Original Article

Gender Digital Divide and Education: A Reflection from the University of Nairobi, Kenya

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ABSTRACT

The use of digital technology safely and effectively is increasingly becoming important. Moreover, since the onset of the COVID-19 pandemic, digital technological skills have continued to transform the educational landscape, bringing a wide range of benefits to both students and teachers. This requires both men and women students and teachers to know how to use digital devices and connectivity tools for high-quality and future-focused teaching and learning processes. The objective of the study was to find out the extent to which gender digital divide exists in the Faculty of Education, University of Nairobi. Findings and information presented and discussed in this paper were obtained from a critical review of relevant literature based on gender and digital technology in education. In addition, using documentary analysis guide statistical data based on the number of women and men in selected Information, Communication and Technology courses was derived from the University of Nairobi's E-Graduation booklets covering three consecutive academic years; 2020, 2021 and 2022. Descriptive data was computed using frequencies and percentages. Findings reveal that gender digital divide gap is clearly visible, for instance, there were only 6 and 8 men and no women graduates in Masters of Science in Computer Science and Masters in Education Technology respectively. Such gender disparity is likely to impact the number of women pursuing Information Communication and Technology-related careers. There is evidence to show that to some extent, the gender digital divide is a result of gendered-related social norms and stereotypes to poor advocacy of digital technological careers. Thus, there is a need to encourage both men and women students to study Information Communication and Technological courses with the aim of ensuring inclusivity and equitable education for everyone, while developing lifelong learning opportunities as stipulated in Sustainable Development Goals 2030.

INTRODUCTION

The aim of this paper is to explore the extent to which gender digital divide exists in the universities, in particular in the Faculty of Education, University of Nairobi using selected Information, Communication and Technology (ICT) degree courses. The researcher will begin by discussing definitions of key terms; namely digital technology and skills and digital divide, with the aim of making it easier for the reader to conceptualize and understand the key concepts presented in this paper. This will be followed by a discussion on the benefits of ICT to teachers and students, statistical evidence on gender digital divide, methodology, presentation and discussion of findings derived from the Faculty of Education, University of Nairobi. In addition, reasons explaining the occurrences of gender digital divide will be presented. Lastly, a discussion on the suggestions on some of the ways educators and scholars can bridge the gender digital divide is presented in addition to the conclusion.

WHAT IS DIGITAL TECHNOLOGY AND SKILLS?

Digital technology is a set of tools, resources, systems, devices and resources used to generate, communicate, store or process, and manage data and information. Digital technology is continuously evolving and expanding from traditional media; radio, television and video to include social media, mobile technologies such as phones, internet, digital networks, content, services and applications among others (USAID, 2021). Digital skill is the ability to use digital devices and communication applications to access, find, evaluate, use, share, create and manage content or information using computers and smartphones. In simple words, any skill can be termed digital if it helps one to effectively operate electronic devices and work seamlessly in the digital world, for instance, social media management, emailing, instant messaging and data entry are all part of the basic digital skills. Thus, digital skills are essential skills needed for one to be able to effectively use computers and other devices to access and manage information. The digital world is continuously evolving, and technology is making its way into every aspect of people's lives, including teaching and learning at all levels of education.

WHAT IS DIGITAL DIVIDE?

Digital divide is the gap, distinction or differences between those who have and those who are excluded from accessing vital Information, Communication and Technology (ICT) resources, internet and or mobile and have or do not have the knowledge or skills to effectively use electronic forms of knowledge and communication services (Kvasny, Payton, Mbarika, Amadi and Meso, 2008; Antonio & Tuffley, 2014; USAID, 2020; USAID, 2021; Tyers-Chowdhury and Binder, no date). Digital divide is all about segregating the "haves" from the "have-nots" in information technology (Kvasny, *et.al* 2008). Without access to technology, it is difficult to develop and be competent in technical or digital skills. It becomes redundant and challenging to access technology without the basic initial knowledge or the skill to utilize it (Antonio & Tuffley, 2014).

WHAT IS GENDER DIGITAL DIVIDE?

