

Unlocking Potential: The Impact of ICT on Female Education and Employment in Bangladesh

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Abstract

The widespread adoption of ICT in recent years has opened up new avenues for female learners and job seekers, creating opportunities for skill development and career advancement. Therefore, this paper explores the impact of ICT on female education and employment in Bangladesh and identifies the potential for future growth and development. The study was conducted using a quantitative approach, and data were collected from 400 respondents. The findings reveal that the majority of female students reported having access to ICT tools (84% of female students had access to smart phones, 33% computers, and 38% tablets), which indicates closing the digital gender gap in education. Besides, the majority of female employees articulated that they have access to ICT tools (87% of female employees had access to smart phones, 40% to computers, and 34% to tablets) that offer versatility and

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enable easy access to information and communication technologies in their employment.

Key Words: ICT, Female Potential, Empowerment, Female Education, Female Employment.

1. Introduction

Information and communication technology (ICT) is crucial to the development of the global educational system in the fourth industrial age. ICT usage in education, in particular, improves learning effectiveness, adding value to both teaching and learning (Ahmed, 2023). It supports students' ability to communicate creatively and learn effectively (Henderson, 2020). Additionally, ICT expanded learning in a way that was not before possible. In the years, after the introduction of ICT in education, students discovered that studying in a technologically enhanced environment was more interesting and engaging than in a typical classroom setting (Kerrey et al., 2000). ICT, on the other hand, contributes significantly to the creation of jobs and serves as a catalyst for economic growth. Small firms' competitiveness and ability to reach global markets are significantly impacted by the successful use of information communication technology (Chege & Wang, 2020). In a statistics, it was found that about 60.67% of the women had the ICT access around the world whereas 80% had the interest (Sobowale et al., 2016). In this context, Liong et al. (2023) articulate that information and communication technology (ICT) has a crucial role in women's higher education and employment. Although gender disparities have been explored in terms of using ICT, young females are highly motivated to continue their education and employment in the ICT sectors.

Similarly, adolescent females with low levels of gender stereotypic beliefs believe that high degrees of parental and peer support stimulate them to develop their careers in the ICT sectors (Liong et al., 2023). Respectively,

it was found that information technology has a vital role in the development of women's entrepreneurship in the twenty-first century. Information technology provides a suitable working environment for women so that they can play a praiseworthy role in both economic and social development. Moreover, in terms of facilitating job access for women and prompting marketing activities, especially in e-retailing, information and communication technology play a noteworthy role in today's world (Mivehchi, 2019). Conversely, ICT creates a healthy environment for marginalized people, including women, so that they can turn themselves into human resources for the labor market. Besides, ICT has affirmative implications for female labor participation in different workforces in different developing countries. In this vein, different economic factors, including income disparities, per capita income, and fertility rates, significantly influence women's engagement in the labor market (Nikulin, 2017). Similarly, in another recent statistic, it was observed that women are working in diverse IT positions, including 16% working in general management affairs, 31% working in shared management (IT, HR), 11% working in business management, and 3% working at the CEO level around the world. These statistics clearly indicate women's access to the ICT sector around the world (Sherif, 2023).

However, the application of ICT has shown great promise in unlocking the potential of female learners (Hussain, 2021) in Bangladesh by enhancing their educational opportunities and improving their employment prospects (Amarjeet & Bhura, 2021). Despite some progress, women continue to face significant barriers in accessing education (Yousaf & Schmiede, 2017) and securing formal employment opportunities (Banks, 2013). However, the widespread adoption of ICT in recent years has opened up new avenues for female learners and job seekers, creating opportunities for skill development and career advancement (Gadi, 2022). Therefore, this paper

explores the impact of ICT on female education and employment opportunities in Bangladesh and identifies the potential for future growth and development.

2. Aim and Objectives of the Study

The main aim of the study was to explore the impact of ICT on female education and employment in Bangladesh. The particular objectives were:

- a) To identify the current status of accessing ICT tools for both female students and employees in Bangladesh.
- b) To examine the benefits of using ICT tools for both female students and employees in education and employment in Bangladesh.
- c) To investigate the challenges of using ICT tools for both female students and employees in education and employment.

