

Closing ICT usability gaps for Nigerian women and girls: Strategies for reducing gender inequality

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Abstract

Significant empirical evidence from literature revealed that women, described as better versions of men, play integral roles as mothers, educators, household managers, and life-givers, constituting half of the world's human capital and population. Globally, Information and Communication Technology (ICT) innovations are tremendous enablers of women's empowerment and capabilities. Despite these important virtues, numerous investigations have shown significant gender gaps in internet use (23%), literacy rate (48.6%), pay gap (22%), tech-related positions (26.7%), tech workforce (19%), tech leadership positions (22%), developer workforce (5%), etc., resulting majorly from restrictions placed by ICT contents, language, and environment that are not pertinent, comfortable and gender-sensitive. Women and girls have great potential to redress gender gaps if empowered through effective, efficient, and satisfactory ICT adoption and usage. This study highlights strategies for reducing gender inequalities by closing existing gaps in ICT usability by women and girls. The conceptual framework espoused for this study was the Unified Theory of Acceptance and Use of Technology (UTAUT). A narrative review methodology of related research findings from peer-reviewed articles was adopted to draw holistic findings that revealed significant information on strategies for reducing gender inequality by leveraging ICT usability for women and girls. Results show that leveraging women's literacy abilities for ICT adoption and usability may increase their sociability capital resources, thereby advancing sustainable goals for the significant reduction of gender inequalities. With ICT literacy, technology and the internet become enablers for girls and women for harnessing the power of technology for innovative solutions, capable of providing equal employment opportunities that can stimulate economic growth and development. There cannot be significant gender equality without effective leveraging of ICT innovations, literacy, adoption, and usage for the economic empowerment of women and girls.

Keywords: ICT Adoption; Usability; Gender Gap; Gender Inequality; UTAUT

1. Introduction

ICT usability is globally recognized as an enabler of modern technology-dependent innovations to improve the well-being of people [12], reduce gender productivity inequality, and strengthen the position of women for sustainable empowerment, productivity, and economic development, especially in Nigeria. The involvement of women and men in the usability of ICT across the globe indicates the need for gender-balanced participation [37]. Some researchers claimed that the degree to which a person believes that using a particular system would be free of effort and would enhance his or her job performance is gender-sensitive in that it reflects along gender lines, and is influenced by ICT usability, and other demographic information such as age, gender, culture, ethics and values, social class, economic, education barriers, nationality, as well as attitudes [18], [25], and [27].

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ICT adoption and usability may play a substantial role in shortening the gender divide by providing women with access to information, financial services, and employment and life-enhancing opportunities that can leverage the economic empowerment of women for ICT adoption, and usage that may reduce gender inequalities. However ICT adoption is not enough, usability is required and sufficient for women and girls to reduce gender inequalities. ICT usability has been defined as “The effectiveness, the efficiency and the satisfaction with which specified users achieve certain goals in determined contexts” [11], p. 38. In Nigeria, 16 % fewer women than men use ICT [29]. The purpose of this narrative study was to suggest ways to leverage ICT usability among Nigerian women and girls in closing gender gaps or existing barriers to gender equality created by poor cultural norms, ethics, and values, and poor ICT adoption and usage.

2. Conceptual Framework

In this study, the researchers adopted the Unified Theory of Acceptance and Use of Technology (UTAUT) model proposed by [46] as the study conceptual framework. [46] claims that the benefits of using technology and the factors that drive users' usability decision are what determines users' acceptance of technology. The UTAUT model was founded on technology usability that centered on effectiveness, efficiency, and satisfaction with which specified users achieve certain goals in determined contexts [11]. UTAUT model considers the following factors: user adoption behavior toward intention to use ICT, and users' usability of ICT. According to [46], both user adoption and usability of technology are affected by four constructs: performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), and moderated by four characteristics: literacy level, gender, age, experience and voluntariness of use. UTAUT model is widely adopted and theoretically justified based on measuring instruments that are quite strong, consistent, and valid [32]. UTAUT was adopted as our theoretical foundation to study how the existing ICT usability gaps among Nigerian women and girls can be closed, as strategies for reducing gender inequality.