The gender digital divide refers to the inequalities existing between men and women in terms of access and use of digital technology (USAID, 2021), or situations where men's internet access and usage exceeds that of females (Antonio &

Tuffley, 2014). In developing countries, women tend to struggle to afford and use technological products and access the internet (USAID, 2020; Tyers-Chowdhury and Binder no date). However, provision and access to ICT products is not a guarantee that men and women have the pre-requisite knowledge and skills to enjoy the benefits of the products (Antonio & Tuffley, 2014). Without equal access to digital technology and skills, women may not be able to fully participate in the current evolving digital world. Holding back women from accessing and using digital technology is likely to affect every aspect of their lives, and even their ability to speak out and campaign on issues affecting their day-to-day lives. Moreover, if women are not involved in creating digital tools and online content this could exacerbate the existing gender digital inequalities. In the next section, we shall analyse the benefits of digital technology in education and in particular the importance of equipping teachers with digital skills.

BENEFITS OF DIGITAL TECHNOLOGY AND SKILLS IN EDUCATION

The COVID-19 pandemic stimulated innovation within the education sector, unearthing new possibilities in the teaching and learning process. During this pandemic, for the first time, teachers and learners had to work and teach remotely. The pandemic highlighted the urgent need for more resilient and digital-first technology to enable students to learn from home while giving teachers the devices and connectivity tools required for high-quality and future-focused education. Technology plays a vital role in enabling teachers to access and use tools, like Microsoft Teams, Zoom and Google platforms for remote learning and virtual classrooms which has now become the norm in most institutions of higher learning. Consequently, an emergence of new approaches to learning, education, and training have come up. Since digital devices and applications for teaching and learning are here to stay, it means that educators and learners both men and women, girls and boys must be equipped with the necessary and relevant skills and knowledge on how to navigate them. The provision of digital technology and

online experiences, both formal and informal education, are critical opportunities since they accelerate the growth and development of the youth (Luvanda, 2023; Kamau, 2023) which enables them to be able to fit in the evolving technological society.

The United Nations agency noted that having more women connected to the internet will give them an opportunity to earn and generate additional income, increase employment opportunities and business pursuit and access relevant and updated knowledge and information (Luvanda, 2023; Kamau, 2023). In addition, this will facilitate social cohesion and networking, while subverting gender norms which leads to empowerment (Kamau, 2023) of both men and women. According to Kamau (2023), there is evidence to show that about 90% of jobs worldwide have a digital aspect, hence the need to fully involve men and women in the digital space. Digital technology has been touted as the basis for future jobs, a big driver of the economy; thus, having few women in this space is a way of locking out a huge chunk of the population; of innovation, entrepreneurship and future job opportunities (Luvanda, 2023; Kamau, 2023).

A gender-responsive approach to innovation, technology and digital education increases the awareness of women and girls regarding their rights and civic engagement. Thus, advancements in digital technology offer immense opportunities to address development and humanitarian challenges, and above all facilitate the achievement of the 2030 Agenda's Sustainable Development Goals (SDG). Therefore, inclusive, transformative technology and digital education are crucial for a sustainable future. SDG 4 indicator 4.4.1 on skills for a digital world measures the number of youth and adults who have the right to technological information skills. According to the global target concept indicator 4.4.1, digital skills are supposed to determine the effective use of ICT. The indicator is defined as the percentage of youth (15 to 24 years) and adults (15 years and older) who have the knowledge and skills to effectively use computers, smartphones and other relevant software.

At the Annual Mobile World Congress (AMWC) in Barcelona, Spain in 2022, Safaricom's Chief Executive Officer, further reinforced a statement by EQUALS & UNESCO (2019) while noting that the inclusion of digital skills and connectivity is no longer a luxury and an option; but a necessity and essential life skill required for the full participation in developmental aspects. The COVID-19 pandemic has demonstrated the importance of connectivity for everything from work, education, and financial services to telemedicine. COVID-19 has shown the urgency in addressing the global digital divide, which has seen many especially women being left out of opportunities for economic development. Thus, closing the gender digital divide can help women and girls to develop digital skills which translates into stronger families, communities, economies and better technological development (EQUALS & UNESCO, 2019).

Since digital literacy is considered an important skill to cope with 21st-century developments, the teacher is a crucial player in the successful implementation of ICT and should be well prepared through adequate training (Hwang et al., 2010 in Murithi & Yoo 2021). Teachers' competency is a vital capacity required to implement ICT in teaching and learning. Equipping teachers with ICT skills will go along in making teaching and learning enjoyable and interesting while motivating students to learn. For instance, by utilizing technology such as videos, images, interactive whiteboards, collaborative software and other digital resources, teachers can create engaging and stimulating learning experiences for students and reduce the burden of preparing printed materials since soft materials can be reused. The use of technology can help teachers make more complex topics easier to understand for all learners while enhancing interaction during the teaching and learning process. Thus, equipping teachers with ICT skills is likely to help them be able to create better learning experiences for their learners, in addition to preparing learners for the modern world while developing their critical thinking skills. What

statistical evidence is there to show that gender digital divide exists?