3. Literature Review

The transformative influence of information and communication technology (ICT) on female education and employment in Bangladesh is a burgeoning field of study. As the country endeavors to achieve economic advancement, the field of information and communication technology (ICT) emerges as a catalyst, leading to a transformation of conventional gender roles. The provision of digital resources has the potential to empower women (Akhter & Ahmed, 2022) through the facilitation of educational possibilities that were previously unattainable. Digital platforms serve as a means to address disparities in formal education, facilitating the cultivation of essential skills for modern professional environments. In addition, information and communication technology (ICT) plays a crucial role in providing flexible work arrangements, which in turn allows women to actively engage in the labor market while effectively managing their household duties. From

this perspective, it is crucial to analyze the intricate intersections between ICT and female education and employment in order to comprehend the socio-economic ramifications within the specific setting of Bangladesh.

Sultana (2022) conducted a study on examining the impact of information and communication technology (ICT) on the provision of educational opportunities for marginalized populations, with a particular focus on females, in order to facilitate their empowerment. The research primarily focuses on identifying the variables that contribute to the vulnerability of girls in Bangladesh, including but not limited to inequality, sociocultural structures, and economical constraints. The research further elucidates that as a result of these circumstances, women's professional trajectories are limited, and they encounter barriers to their empowerment. The research used a mixed methods approach, whereby primary data was acquired via focused group discussions (FGD), while secondary data was obtained from government websites, relevant papers, and books. The study's results demonstrate that Information and Communication Technology (ICT) has the potential to provide a diverse array of educational possibilities for females by facilitating the use of open and distant learning (ODL) resources. In a similar vein, the research proposes that girls belonging to marginalized populations have the ability to experience empowerment via their involvement in information and communication technology (ICT)-enabled education, leading to significant life transformations. Nevertheless, the study fails to explicitly address the influence of ICT on female education and employment inside the nation (Sultana, 2022).

Besides, Jamal et al. (2022) examined a study concerning the empowerment of females in information and communication technology education. The study predominantly highlights the gender inequality issues that hinder women's empowerment in Bangladesh. In particular,

the study depicts the poor participation of women in science, technology, engineering, mathematics, and ICT-based education. The study was carried out by focusing on a qualitative research approach, whereas the findings of the study demonstrate that due to socio-economic disparity, girls and women in Bangladesh are still struggling to develop their careers in the ICT sector (Jamal et al., 2020).

Similarly, Hassan et al. (2020) investigated the effects of ICT training and education on the employability and entrepreneurial abilities of women, with a focus on their contribution towards the attainment of sustainable development objectives. The study specifically examines the impact of skills-based information and communication technology (ICT) training and education on the employability of women and their entrepreneurial abilities within the Pakistani environment. The study used a quantitative research strategy, using the survey method to gather data. Furthermore, the data analysis included the use of partial least square structural equation modeling (PLS-SEM) using the SmartPLS software. The results of this study indicate that the provision of skills-based ICT training and education has a notable and favorable influence on the employability of women, as well as their entrepreneurial aptitude. Correspondingly, there exists a good correlation between women's employability abilities and their entrepreneurship talents (Hassan et al., 2020).

Respectively, Hussain & Chen (2018) conducted a study on the impact of information and communication technology (ICT) in terms of developing entrepreneurial possibilities for women in Bangladesh. The primary focus of this study was to examine the many issues related to information and communication technology (ICT) and the limitations it imposes on female entrepreneurs who operate small and medium enterprises (SMEs) in Bangladesh. Additionally, the research underscores the need to incorporate information and communication technology (ICT) management in order to

achieve operational success in small and medium-sized enterprises (SMEs). The study was conducted by following a qualitative approach, whereas secondary data were used to develop findings. However, the findings of the study examined and analyzed the potential benefits of ICT for women entrepreneurs in Bangladesh, with a focus on its role in promoting ongoing improvements in women's empowerment. The findings of the study also examined the current partnership between women entrepreneurs and information and communication technologies (ICTs) in Bangladesh. Furthermore, the study results underscore the notion that entrepreneurship has a distinct potential for fostering women's self-reliance. Nowadays, women in Bangladesh are actively involved in establishing their own entrepreneurial ventures. For instance, they are engaged in the operation of various establishments such as boutique shops, food shops, and restaurants. The pursuit of entrepreneurship has the potential to significantly transform individuals' lives and contribute to the advancement of women's empowerment (Hussain & Chen, 2018).

