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Gender Equality in digitalization and Computer Use

Abstract

This research paper is to examine gender and computer use in education in various countries using data sources. The results of the study indicate that the concerns expressed by educators about gender equity are valid. Female students have less knowledge about information technology, are less interested in using computers compared to male students, and experience more difficulties with the software. This could be due to factors such as differences in parental support, access to computers, the lack of female role models, and the type of computer-related activities conducted in schools. Gender differences were found both inside and outside of schools, highlighting the need for awareness and action by both teachers and parents. Although the USA was found to be the most "gender equal" country among those examined, there is a lack of policies in schools regarding gender issues, and even when they exist, they are not communicated to parents.

The purpose of the study is to examine gender and computer use in education in various countries and to identify factors that contribute to gender differences in computer use. The study aimed to address the concerns expressed by educators about gender equity in computer use and to highlight the need for awareness and action by both teachers and parents. The study used a quantitative research design and data sources from various countries to achieve its objectives. The approach to the topic was a comparative analysis of gender differences in computer use, and the theoretical scope of the paper was to understand the factors that contribute to these differences. The expected research results were to identify gender differences in computer use and to highlight the need for action to address these differences. The social implications of this research are significant, as it highlights the need for gender equity in computer use, which can lead to improved educational outcomes and better career opportunities for female students.

Keywords: Gender Equality, Information technology, Computer use, Parental support

Introduction

The use of computers and digital technologies has become increasingly integrated into various aspects of daily life, from education and work to social interactions and entertainment. However, despite the potential benefits of digital technologies, the use of computers and the internet continues to be unequal, with gender being one of the key factors contributing to digital divides. According to a report by the International Telecommunication Union (ITU, 2020), women are less likely to own and use digital devices, have lower levels of digital literacy, and face more barriers to accessing digital technologies compared to men.

The digital gender gap has significant consequences for gender equality, as it affects women's opportunities for education, employment, and civic engagement. In particular, the digital divide exacerbates existing gender inequalities and perpetuates discriminatory social norms and expectations (UN Women, 2019). Therefore, understanding and addressing the factors that contribute to the digital gender gap is crucial for promoting gender equality in the digital age.

In this paper, we aim to review the literature on the relationship between computer use and gender equality, with a focus on the key barriers to women's and girls' access and use of digital technologies. By synthesizing the existing research, this paper aims to provide a comprehensive overview of the digital gender gap and its implications for gender equality.

Literature review

Recognizing the importance of gender equality in the digital era

Digitalization is a fundamental aspect of contemporary societies and a valuable instrument for achieving sustainable development. Utilizing digital tools and technologies paves the way for social engagement and plays a crucial role in the "future of work" and, more broadly, the future of development. For instance, telemedicine can enhance access to healthcare services, expand coverage, and improve quality, while e-governance can facilitate public services and boost user interaction and involvement in decision-making processes (UNDP, 2019). Collecting and using disaggregated data systematically can aid in providing customized services and solutions based on requirements and addressing specific

obstacles. The 2030 Agenda for Sustainable Development and several of its objectives highlight the potential of digital technologies to contribute to sustainable development and expedite human progress .

Nonetheless, digitalization does not affect all genders equally. To fully harness its potential, it is vital to consider the gender aspects of digitalization. Ignoring the varied effects of technology on women and men is likely to widen the gender digital gap. The significance of gender equality in the digital realm has grown in the context of the digital and data-driven transformation of the economy and governance systems, further accelerated by the COVID-19 pandemic.

By 2022, digitization is expected to account for 65 percent of the global GDP (World Economic Forum, 2016). However, approximately 234 million fewer women than men have access to mobile internet in low- and middle-income countries (GSMA, 2019). Increasing digital access for women would enhance their economic prospects and strengthen their position in the job market, particularly given the influence of digital transformation and automation on employment opportunities—a study in 30 countries revealed that women's jobs have a 70 percent or higher risk of automation (ILO, 2019). Furthermore, granting an additional 600 million women and girls access to online services worldwide could result in a GDP increase of US$18 billion.

Digital technologies are vital for women's civic participation, communication abilities, and mobility. Access to digital devices amplifies the impact of women's organizations and raises the visibility of women's agendas online. While digital activism and social media campaigns may not replace offline engagement in the near future, they can reinforce women's demands and assist activists in mobilizing communities and movements (UNDP, 2019). Evidence indicates that digital technologies play a significant role in democratic processes, self-organization, self-help, and mutual learning; increased access to high-quality digital services and information enables more women to engage in these processes.