GENDER DIGITAL DIVIDE: STATISTICAL EVIDENCE

Significant statistical gaps exist globally, and in East Asia and specifically in the Pacific, about the digital literacy of girls and boys (UNICEF, 2023) or what is referred to in this paper as gender digital technology. Globally, women are accessing and using digital technology and skills in smaller numbers as compared to men. The gender-based exclusion and inequalities are present throughout the technological world (UNICEF, 2021) and at all levels of education: early childhood, primary, secondary and tertiary. In addition, women constitute less than one-third of those enrolled in ICT departments in institutions of higher learning (EQUALS & UNESCO, 2019). While in the workplace, women workers make up an estimated 26 % of Data and Artificial Intelligence roles, 15% in engineering and 12% in Cloud Computing (UNICEF, 2021).

For one to own a mobile phone, it must be registered in one's full name regardless of whether it is a man or woman. However, there is evidence to show that even if a mobile phone is registered in a woman's name, it does not necessarily mean that a woman is the primary user (USAID, 2021). The Groupe Speciale Mobile Association (GSMA) Gender Gap Report (2020) highlights that mobile phone ownership, a principal way of accessing the internet, is 20% lower for women than men. Globally, women are 7% less likely than male to own a mobile phone and 15 % less likely to use mobile internet especially in low- and middle-income countries (UNICEF, 2021). Out of 393 million women (over 18 years) without mobile phones, the majority, 207 million are in South Asia and 74 million in Sub-Saharan Africa (Rowntree & Mathew 2020).

In terms of ownership of mobile phones, Luvanda (2023) pointed out that the gender divide is larger and most pronounced in South Asia where 26% of women are less likely to own a mobile phone than men. Further, a global study by Girl Effect and the

Vodafone Foundation found that boys were 1.5 times more likely than girls to own a mobile phone and 1.8 times more likely to own a smartphone. Furthermore, 46% of boys used the internet on their phones, compared with 27% of girls (UNICEF, 2023). In Sub-Saharan Africa, the gender gap is 13% (74 million) (Luvanda, 2023. Generally, women are 20% less likely than men to own a smartphone (Rowntree & Mathew 2020; USAID, 2021; Luvanda, 2023). This shows that significant gender statistical gaps exist globally, in East Asia and the Pacific based on digital literacy (UNICEF, 2023).

In access and use of the internet, globally about 3.7 billion people have no access to the internet, with half of them being women (Kamau, 2023). More than 300 million men as compared to women are able to access the mobile internet in low and middle-income countries (Mobile Gender Gap Report, 2020). The implication here is that more than half of the world's women are offline: the global internet penetration rate for women on all devices is 48%, compared to 58% for men (a gender gap of 17-20 %) (USAID, 2021). Globally about 1 billion and 186 million women in Sub-Saharan Africa are not using mobile internet (USAID, 2021).

The implication here is that there is a growing and persistent gap in women's meaningful use of mobile technology and the internet, and this gap increases as technology gets more sophisticated and expensive. There is a tendency for women to use mobile (and mobile internet) differently and less frequently than men. Women tend to use a smaller range of mobile services than men, use mobile services (other than voice) less frequently and intensively than men; and own less expensive and sophisticated handsets (USAID, 2021). This gender divide continues to widen as technologies get more sophisticated and expensive, enabling more transformational usage and impact (EQUALS & UNESCO, 2019). The gender gaps are particularly prevalent in sending and receiving Short Message Service (SMS), use of mobile money and mobile internet. However, this divide is more glaring in the Least Developed Countries (LDCs), many of which are in Africa, where

Kamau (2023) reported that in 2020 only 19% of women in LDCs used the internet, compared to 86% in developed countries. Further evidence shows that the gender digital divide in access to the internet remains the largest globally, with the least developed countries at 32.9% while the internet gap is largest in Africa (Luvanda, 2023).