While prior research has made major contributions to understanding the impact of ICT on women's empowerment, there is a gap in the literature about the exploration of women's potential and their existing access to ICT tools for educational and career development. Hence, this research endeavors to examine the influence of information and communication technology (ICT) on the educational and career opportunities for women in Bangladesh while also identifying the prospects for future expansion and advancement in this domain.

4. Materials and Methods

4.1 Research Design and Approach

This study was conducted using a quantitative research methodology. Quantitative research is often defined as the collection and examination of numerical data,

together with the formulation of hypotheses and the extrapolation of results to larger populations (Bhandari, 2020). The inquiry was guided by the positivist school of thought, and an explanatory research strategy was used. The primary goal of adopting the quantitative approach was to examine how ICT has affected female employment and educational prospects in Bangladesh and to identify areas with the greatest potential for growth and development in the future. One of the primary reasons for the use of the quantitative approach was that it made it easier to produce descriptive statistics (Madrigal & McClain, 2020).

4.2 Study Area and Target Population

To investigate the impact of ICT on female education and employment in Bangladesh, the author conducted a cross-sectional survey of 400 female respondents who belonged to the Jatiya Kabi Kazi Nazrul Islam University, Trishal, Mymensingh whereas 200 respondents were female students and 200 respondents were female employees. These samples were designed by stratified random sampling.

3.3 Data Collection and Analysis Procedures

The survey was conducted using a structured questionnaire that included questions related to their access to and use of ICT, their educational and employment status, and their perceptions of the impact of ICT on their education and employment. Then the collected data were analyzed using the statistical software SPSS version 20. Descriptive statistics such as frequencies were calculated to summarize the characteristics of the sample.

5. Results and Discussion

In this study, a univariate analysis approach was used to interpret and present the data. In particular, bar charts, pie

charts, and column charts were used to present the survey findings. Accordingly, descriptive statistics were carried out to analyze the data.

5.1 Demographic Analysis

Since the principal objective of the study was to explore the impact of ICT on female education and employment in the 21st century, this segment (Table 1) precisely exhibits the respondents' gender, age, level of education, marital status, living area, employment status, and nature of employment.

As the study mainly focused on the impact of ICT on female education and employment, 100% (n=400) of the respondents were female, but there were two categories: 50% (n=200) were female students of different departments, and the remaining 50% (n=200) were female employees who belong to the Jatiya Kabi Kazi Nazrul Islam University, Trishal, Mymensingh (see Table 1). At the same time, it was identified that the majority of the respondents were aged between 18 and 24 years, which contributed 67% (n=268) of the respondents. The survey also demonstrated that 30% (n=20) of the respondents were undergraduates, whereas only 20% (n=80) were newcomers. However, the survey data exhibits that the majority of the respondents, i.e., 85% (n=340), were unmarried, and most of the respondents, i.e., 82% (n=328), belonged to urban areas in Bangladesh (see Table 1).

Table 1: Demographic analysis

Variables		Frequency	Percent (%)	Cumulative Percent (%)
Gender	Female	400	100	100
	Female Students	200	50	50
	Female Employees	200	50	100
Age	18-24	268	67	67
	26-35	132	33	100
Level of Education	Newcomer	80	20	20
	Undergraduate	120	30	50
	Graduate	100	25	75
	Post-Graduate	100	25	100
Marital Status	Married	60	15	15
	Unmarried	340	85	100
Area of Living	Rural Area	72	18	18
	Urban Area	328	82	100
Employment Status	Employed	200	50	50
	Job Seekers	60	15	65
	Students	140	35	100
Nature of Employment	Tuition	240	60	60
	Entrepreneurship	100	25	85
	Event Management	60	15	100

Source: Field Survey at Jatiya Kabi Kazi Nazrul Islam University (January-April 2023).