Mobile internet access and online platforms are also crucial for the emotional well-being of migrant families and communities, including refugees. Studies reveal that mobile technologies help female migrant workers reduce stress related to social isolation, maintain contact with their families, learn about their rights, and share information within migrant communities (ILO, 2019).

Digitalization and digital tools offer tremendous potential for women's empowerment but also pose significant risks to their safety and rights. The prevalent use of social media and digital platforms has led to the rise of technology-enabled gender-based violence (UN Women, 2015), which has been intensified by the increased reliance on online spaces during the COVID-19 pandemic. Women's and human rights defenders, women in politics and civil society organizations, journalists, women with disabilities, members of minority groups. Research indicates that online violence against women has severe consequences for their physical, psychological, social, and reproductive health, and may limit their access to services and online information, as well as hinder their ability to be active digital citizens (UNDP, 2019)..

Gender and digital inclusion: current picture and existing barriers
Achieving digital inclusion for all genders requires a comprehensive approach that involves various parties. To promote gender equality in the digital world, it is important to involve stakeholders such as governments, local authorities, private companies, civil society, and users themselves (World Bank, 2021). Governments have a crucial role in improving digital infrastructure, creating enabling technologies, and establishing regulations and protocols to ensure women have equal access to digital identification and e-services while protecting their privacy (UN, 2020). The advancement of technology, such as national electronic IDs, biometrics, and digital systems, presents both opportunities and challenges that require government intervention to secure the privacy and safety of individuals and groups (World Wide Web Foundation, 2020). Governments can also make services more accessible and affordable through public and private sectors and allocate funds to initiatives that aim to make e-government services gender-responsive (World Bank, 2021). National statistical agencies and academia can collaborate to provide gender-disaggregated data, which is crucial for developing inclusive digital strategies (UN, 2020).

The private and public sectors can also promote gender-responsive leadership to ensure women can actively participate in the development of these strategies (World Bank, 2021). Involving women, gender equality specialists, and women's organizations in policymaking and service design and delivery is essential to enhance women's digital inclusion and ensure that policies and services meet their needs (UN, 2020). It is important to recognize that access, possession, and utilization of digital tools are not the same for both genders. Globally, women tend to face more challenges than men in accessing and using technology (World Wide Web Foundation, 2020). This is due to a lack of skills and social norms that restrict their ability to use technology (UN, 2020). Women in low- and middle-income countries are

7% less likely to own a mobile phone and 15% less likely to own a smartphone, and only 58% of women use the mobile internet (World Bank, 2021). In Europe and Central Asia, 52 million women don't have access to the mobile internet. Despite being 2% more likely to own a mobile phone, women in this region are 4% less likely to use the mobile internet. With few exceptions, women in this region are also less likely to use the internet for personal purposes (UN, 2020).

Table 1: Individuals using the internet, by gender (%)

Country/Territory	All individuals	Women	Men
Albania	72.2	71.2	73.2
Armenia	66.5	67.2	65.8
Azerbaijan	81.1	78.0	84.2
Belarus	85.1	85.7	84.2
Bosnia and Herzegovina	73.2	69.3	77.8
Georgia	72.5	71.9	73.3
Kazakhstan	85.9	84.9	87.1
Kosovo*	89.4	89.0	89.9
Montenegro	81.4	80.7	81.9
North Macedonia	81.4	79.2	83.5
Serbia	78.4	76.0	81.8
Turkey	77.7	72.1	83.3
Ukraine	70.1	68.2	72.4
Uzbekistan	70.4	65.9	74.9

Source: ITU, Individuals using the internet (from any location), by gender**

(Latest year available, no older than 2018; age scope of population varies across countries and territories)

Thirdly, it is crucial to acknowledge that women and other target groups are not uniform and face varying vulnerabilities in different circumstances. Therefore, it is essential to adopt an intersectional perspective when examining patterns of digital exclusion. The gender gap in the use of mobile internet is shrinking, with the difference dropping from 25% in 2017 to 19% in 2019 and 15% in 2020. In 2020, approximately 112 million more women gained access to the digital world through mobile internet in low- and middle-income countries.

Main obstacles to gender equality in the digital age
The main barriers to women and girls taking advantage of digital technology opportunities and participating in the digital transition are structural inequalities that are deeply ingrained in society. This section provides an overview of some of the primary obstacles to gender equality and women's empowerment in the digital age.