Although Kenya is the regional ICT hub for East Africa with broadband connectivity, ICT infrastructure, value-added services, mobile transfers and FinTech services, there remains a glaring concern in access to digital devices, knowledge and skills between men and women. Kamau (2023) has noted with concern that Kenya's digital revolution has continued to exclude women, resulting in a huge gender digital gap. Data drawn from GSMA Mobile Gender Gap Report 2019, shows that women in Kenya are 23% and 39% less likely to own a smartphone and have access to mobile internet respectively. The gender digital divide appears to be growing with the gap in mobile internet use increasing from 34% in 2019 to 42% in 2020. Findings from "Kenya's Digital Economy: A People's Perspective", 2021 further confirm the GSMA mobile gender gap report 2019 by revealing that 50% of women use mobile internet as compared to 71% of men, while only 35% of women use advanced digital services as compared to 54% men (Koyama, Totapally, Goyal, Sonderegger, Rao & Gosselt, 2021). This confirms that the gender gap in access and use of mobile phones and internet continues to widen.

During the two-day Kenya Edtech Summit 2023, held on September 20th in Nairobi, Kenya, education technology experts reported that despite the strides being made in digital learning in East Africa, numerous gaps continue to exist. In terms of gender divide in digital technology careers and courses in Kenya, Luvanda (2023) found out that no girl in primary school could name a single technology career. Further, the founder of Lake Hub, a technology and social innovation hub based in Kisumu, observes that the digital gender gap in Kenya needs urgent attention because women are still lagging behind in access to and adoption of digital technology and skills (Kamau, 2023). Findings by UNESCO (2017) further

confirm that the gender gap in the ICT workforce begins in the early years of women's lives, resulting in few girls in digital technology-related courses in tertiary education. The question is; to what extent is this information by UNESCO (2017) still valid even in the post-COVID-19 period?

METHODOLOGY OF THE STUDY

The use of descriptive design allowed the researcher to make use of a documentary analysis guide to analyse data from the E-graduation booklets obtained from the University of Nairobi website. Being a World Class University, the University of Nairobi offers a number of technology-related degree courses and programs at the diploma, bachelor and master's levels, namely; Computer Studies, Microprocessor Technology and Instrumentation, Information Communication Technology, Computational Intelligence, Distributed Computing and Education Technology. The degree courses were obtained from the 2020, 2021 and 2022 E-graduation booklets. Data for this paper was derived from an analysis of the men and women ICT students who graduated from the Faculty of Education, University of Nairobi in the 2020, 2021 and 2022 academic years. Using a simple

documentary analysis guide, the researcher sought to find out the number of men and women students who had graduated with the selected ICT diploma, undergraduate and postgraduate degree courses. The aim of this research was to explore the extent to which the gender digital divide exists in selected ICT courses offered in the Faculty of Education, University of Nairobi A comparative analysis was done across the three academic years; 2020, 2021 and 2022 using frequencies and percentages based on gender and the selected degree courses. Findings are presented and discussed in the next sub-section.

DISCUSSION AND PRESENTATION OF FINDINGS OF ICT GRADUATES FROM THE FACULTY OF EDUCATION, UNIVERSITY OF NAIROBI

Statistical data which was generated from the E-graduation booklets on ICT graduates by diploma, undergraduate and postgraduate degree programs and gender are presented in Tables 1, 2 and 3.

Men and Women Graduates in Computer Studies

Findings on the number of men and women graduates in computer studies are presented in Table 1.

Table 1: Graduates in Computer Studies

No	Degree Programs	Year of Graduation	Men	%	Women	%	Totals
1	Diploma in Computer Studies	2020	26	72%	10	27%	36
		2021	7	77%	2	22%	9
		2022	-		-		
	Totals		**33**		**12**		**45**
2	Bachelor of Science in Computer Studies	2020	52	83%	11	17%	63
		2021	43	73%	16	27%	59
		2022	50	84%	9	15%	59
	Totals		**145**		**36**		**181**
3	Master of Science in Computer Science	2020	4	100%	-	0%	4
		2021	1	100%	-	-	1
		2022	1	100%	-	-	1
	Totals		**6**		**0**		**6**

Data in Table 1 shows that there are more men who graduated with diplomas, bachelor and master's in computer studies as compared to

women. Out of 45 students who graduated with a diploma in computer sciences in 2020, 2021 and 2022, the majority of 33 were men and only 12

women. It is clear from Table 1 that in all three academic years there were more men graduates out of 145 who graduated with a Bachelor of Science in computer as compared to only 36 women graduates. Surprisingly there was no woman student who graduated with a master's degree in computer sciences across the three academic years.

