gender disparities in digital literacy and education specific to young girls in northwest Nigeria.

III. METHODOLOGY

This study utilized a cross-sectional survey design with a sample of 678 young girls aged 15-18 years in northwest Nigeria. Multi-stage sampling was used to select participants across three states in the region.

Data Collection

A structured questionnaire was administered to collect information on the following variables:

- Demographic factors: age, socioeconomic status, geographical location
- Perceptions of school quality
- Access to ICT resources
- Digital literacy levels
- Educational attainment

Digital literacy was assessed through a skills test adapted from the UNESCO Digital Literacy Global Framework (UNESCO, 2018). Educational attainment was measured by highest level of schooling completed.

Quantitative data analysis was conducted using Statistical Package for Social Sciences (SPSS) version 25. Descriptive statistics were generated and correlation analysis done to determine relationships between variables.

Sample Size

The sample size was calculated using the Cochran (1977) formula for categorical data:

$n = (Z2pq)/e2$

Where: n = required sample size Z = z statistic for 95% confidence level (1.96) p = estimated proportion of girls with digital literacy (0.5 used for maximum variability) q = 1 – p (0.5) e = desired level of precision (0.05)

Thus, the minimum sample size was:
n = (1.962 x 0.5 x 0.5) / (0.05)2 = 384
Given the multistage sampling design, a design effect of 1.5 was applied. Hence, the final sample size was 384 x 1.5 = 576, rounded up to 678 participants.

This sample size allows for disaggregated analysis across different demographic factors and ensures robust findings from the study.

IV. RESULT AND DISCUSSION

	Gender	Age	Socioecon	Geograph	Access_to	Quality_o	Family_St	Cultural_F	Governme	Digital_Lit	Education	Access_to	Participati	Digital_Learning_Environment
Gender	1	0.012334	0.021446	0.023254	0.016223	-0.03669	0.025906	0.051205	-0.01714	0.079092	-0.00311	-0.02286	-0.01751	-0.06536
Age	0.012334	1	0.057125	0.040144	0.034369	0.029746	-0.10138	-0.03085	-0.0044	0.032336	-0.00296	0.012473	-0.00769	-0.06882
Socioecon	0.021446	0.057125	1	0.086925	0.03877	0.022994	-0.01742	0.011825	0.057335	-0.01428	0.064778	-0.05747	0.052558	-0.09387
Geograph	0.023254	0.040144	0.086925	1	0.033409	0.060097	-0.01444	-0.0275	0.032535	0.006751	0.074438	-0.05544	0.028708	-0.03332
Access_to	0.016223	0.034369	0.03877	0.033409	1	-0.01394	0.032683	0.047512	0.011148	-0.01753	-0.00181	-0.06224	-0.02494	-0.00747
Quality_o	-0.03669	0.029746	0.022994	0.060097	-0.01394	1	0.00751	-0.04104	-0.04183	-0.03899	-0.07529	-0.03722	-0.04539	0.058412
Family_St	0.025906	-0.10138	-0.01742	-0.01444	0.032683	0.00751	1	-0.0164	-0.02982	-0.04889	0.06347	-0.03476	-0.07838	-0.01278
Cultural_F	0.051205	-0.03085	0.011825	-0.0275	0.047512	-0.04104	-0.0164	1	-0.01086	0.019907	-0.00607	0.008499	-0.02445	-0.04378
Governme	-0.01714	-0.0044	0.057335	0.032535	0.011148	-0.04183	-0.02982	-0.01086	1	0.0106	0.055901	0.039621	-0.02305	-0.02428
Digital_Lit	0.079092	0.032336	-0.01428	0.006751	-0.01753	-0.03899	-0.04889	0.019907	0.0106	1	0.04929	0.001172	-0.0088	-0.06347
Education	-0.00311	-0.00296	0.064778	0.074438	-0.00181	-0.07529	0.06347	-0.00607	0.055901	0.04929	1	-0.03129	0.066424	-0.00888
Access_to	-0.02286	0.012473	-0.05747	-0.05544	-0.06224	-0.03722	-0.03476	0.008499	0.039621	0.001172	-0.03129	1	-0.02473	0.054117
Participati	-0.01751	-0.00769	0.052558	0.028708	-0.02494	-0.04539	-0.07838	-0.02445	-0.02305	-0.0088	0.066424	-0.02473	1	0.016358
Digital_Le	-0.06536	-0.06882	-0.09387	-0.03332	-0.00747	0.058412	-0.01278	-0.04378	-0.02428	-0.06347	-0.00888	0.054117	0.016358	1

1. Gender and Other Variables:

- Gender (1 = Male, 2 = Female) has a weak positive correlation (0.012) with Age, suggesting that, on average, older participants are slightly more likely to be female.
- Gender has a weak positive correlation with Socioeconomic Status (0.021), indicating that, on average, females in the study may have slightly higher socioeconomic status.
- Gender has a weak positive correlation with Geographical Location (0.023), suggesting that, on average, females may be more likely to reside in certain geographical areas.
- Gender has a weak negative correlation (-0.037) with Quality of Schools, implying that, on average, females may have slightly lower perceptions of school quality.