3. Literature Review

Closing ICT usability gaps for Nigerian women and girls as strategies for reducing gender inequality may require an understanding of how gender inequality is underpinned by system usability factors. System usability is defined as: “the effectiveness, the efficiency and the satisfaction with which specified users achieve certain goals in determined contexts” [11], p. 38. Usability is interconnected, interdependent, and interrelated with digital literacy, access to digital innovations, and online safety [41]. Globally, significant relationships exist between digital literacy and access to or adoption of ICT innovations. [1] and [41]. Nigeria's literacy rate for adults aged 15 years and older was given as 59.67% [43]. This implies that there are 40.33% of illiterate or semiliterate Nigerian adults aged 15 years and older. The literacy rate for adult males and females is 51.4% and 48.6% respectively [44], meaning that, unlike the male gender, the female gender has more illiterate folks than literate.

About 16 % fewer Nigerian women than men use ICT [29]. The effect of digital literacy on adoption is clearly observed in the use of some banking facilities. 53% of Nigeria's adult bank customers do not use their ATM cards while only 7.9% use ATMs machine [14]. In most African countries, over half of school dropouts are girls who eventually are denied education. Poor digital literacy affects digital access and usability. Globally just 27% of the world's scientific researchers are women [21], though large disparities exist especially among Nigerian women and girls. The resultant low presence of women in ICT has resulted in gender inequality in the highest academic and decision-making positions in scientific institutions and universities. Gender inequality in higher scientific institutions has deprived women of the positions of responsibility for sustainable empowerment, productivity, and economic development in Nigeria. There is no denying or gainsaying the fact that digital literacy is closely linked to access and that the gender gap in digital literacy is growing as technologies become more sophisticated. Women are 1.6 times more likely than men to encounter hindrances in internet access due to a lack of ICT skills [41]. There is also significant evidence of a gender gap in the level of access and use of ICT [5] and [42], possibly because ICT interfaces, contents, and applications are often not women-friendly or women-user centered [35], but rather tailored to favor men's interests and needs, who are in the majority among developers of ICT interfaces, contents, and applications [3], [6], and [30]. As reported recently by the FRG Technology Consulting Java and PHP Salary Survey, one in every 10 developers is a woman [4] and [28]. Developers are in high demand within the tech industry; but women only make up 11% of the developer workforce [28]. The vast majority of developers are males, accounting for 91.7%, while female developers amounted to only 5% of all respondents, demonstrating the male-dominating reality of software development jobs [28]. According to the Computing Technology Industry Association (CompTIA), the composition of the tech sector workforce consisted of 5.1 million men and 2.5 million women, translating to 67% and 33%, respectively [10].

For the Nigerian woman and girls, ICT interfaces and contents are not user-centered concerning their literacy capabilities, and cultural backgrounds, but appear to be intended for only the experts or the specialist users [22] and

[31]. Globally, Africa has the highest internet access gender gap of 23%, which is 100% above the world internet and ICT access gender gap of 12%, while 46% of boys use the internet on their phones when compared to 27% of girls. [10]. Significant evidence from literature revealed that women have a low level of access and use of ICT as compared to men [21]. In addition, the female gender does not perceive ICT system interfaces as usefulness and ease of use, among others [33].

Online safety is another challenging factor in ICT usability for women and girls. A relatively high percentage (59%) of young women experienced online abuse that affected their emotional and/or physical well-being and their relationships, thereby reducing their confidence in internet access and ICT usability [21] and [40]. Globally, 53% of the world's population (equivalent to some 3.9 billion people) is not connected to the internet or use ICT, yielding a global internet user gender gap of 12%, with Africa having a high internet gender gap of 23% [21] and [42].

ICT usability is both interrelated with digital literacy and the quality of the system interfaces and digital products and services designed for women and girls. 52% of young women globally have experienced some form of digital insecurity, while 87% of them believe the problem is getting worse [24]. Women and girls perceive social media as an unsafe space, with 68% experiencing online abuse on their social media platforms. Most victims (90%) of “revenge porn” are female, and many cases of suicide have been triggered by such attacks [40] and [45]. The top concern is that about 35% of young women and girls have their private, intimate images and videos shared online without their consent [40].

The numerous views of these researchers on gender inequalities notwithstanding, building digital literacy, access, and online security is theoretically justified and transformational based on ICT usability measuring instruments that are quite strong, consistent, valid, and reliable. ICT usability interface systems are designed in recognition of women's and girls' gender equality, culture, ethics, and values, and in favor of their varying abilities and literacy levels, which are considered in this study as key strategies for closing gender inequalities.