Although 50% (n=200) of the respondents were employed in different sectors [including 60% (n=240) were involved in tuition, 25% (n=100) were involved in entrepreneurship, and only 25% (n=100) were involved in event management], only 15% (n=60) of the respondents were job seekers, and the remaining 35% (n=140) of the

respondents were ongoing female students of different departments of Jatiy Kabi Kazi Nazrul Islam University (Table 1).

5.2 Female Students Access to ICT Tools (Smart phones, Computers, Tablets)

According to the survey data, it is evident that female students' participation in using ICT tools varies across different devices. In terms of smartphone access, a significant majority of female students, accounting for 84% (n=336) of the total, have access to smartphones (Figure 1). This significant number indicates that female students have easy access to and use smartphones as an information and communication technology (ICT) tool. Smartphones are lightweight, adaptable, and user-friendly gadgets that make it simple to access a variety of internet services and apps that provides a significant educational assistance to the female gender. In this case, the large proportion of female students who have access to smartphones shows a promising development in closing the digital gender gap since it enables them to interact with a variety of educational and technical resources.

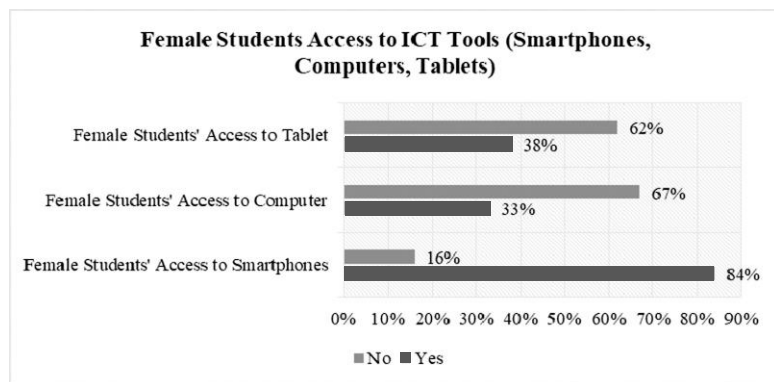


Figure 1: Female Students Access to ICT Tools (Smart phones, Computers, Tablets)

Conversely, the findings show that female students participate at a lesser level when it comes to computer access. In contrast to smartphone availability, only 33% (n=132) of female students had access to computers, showing a considerable discrepancy (Figure 1). This lower proportion may be caused owing to a number of factors including a lack of computer knowledge, budgetary restrictions, cultural hurdles, or the inaccessibility of computers in certain places. As computers provide more comprehensive functionalities for educational purposes, software development, programming, and other advanced ICT skills, the lower access to computers indicates a potential threat to women's empowerment. Therefore, concerned authorities should prioritize promoting gender equality and digital inclusion.

Similarly, the survey data shows that 38% (n=152) of female students have access to tablets. While this percentage is higher than that of computer access, it still indicates that a significant number of female students lack access to this ICT resource. Compared to desktops, tablets provide a more interactive and portable medium, making them appropriate for a variety of educational apps, e-books, and multimedia material. However, the lower access to tablets suggests a need for efforts to increase availability and affordability of these devices to ensure that all female students have equal opportunities to engage with modern digital technologies.

However, the findings indicate that female students have relatively high smart phone access rates, but there is still space for growth in terms of tablet and computer access. Besides, providing female students with equal access to computers and tablets will enable them to gain vital ICT skills, participate in academic activities, and interact with the increasingly digital world. Therefore, every female student should have access to the tools she needs to succeed in the digital age by bridging the gaps that still exist and promoting gender equality in the use of ICT technologies.

5.3 Female Employees Access to ICT Tools (Smartphones, Computers, Tablets)

According to the survey data, it is evident that the use of ICT tools by female employees differs depending on the device. There is a significant majority of female employees who have access to smartphones, making up about 87% (n=348) of the total (Figure 2). This high number shows that women employees have easy access to and use smartphones as ICT tools. Smartphones offer portability, versatility, and a wide range of applications and internet services, enabling easy access to information and communication technologies.