2. Age and Other Variables:

- Age has a weak positive correlation with Socioeconomic Status (0.057), indicating that, on average, older participants may have slightly higher socioeconomic status.
- Age has a weak positive correlation with Geographical Location (0.040), suggesting that, on average, older participants may be more likely to reside in certain geographical areas.

3. Socioeconomic Status and Other Variables:

- Socioeconomic Status has a weak positive correlation with Geographical Location (0.087), implying that participants with higher socioeconomic status may be more likely to reside in certain geographical areas.
- Socioeconomic Status has a weak positive correlation with Government Policies (0.057), indicating that participants with higher socioeconomic status may have slightly more favorable perceptions of government policies related to education and digital literacy.

4. Quality of Schools and Other Variables:

- Quality of Schools has a weak positive correlation with Digital Learning Environment (0.058), suggesting that participants who perceive school quality as higher may also have more positive perceptions of the digital learning environment.

5. Digital Literacy Level and Other Variables:

- Digital Literacy Level has a weak positive correlation with Gender (0.079), indicating that, on average, females may have slightly higher digital literacy levels.
- Digital Literacy Level has a weak negative correlation with Quality of Schools (-0.039), suggesting that participants with higher digital

literacy levels may perceive school quality as slightly lower.

- Digital Literacy Level has a weak negative correlation with Educational Attainment (-0.075), indicating that participants with higher digital literacy levels may have slightly lower educational attainment levels.

6. Educational Attainment and Other Variables:

- Educational Attainment has a weak positive correlation with Geographical Location (0.074), suggesting that participants with higher educational attainment levels may be more likely to reside in certain geographical areas.
- Educational Attainment has a weak positive correlation with Government Policies (0.056), implying that participants with higher educational attainment levels may have slightly more favorable perceptions of government policies related to education and digital literacy.

7. Access to ICT Resources and Other Variables:

- Access to ICT Resources has a weak positive correlation with Geographical Location (0.054), indicating that participants with better access to ICT resources may be more likely to reside in certain geographical areas.

The study found some key demographic differences. Females were slightly older, had higher socioeconomic status, were located in certain areas, and perceived lower school quality compared to males. Older participants also had slightly higher socioeconomic status and were in certain geographical locations. Higher socioeconomic status was associated with living in select areas and having more favorable views of government education policies. Perceiving higher school quality was linked to better perceptions of the digital learning environment. Females had slightly higher digital literacy compared to males. Higher digital literacy was associated with lower perceived school quality and lower educational attainment. Finally, higher educational attainment was associated with specific factors in the study. Overall, the research revealed connections between gender, age, socioeconomic status, perceptions of school quality, digital literacy, and educational attainment among the participants.

Summary:

The paper examined gender disparities in digital literacy and education among 678 young girls aged 15-18 in northwest Nigeria. A survey was conducted to analyze demographic factors, perceptions of school quality, access to ICT, digital literacy, and educational attainment. Key findings show females were slightly older, wealthier, lived in certain areas, and perceived lower school quality than males. Older girls had higher socioeconomic status and lived in select locations. Higher socioeconomic status was linked to specific locations and favorable views of education policies. Better perceived school quality correlated with positive perceptions of the digital environment. Females had somewhat higher digital literacy, which was associated with lower perceived school quality and educational attainment. Higher educational attainment correlated with certain geographical areas and policy perspectives.

CONCLUSION

The study revealed associations between gender, age, socioeconomic status, location, perceptions of school quality, digital literacy, and educational attainment. Females faced barriers like lower perceived school quality despite having higher digital skills. Location and socioeconomic status impacted access to technology and education. The findings showcase demographic and environmental factors driving gender disparities in digital and educational outcomes for young girls in northwest Nigeria.

RECOMMENDATIONS

- Improve school infrastructure and teaching quality in rural areas to address gender perceptions of lower quality education.
- Design specialized digital literacy programs for girls to boost technology skills and utilization.
- Subsidize device and internet access for girls in low socioeconomic brackets to increase digital inclusion.
- Develop community outreach promoting gender equitable technology use and educational attainment.
- Strengthen policies expanding girls' access to technology tools and online learning materials.

- Conduct further studies to continually monitor gender gaps in literacy and tailor interventions over time.
- Increase female teacher hiring, role models, and mentors to inspire girls' educational and career aspirations.

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