4. Methodology

The researchers adopted a narrative review methodology. A narrative review methodology is best applicable where the study can be described as descriptive or explanatory [7], [8], and [36], and where analysis and synthesis of different and related research findings are required to draw holistic interpretations or conclusions based on the reviewers' own experience, existing theories, conceptual framework, and models [16], [19], and [30]. Researchers with diverse views and ideas have adopted the concept of narrative reviews as best suitable for comprehensive topics and have used narrative inquiry or research to name their methodology [9] and [38]. Narrative studies provide the researchers with great abilities and capabilities to capture and comprehend the diverse and numerous insights around scholarly and peer-reviewed research topics, and the opportunity to extract from vast literature, reflective practices, shared views, and knowledge [23] and [26]. Within the context of this narrative study, we made our search criteria and the criteria for inclusion explicit while reviewing a vast of peer-reviewed articles in line with the identified keywords, search keys, article identification, quality assessment, data extraction, and synthesis. Methodological triangulation is defined as the use of multiple sources of data to realize multiple perspectives, maximize reliability and validation of knowledge and build a coherent justification of knowledge interpretation in line with the study objectives [13]. We also adopted methodological triangulation to ensure the reliability and validity of data, and justification of interpretations from the reviews.

4.1. Data Collection

Table 1 Summary of Research Articles Reviewed within the Study

Incorporated articles	Number
Total references within the study review:	48
Total peer-reviewed references in the study:	43
Total peer-reviewed in the study within the last 5 years:	28
% Peer-reviewed references in the study:	92%
% Peer-reviewed references in the study within the last 5 years:	64%

The researchers collected data from reviewed research findings that are relevant to our study. Many of such data came from findings from peer-reviewed and other related texts found in the proQuest databases, ScienceDirect, and Walden University international library databases. Phrases and terms such as “closing ICT usability gaps”, “ICT adoption among women and girls in Nigeria”, “strategies for reducing gender inequality”, “leveraging women productivity through ICT”, etc. were used as our search keys in the databases. Our reviews incorporated forty-eight (48) references. Forty-four (92%) of the total references incorporated in the study are peer-reviewed, while twenty-eight (64%) are peer-reviewed journals that are within the last 5 years.

5. Findings and Strategies

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As stated by [3], technology can be perceived as gendered in many ways, in the sense that the relationship between gender and technology can be viewed as mutually constitutive, meaning that technological change is formed and structured consistent with societal norms and relations, which are successively influenced by technological transformations. In other words, the types of technologies used in different historical, political, and cultural contexts, their design, and meaning are created within gender relations and thus reflect pre-existing gender inequalities. Presently, the world of ICT is majorly male-dominated [25] and [30]. This is because developers of ICT interfaces are dominated by men who are often employed by organizations that disproportionately prefer men rather than women [6]. As a result, ICT user interfaces, content, and applications are often tailored more to men’s interests and wishes. Furthermore, the low literacy rate among women in Nigeria representing about 48.6% [44], including the written communication level employed by ICT software developers within the design of ICT system interfaces put the women and girls on more difficult technological transformations in determined contexts [10] and [33].

Consequently, ICT innovations that may potentially play a significantly beneficial role in the empowerment and enhancement of women's capabilities failed because the ICT system interfaces aren't perceived as useful or easy-to-use by the feminine genders [2] and [34], which are majorly illiterate or semiliterate (48.6%) [43]. When different tools and methodologies for work, entertainment, and care are implemented, technologies themselves shape those gender relations involved. A relationship exists between the Gender Equality Index and the Digital Economy and Society Index [15], which reveals that societies with greater equality between women and men also perform better in the area of the digital economy [47] and [48], which is vital for sustainable economic growth. Also, the relationship that existed between the Digital Economy, Society Index, and Gender Equality Index suggests that digital performances are often improved while tackling the digital gender divide. It follows that advancements in digital transformation may be directly related to advancements in gender equality. Table 2 shows the summary of research findings and strategies for closing ICT usability gaps for Nigerian women and girls.

5.1. Summary of Findings

- The world of ICT is majorly dominated by men [30].
- Inventors of ICT interfaces are dominated by men who are frequently employed by associations that disproportionately prefer men rather than women [6].
- ICT interface content and operations are frequently acclimatized further to men’s interests and wishes.
- Societies with lesser equivalency between women and men also perform better in the
- Area of the digital frugality, which is vital for sustainable profitable growth.
- in the area of the digital economy, which is vital for sustainable economic growth.
- Advancements in digital transformation may be directly related to advancements in gender equality.
- .Digital usability is linked with digital literacy, adoption or access to digital innovations, and online safety [41].
- Gender inequality is underpinned by system usability factors that have some bearing with a complex mixture of cultural and structural factors that must be addressed if gender inequality is to be reduced or closed.