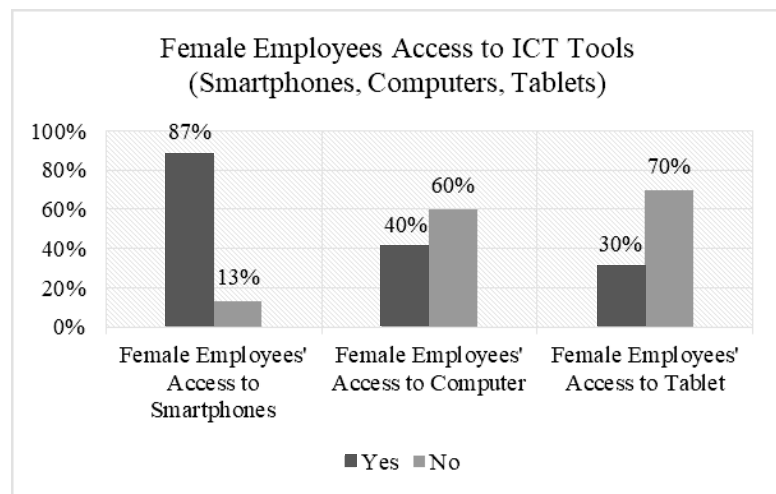


Figure 2: Female Employees' Access to ICT Tools (Smartphones, Computers, Tablets)

The large proportion of female employees who have access to smartphones is a positive trend in closing the digital gender gap in the workplace since it enables them to participate in a variety of work-related activities, communications, and digital resources. The findings reveal that 40% (n=160) of female employees have access to

computers when it comes to computer use (Figure 2). Even though this proportion is smaller than smartphone access, it nevertheless shows that a substantial proportion of female workers use computers for tasks linked to their jobs. Computers offer expanded capabilities and are frequently used for tasks such as data analysis, document processing, and software application development. The data suggests that there is still room for improvement in providing equal access to computers for all female employees, as the remaining 60% (n=240) without access may face limitations in utilizing these essential ICT tools for their work (Figure 2).

Similarly, 34% (n=136) of female employees have access to tablets, according to the data. Despite the fact that this percentage is lower than that of computer access, it indicates that a significant number of female employees use tablets as ICT instruments. Tablets provide a portable and interactive platform that is suitable for a variety of work-related tasks, presentations, and digital content access. The data suggest, however, that tablet accessibility for female employees must be improved, as the remaining 64% (n=256) without access may be unable to maximize the benefits of this device in their professional endeavors (Figure 2).

Nevertheless, the above findings demonstrate a relatively high level of smartphone access among female employees, indicating their active engagement with ICT tools in the workplace. However, providing equal access to computers and devices for all female employees still has room for improvement. Providing equitable access to these devices will enable female employees to improve their ICT skills, productivity, and professional development. Therefore, efforts should be made to close extant disparities, promote gender equality in access to ICT tools, and provide the necessary resources for all female employees to flourish in the digital workplace.

5.4 Benefits of Using ICT Tools in Education and Employment

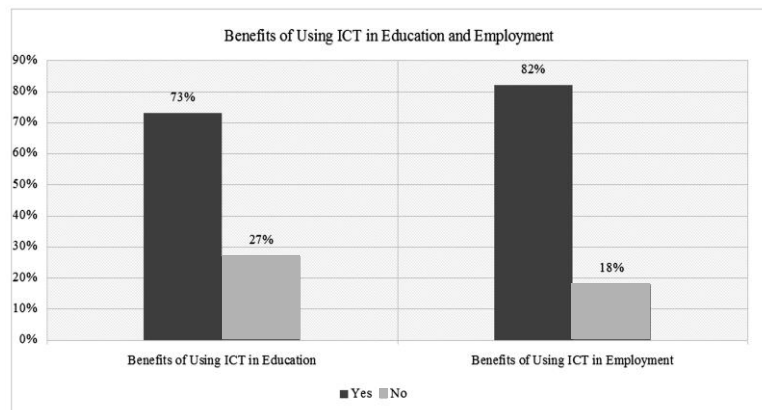


Figure 3: Benefits of Using ICT in Education and Employment

The survey data highlights the perceived benefits of using ICT tools among female students in education and female employees in employment. Among female students, a vast majority of 73% (n=292) believe that they enjoy the benefits of using ICT tools in education. These statistics indicate a positive perception among female students regarding the advantages of incorporating ICT tools into their learning process. The use of ICT tools in education can enhance various aspects including access to information, interactive learning experiences, collaboration, and the acquisition of digital literacy skills. The high percentage of female students acknowledging these benefits suggests that ICT tools positively impact their educational journey, enabling them to explore new resources, engage with digital content, and develop essential skills for the digital age. In contrast, 27% (n=108) of female students do not perceive the benefits of using ICT tools in education. The reasons for this perspective could vary, including limited access to ICT tools, inadequate digital infrastructure, a lack of awareness about the potential benefits, or personal preferences for