Men and Women Graduates in Educational Information and Technology

Findings on the number of men and women graduates in Educational Information and Technology is presented in Table 2.

Table 2: Graduates in Educational Information and Technology

Degree program	Year of Graduation	Men	%	Women	%	Totals
Bachelor of Education (Information Communication Technology)	2020	7	70%	3	30%	10
	2021	20	69%	9	31%	29
	2022	2	67%	1	33%	3
Totals		**29**		**13**		**42**
Master's in Education Technology	2020	4	100%	0	-	4
	2021	-		-		
	2022	4	100%	0	-	4
Totals		**8**		**0**		**8**

Findings from Table 2 show that a total of 42 students (29 men and 13 women) graduated with a Bachelor of Education in Information Communication and Technology in 2020, 2021 and 2022. Only 8 male students graduated with a Master's degree in Education Technology. This further confirms findings by UNESCO (2017) that revealed a huge gender gap in technology-related courses in the universities which is likely to affect career progression in this competitive and demanding area of study.

Men and Women Graduates in Microprocessor Technology and Instrumentation and other related courses

Table 3: Graduates in Microprocessor Technology and Instrumentation, Information Technology Management Computational Intelligence and Distributed Computing Technology

No	Name of Degree Programs	Year of Graduation	Men	%	Women	%	Total
	Bachelor of Science in Microprocessor Technology and Instrumentation	2020	-		-		
		2021	-	-	-		-
		2022	10	83%	2	16%	12
	Totals		**10**		**2**		**12**
	Master of Science (Information Technology Management)	2020	14	56%	11	44%	25
		2021	24	71%	10	29%	34
		2022	12	67%	6	33%	18
	Totals		**50**		**27**		**77**
	Master of Science in Computational Intelligence	2020	4	100%	0		4
		2021	-		-		
		2022	50	85%	9	15%	59
	Totals		**54**		**9**		**63**

No	Name of Degree Programs	Year of Graduation	Men	%	Women	%	Total
	Master of Science in Distributed Computing Technology	2020	15	94%	1	6%	16
		2021	-		-		
		2022	3	60%	2	40%	5
	Totals		**18**		**3**		**21**

Data from Table 3 shows a glaring gender gap in the Bachelor's and Master's degree programs in favour of men students. For instance, in 2022 only 2 (16%) women students as compared to 10 (83%) men who graduated with a Bachelor of Science in Microprocessor Technology and Instrumentation, while there were no students who graduated with the same degree in 2020 and 2021. Out of 77 students who graduated with a Master of Science (Information Technology Management), 50 were men and 27 were women. A majority (63) of those who graduated with a Master of Science in Computational Intelligence in 2020 and 2022, 54 were male students (54) and only 12 women students. A similar gender disparity is noted with the Master of Science in Distributed Computing Technology in 2020 and 2022 where out of a total of 21 students, 18 were men and only 3 were women graduates.

Gender disparity among ICT graduates as shown in Tables 1, 2 and 3 further confirms findings by UNESCO (2017) and Luvanda (2023) who noted that the number of women graduating from the university with an ICT or computer science degree is disproportionately low and comprises of less than 30% of ICT graduates. With regard to digital skills, according to UNESCO (2021), data shows that women are less likely than men to have advanced digital skills. The gender digital divide reflects the inequalities existing between men and women in terms of digital technological-related careers (USAID, 2021). It is no wonder that globally women are underrepresented (14%) in software engineering (Sava, 2021). Thus, it can therefore be inferred that a significant barrier exists in women securing entry-level positions in ICT-related careers, occupations and jobs. The current study sought to further explore from available literature reasons leading to the gender digital divide in society and more so in education as presented and discussed in the next section.

WHY DOES THE GENDER DIGITAL DIVIDE EXIST?

The reasons explaining why the gender digital divide exists are interrelated and complex. According to UNICEF (2021), the existence of gendered social norms and stereotypes shows that Science Technology, Engineering and Mathematics (STEM) careers meant for boys are more likely to negatively affect girls' interest, aspirations, engagement and achievement in STEM. The fact that women are trapped in traditional family roles where girls still believe that certain homestead chores are meant for girls and others for boys tends to make them lean more towards career choices that are traditionally associated with women. Stereotypes around technology being for boys and fear of being discriminated against affect girls' interest in applying for ICT-related courses. Thus, girls tend to lack basic digital literacy skills that could give them opportunities to make use of their full potential (Antonio & Tuffley, 2014; USAID, 2020; Luvanda, 2023; Tyers-Chowdhury and Binder, no date) in joining technological-related courses and careers. Further, gendered cultural norms make some people think that access to digital devices is considered "unsafe" and "immoral" for girls and women. This is likely to restrict and minimize the usage of digital devices by both girls and women, which is likely to increase not only the gender digital divide but also gender disparities and gaps in educational attainment and achievement.