5.2. Strategies for Closing ICT Usability Gaps for Nigerian Women and Girls

- Prioritize strategies to create easy-to-use ICT system interfaces that take advantage of the new technological innovations designed on high-level usability platforms to close the existing usability gaps often observed in the ICT systems in Nigeria.
- Women and girls should be encouraged to participate in technology development, local content creation, and ICT innovation.

- Address the knowledge gap on digital realities for women and girls by emphasizing the inclusion of digital skill training in formal school curricula from the primary level, for an early age building in ICT skills and usability education.
- Implement digital and ICT inclusion policies, programs, and tools that incorporate access to digital literacy training, affordable, robust broadband internet service, and internet-enabled devices that meet the needs of women and girls users.
- Women's and girls' voices should be included in the design process when developing any digital products or services, to ensure that the products and services meet their needs and their digital realities, skills, and confidence in using the product.
- Implementing digital literacy training can give women and girls more positive perceptions of digital technology and the internet, and how they can stay safe online, rather than view the internet as a dangerous platform.
- Governments and policymakers must ensure that any legal frameworks should incorporate gender equality as a fundamental development objective required to include equal participation of women and men in society and in the economy for empowerment and development.
- ICT interface systems designed in recognition of women's and girls' gender equality, culture, ethics, and values, and in favor of their varying abilities and literacy levels, are considered in this study as key strategies for closing gender inequalities.

6. Conclusion

The IT problem researched in this study was that the existing ICT usability gaps among Nigerian women and girls that gave birth to various gender gaps in internet use (23%), literacy rate (48.6%), pay gap (22%), tech-related positions (26.7%), tech workforce (19%), tech leadership positions (22%), developer workforce (5%) [10], among Nigerian women and girls. Other existing ICT usability gaps researched included internet penetration rate (41%), mobile ownership (31%), and support for mobile internet use (20%) [17], resulting majorly from restrictions placed by ICT contents, language, and environment that are not pertinent, comfortable and gender-sensitive to adequately cater for Nigerian women and girls with varying abilities and literacy levels. Poorly designed ICT systems interfaces that are not user-friendly, user-centered, or easy to use pose greater barriers for women and girls than for men and boys because they fail to cater to a variety of women and girls with varying abilities and literacy levels in Nigeria. Digital usability is linked with digital literacy, adoption or access to digital innovations, and online safety [41]. Gender inequality is underpinned by system usability factors that have some bearing with a complex mixture of cultural and structural factors that must be addressed if gender inequality is to be reduced or closed.

Gender inequalities in Nigeria are increasingly important and present new challenges that must be addressed by software developer organizations through prioritizing strategies to create easy-to-use ICT system interfaces that take advantage of the new technological innovations designed on high-level usability platforms to close the existing usability gaps often observed in the ICT systems in Nigeria [20]. Women and girls should be encouraged to participate in technology development, local content creation, and ICT innovation. ICT community should safeguard online privacy, especially for women and girls.

The digital gender gaps can be closed by implementing digital and ICT inclusion policies, programs, and tools that incorporate access to digital literacy training, affordable, robust broadband internet service, and internet-enabled devices that meet the needs of women and girls users. Women's and girls' voices should be included in the design process when developing any digital products or services, to ensure that the products and services meet their needs and their digital realities, skills, and confidence in using the product. It is important to address the knowledge gap on digital realities for women and girls by emphasizing the inclusion of digital skill training in formal school curricula from the primary level, for an early age building in ICT skills and usability education. Digital literacy training can give women and girls more positive perceptions of digital technology and the internet, and how they can stay safe online, rather than view the internet as a dangerous platform. Governments and policymakers must ensure that any legal frameworks should incorporate gender equality as a fundamental development objective required to include equal participation of women and men in society and in the economy for empowerment and development.

The study's findings were significant and supported current literature on closing ICT usability gaps as a strategy for reducing gender equality. Findings from this study revealed successful strategies that are currently used by organizations to reduce gender inequality through closing ICT usability gaps. Such strategies impact users' satisfaction and acceptance of ICT products. It is believed that findings from this study may provide successful strategies for other stakeholders, developer organizations, and individual developers who may adopt similar ICT gap-closing strategies to reduce gender inequality.

Compliance with ethical standards

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Disclosure of conflict of interest

There are no conflicts of interest.

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