Gender norms and cultural biases
Gender stereotypes and cultural norms can hinder women's and girls' access to digital technology, limiting their education and job opportunities in the ICT sector. For example, parents may restrict the use of mobile phones and internet activities more for girls than for boys. In households with limited computing resources, boys and men may receive preferential access over girls and women. Social norms and gender biases in teaching materials and techniques, as well as a lack of support from family and teachers, can discourage girls and women from pursuing careers in STEM fields. A study in Moldova found that over 30% of young women who liked computer science in school did not consider ICT as a career option because "it's not for girls." A lack of exposure to female role models, including female teachers, also plays a significant role in discouraging girls from pursuing STEM careers, while their interest and confidence increase when exposed to positive role models. Social norms and expectations of women's roles in the family and as primary caregivers, along with a masculine corporate culture in the tech sector, are major barriers to women's participation in the workforce and hinder their employment and career advancement opportunities in the digital age.

Affordability of internet and digital devices
Economic inequality is both a cause and effect of digital exclusion. The economic status of mobile users, cultural patterns, infrastructure, and the cost of equipment and internet access determine the purchase of advanced devices. Factors such as the affordability of the internet and the cost of smart devices disproportionately affect women and girls, particularly the poor. Affordability is the second most commonly cited barrier to using the mobile internet.

Lack of education and digital literacy
Access to education and overall literacy rates are also important factors in digital exclusion. Women with secondary education are six times more likely to use the internet compared to women with a primary education or lower. The level of literacy required to use the internet and advanced devices increases with the complexity of the device. Women generally have lower digital literacy skills compared to men across all levels of digital literacy and are 25% less likely to use ICT for basic purposes. This gap widens as the skills required become more advanced, with women being four times less likely than men to have advanced ICT skills. Raising awareness and promoting digital literacy can increase knowledge about the functions of devices, the internet, and the opportunities of being connected. Providing digital skills training in formal and informal settings, as well as gender-sensitive training for teachers, can help reduce the gender gap in digital skills.

Research question
What are the main barriers to women and girls' access and use of digital technologies, and how do these barriers impact their opportunities for education, employment, and civic engagement in the digital age?

1 Hypothesis
Hypothesis 1: Women and girls face more barriers to accessing and using digital technologies compared to men, due to factors such as affordability, lack of digital literacy skills, and restrictive social norms and cultural expectations.

Hypothesis 2: Women and girls who have higher levels of digital literacy skills are more likely to use digital technologies for personal and professional development, and are less likely to experience barriers to digital inclusion.

Hypothesis 3: Economic constraints, such as the cost of technology and internet access, play a significant role in limiting women and girls' access and use of digital technologies, and contribute to the digital gender gap.

Methodology
As the researcher, my main research question is focused on understanding the main barriers that hinder women and girls' access to and use of digital technologies and how these barriers affect their opportunities for education, employment, and civic engagement in the digital age. To analyze the results of the focus group study, I followed a systematic methodology. First, I transcribed the data collected from the focus group sessions, ensuring accurate representation of participants' responses and viewpoints. Next, I developed a coding framework to categorize and organize the data, aligning it with the research questions. I then proceeded to analyze the coded data using qualitative and quantitative methods. Through thematic analysis, I identified recurring themes such as the influence of social norms and cultural expectations on women's and girls' access to digital technologies, the significance of digital literacy skills for personal and professional development, and the necessity for affordable and accessible digital technologies for all. Additionally, I conducted a comparative analysis to examine the differences in digital literacy and computer use among different age groups of women.

The focus group
The results of the focus group study on computer use and gender equality revealed several key findings regarding the experiences and perspectives of women and girls on the topic. When analyzing the results based on age, it was found that women over 30 years old had a higher level of digital literacy and more frequent use of computers compared to younger women. The second group of women aged 22-29 had a moderate level of digital literacy, with some using computers regularly for work or personal activities, while others reported limited exposure to digital technologies. The youngest group of women aged 21-15 had limited exposure to digital technologies and reported a lower level of digital literacy.

Despite the differences in age, several common themes emerged across all focus groups, including the impact of social norms and cultural expectations on women's and girls' access to and use of digital technologies, the importance of digital literacy skills for personal and professional development, and the need for affordable and accessible digital technologies for all.

In terms of barriers to digital inclusion, the focus groups identified a range of challenges, including a lack of access to technology and the internet, limited exposure to digital skills training, and economic constraints that prevent women and girls from purchasing digital devices and accessing the internet.

Overall, the results of the focus group study provide valuable insights into the experiences and perspectives of women and girls on the topic of computer use and gender equality, highlighting the challenges and barriers to digital inclusion and the importance of addressing these issues to promote gender equality in the digital age.