traditional learning methods. These findings indicate a need for further efforts to bridge the digital divide and ensure that all female students have equal opportunities to experience the benefits of using ICT tools in education.

Correspondingly, among female employees, an impressive 82% (n=328) believe that they enjoy the benefits of using ICT tools in their employment. This reflects a positive perception among female employees regarding the advantages of ICT tools in the workplace. The use of ICT tools in employment can streamline tasks, improve communication and collaboration, enhance productivity, and enable access to a wide range of digital resources. The high percentage of female employees acknowledging these benefits indicates that ICT tools positively impact their work performance and professional growth.

Nonetheless, it is worth noting that 18% (n=72) of female employees do not perceive the benefits of using ICT tools in their employment. Possible reasons for this viewpoint might include limited exposure to ICT tools in their specific work roles, resistance to change, inadequate training or support, or the perception that traditional methods are more effective. These findings suggest a need for organizations to address these concerns and ensure that all female employees have access to appropriate ICT tools, training, and support to fully leverage the benefits of these technologies in their work environment.

Conversely, the data highlights the positive perception of both female students and female employees regarding the benefits of using ICT tools in education and employment, respectively. However, there is a subset of individuals who do not perceive these benefits, indicating the importance of addressing barriers, providing adequate training and support, and promoting awareness about the advantages of ICT tools. By doing so, more female students and employees can unlock the full potential of ICT tools,

enabling them to thrive in their educational and professional pursuits.

5.5 Challenges of Using ICT Tools in Education and Employment

The survey data sheds light on the perceived barriers faced by female students in using ICT tools in education and female employees in using ICT tools in employment. Among female students, a significant majority i.e. 65% (n=260) argue that they face diverse barriers when it comes to using ICT tools in education.

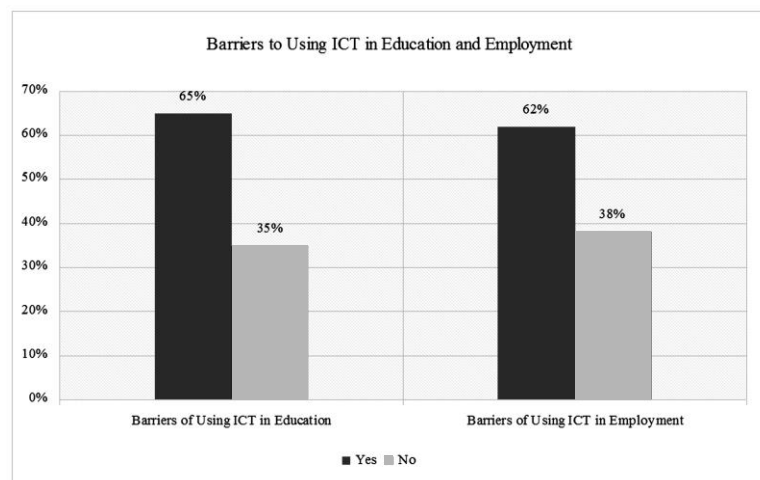


Figure 4: Barriers to Using ICT in Education and Employment

This indicates that a considerable portion of female students encounter challenges or obstacles in effectively utilizing these tools for educational purposes. The barriers include limited access to technology, inadequate digital infrastructure, a lack of necessary training, technical support, and financial constraints, cultural and social factors that discourage their engagement with ICT tools. These findings highlight the need to address these barriers and

ensure equal opportunities for all female students to access and benefit from ICT tools in education.

Conversely, 35% (n=140) of female students do not perceive diverse barriers to using ICT tools in education. This minority may have better access to technology, supportive environments, or prior exposure to ICT tools, enabling them to overcome potential barriers more easily. However, it is crucial to ensure that the majority of female students who perceive barriers receive the necessary support and resources to overcome these challenges, promoting digital inclusion and equal educational opportunities.