Result and finding

Hypothesis	Group 1 (30+) Experienced Women	Group 2 (22-29) Young Professionals	Group 3 (21-15) Teenage Girls
Hypothesis 1	Women and girls face more barriers to accessing and using digital technologies compared to men, due to factors such as affordability, lack of digital literacy skills, and restrictive social norms and cultural expectations.	**Argument 1**: Women in this group reported limited access to technology and the internet, impacting their ability to use digital technologies regularly. **Argument 2**: The cost of technology and internet access was cited as a significant barrier, especially for women in lower-income households. **Argument 3:** Social norms and cultural expectations regarding women's roles and responsibilities were reported as a hindrance to women's and girls' access to technology and digital literacy skills.	**Argument 1**: Women in this group reported limited exposure to digital technologies and digital literacy training, which impacted their ability to use technology effectively. **Argument 2:** The cost of technology and internet access was reported as a significant barrier for many women and girls in this group. **Argument 3:** Social norms and cultural expectations regarding girls' and women's roles and responsibilities were reported as a hindrance to their access to technology and digital literacy skills.
Hypothesis 2	Women and girls who have higher levels of digital literacy skills are more likely to use digital technologies for personal and professional development, and are less likely to experience barriers to digital inclusion.	**Argument 1:** Women in this group who had higher levels of digital literacy skills reported using technology more frequently for personal and professional development. **Argument 2:** Women with higher levels of digital literacy skills reported facing fewer barriers to accessing and using digital technologies. **Argument 3:** Women with higher levels of digital literacy skills reported greater confidence in their ability to use technology, which impacted their ability to access and use digital technologies for	**Argument 1:** Women in this group with higher levels of digital literacy skills reported using technology more frequently for personal and educational purposes. **Argument 2:** Women with higher levels of digital literacy skills reported facing fewer barriers to accessing and using digital technologies. **Argument 3**: Women with higher levels of digital literacy skills reported greater confidence in their ability to use technology, which impacted their ability to access and use digital technologies for

		personal and professional development.	personal and educational purposes.
Hypothesis 3	Economic constraints, such as the cost of technology and internet access, play a significant role in limiting women and girls' access and use of digital technologies, and contribute to the digital gender gap.	**Argument 1**: Women in this group reported the cost of technology and internet access as a significant barrier to accessing and using digital technologies. **Argument 2:** Women in lower-income households reported greater difficulty in affording technology and internet access, which impacted their ability to use digital technologies. **Argument 3:** Women who reported economic constraints reported lower levels of digital literacy skills and more limited access to digital technologies, contributing to the digital gender gap.	**Argument 1:** Women in this group reported the cost of technology and internet access as a significant barrier to accessing and using digital technologies. **Argument 2:** Women in lower-income households reported greater difficulty in affording technology and internet access, which impacted their ability to use digital technologies. **Argument 3:** Women who reported economic constraints reported lower levels of digital literacy skills and more limited access to digital technologies, contributing to the digital gender gap.

Conclusion

Over the years, digitalization and computer use have significantly impacted the world, changing the way we live, work, and communicate. While these technological advancements have created new opportunities and streamlined various processes, the question of gender equality in this domain remains a relevant and essential issue to address.

In the context of digitalization and computer use, gender equality encompasses various aspects such as access to technology, digital literacy, representation in the tech industry, and the creation of inclusive digital spaces. Despite the progress made in recent years, there are still significant gender disparities in these areas.

Women and girls, particularly in developing countries, continue to face barriers to accessing technology and digital resources. These limitations often stem from socio-economic factors, cultural norms, and inadequate infrastructure. Furthermore, the gender digital divide also manifests itself in the form of digital literacy gaps, with women and girls having fewer opportunities to develop necessary digital skills.

Representation in the tech industry is another critical aspect of gender equality. Although women have made inroads in recent years, they still remain underrepresented in various technical and leadership positions within the industry. This underrepresentation not only hampers the diversity of thought and innovation but also perpetuates gender stereotypes that can discourage women from pursuing careers in tech.

In addition to addressing these issues, it is crucial to create inclusive digital spaces that cater to the unique needs and concerns of women and other marginalized groups. The development of technology that is sensitive to gender-specific requirements can help foster a more equitable digital landscape. This may include designing platforms that prioritize user safety and privacy, and addressing gender biases in algorithms and artificial intelligence.

Efforts to promote gender equality in digitalization and computer use must be multifaceted, involving collaboration among various stakeholders such as governments, NGOs, educational institutions, and the private sector. Policies and initiatives that seek to bridge the gender digital divide, promote equal representation, and create inclusive digital spaces are integral to achieving gender equality in this domain.

Open Question: How can men in the tech industry become active allies and work together with women to break down the barriers to gender equality in digitalization and computer use?

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