Similarly, among female employees, 62% (n=248) debate that they face diverse barriers to using ICT tools in their employment. This suggests that a significant proportion of female employees encounter various challenges when utilizing ICT tools in their work settings. These barriers include limited access to technology, specific software, inadequate training, inadequate technical skills, a lack of supportive policies, poor organizational culture, gender biases, a lack of awareness about the benefits and effective use of ICT tools, etc. Addressing these barriers is crucial to enabling female employees to fully leverage the potential of ICT tools, enhance their productivity, and advance their careers.

Conversely, 38% (n=152) of female employees do not perceive diverse barriers to using ICT tools in their employment. This minority may have more favorable work environments, comprehensive training opportunities, prior experience with ICT tools, allowing them to navigate these technologies effectively. However, it is essential to recognize the majority who face barriers and ensure that necessary measures are taken to overcome these challenges, such as providing training programs, improving access to technology, fostering an inclusive workplace culture, and addressing gender disparities.

In conclusion, the data indicates that a significant proportion of both female students and female employees perceive diverse barriers when it comes to using ICT tools in education and employment, respectively. These barriers can hinder their access, engagement, and ability to fully benefit from ICT tools. Addressing these barriers and promoting equal opportunities, access, and support for all females is vital to ensuring their active participation, empowerment, and success in utilizing ICT tools for educational and professional purposes.

6. Conclusion

However, the overall study findings revealed that ICT tools have had a significant positive impact on both female learners and employees in the country. The utilization of ICT tools in their educational and professional endeavors has provided numerous benefits and opportunities for empowerment. The findings indicated that female learners have experienced significant benefits from using ICT tools in education. They reported enhanced access to educational resources, improved learning outcomes, increased engagement and motivation, and the development of digital literacy skills. Similarly, female employees expressed that ICT tools have facilitated their employment opportunities, skill development, and career advancement.

Despite these positive impacts, the study identified several barriers that hinder the full participation of females in ICT in Bangladesh. Limited access to technology, inadequate digital infrastructure, insufficient training opportunities, lack of technical support, and financial constraints emerged as major challenges. Additionally, cultural and social factors, such as gender stereotypes and societal norms, further contribute to the underrepresentation of females in the ICT sector.

7. Recommendations

To address these challenges and promote greater female participation in ICT, several suggestions can be put forward:

- 7.1 Improve access to technology and digital infrastructure:** Efforts should be made to expand the availability of ICT tools, including smartphones, computers, and internet connectivity, particularly in rural and marginalized areas. This can be achieved through initiatives such as subsidizing technology costs, establishing community technology centers, and enhancing broadband connectivity.
- 7.2 Enhance digital literacy and technical skills training:** Providing comprehensive training programs on ICT skills, digital literacy, and computer programming is essential to empower females and equip them with the necessary knowledge and competencies to effectively use ICT tools. These programs should be accessible, affordable, and tailored to the specific needs of females.
- 7.3 Promote awareness and change cultural norms:** There is a need for targeted awareness campaigns to challenge gender stereotypes and cultural barriers that discourage female participation in ICT. These campaigns can highlight successful female role models in the ICT field, promote positive narratives, and foster a supportive environment for females pursuing ICT-related education and careers.
- 7.4 Establish support networks and mentorship programs:** Creating mentorship programs and support networks can provide guidance, encouragement, and opportunities for female learners and professionals in the ICT sector. Mentors and role models can offer valuable insights, career advice, and networking

opportunities to empower females and foster their professional growth.

7.5 Collaborate with public and private sectors:

Partnerships between the government, educational institutions, non-profit organizations, and private companies are crucial to address the multifaceted challenges associated with female participation in ICT. These collaborations can facilitate resource sharing, capacity building, and the implementation of gender-inclusive policies and initiatives.

By implementing these suggestions, it is possible to mitigate the barriers faced by females in accessing and benefiting from ICT tools in Bangladesh. Empowering females in the realm of ICT education and employment will not only contribute to their individual growth but also foster economic development, gender equality, and social progress in the country.

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