Generally, women with lower education levels disproportionately face cultural barriers, including greater time limits and mobility restrictions. Koyama, *et.al,* (2021) noted that

about 34% of women students are more likely than 15% of male students to require permission from parents and other significant others to use digital devices (only when the devices are free), while 40% of young women in rural areas are required to seek permission to travel to places with digital devices, services and network as compared to 30% men. Because of the gendered social and cultural norms, women are often less financially independent than men and have lower levels of income, thus, women tend to have less sophisticated devices and poorer user experiences. It is important to note that gender stereotypical roles are likely to affect girls' confidence, motivation and interest in developing and using more advanced digital competencies (UNICEF, 2023).

Women tend to have less disposable income to spend on mobile or internet services (USAID, 2021; Luvanda, 2023). In addition, women's choice of network is restricted by the need for more basic handsets (women are less likely to have smartphones and support mobile internet use) and the cost of data which are in turn determined by social norms and underlying gender inequalities (USAID, 2021; Luvanda, 2023). Women's use of mobile and internet platforms is further limited by the lower levels of technical and digital literacy skills and lack of confidence in the usage of technological tools and devices. There is evidence to show that mobile, internet access and use follow broader social patterns of social exclusion of women and girls; as girls and women continue to be disadvantaged in their access and use of digital technology because of underlying social conditions, including lower levels of education (USAID, 2021).

Poor advocacy of digital technology careers, and in particular lack of exposure to women role models working in ICT, unavailability of literature and media exposure promoting women working in ICT, and poor advocacy of digital technology careers during their education (Luvanda, 2023) have continued to widen the gender digital divide. Other factors; namely lack of effective career orientation counselling offered to girls before choosing examinable courses in secondary school, safety and security risks associated with online and mobile access, fear of harassment from strangers (unsolicited calls, SMS, online messages, cyberbullying) (USAID, 2021; Luvanda, 2023) and discrimination have continued to widen gender digital gap. The question remains, how do we close the gender digital divide gap?

BRIDGING THE GENDER GAP IN DIGITAL TECHNOLOGY IN KENYA

In this 21st century use of ICT in education has widely been advocated by governments and policymakers, thus the need to promote digital learning in educational institutions globally, in Africa and Kenya in particular. A number of researchers and scholars have suggested a variety of ways which can be used to bridge the gender gap in digital technology and skills.

First, there is a need to build girls' interest in ICT-related courses from the early years. The Kenya Institute of Curriculum Development should ensure textbooks and study materials at all levels of education pre-primary, primary and secondary school contain literature and images of women in ICT careers. There is a need for the Ministry of Education to partner with the Ministry of ICT and the large technological companies operating in East Africa to push to have more women in digital careers to assist in putting in place at primary and secondary schools a girls' coding program and ICT related extravaganzas. Such initiatives can go a long way in creating and enhancing ICT awareness while building confidence among young girls to enable them to effectively use digital technology to help them deal with real-life problems.

Increasing advocacy and awareness among young girls by creating mentorship roles with the aim of helping break the glass ceiling (how to stand out in a men-dominated industry) is key to bridging the gender digital divide. Designing and preparing counselling programs/sessions to help girls choose courses that will see them get admitted into ICT-related courses at the tertiary level of education is important. Enrolment can further be enhanced through scholarships for women who

choose to specialize in ICT fields, this will go a long way to increasing the number of women pursuing technology-related studies at the tertiary level (EQUAL & UNESCO, 2019).

Embedding ICT in formal education by making technology classes mandatory is important in order to avoid the 'secondary school trap' that causes the majority of girls to lose their interest in digital skills. Studies have shown that girls who are encouraged and taught to use digital devices early in life are more likely to insist on the continued use of empowering technologies (EQUALS & UNESCO, 2019). With the introduction of Competency-Based Curriculum in Kenya, digital literacy is one of the core competencies from the early years of education, signalling its importance to successful lifelong learning. The implication here is that there is a need to incorporate ICT in subsequent levels of education and training. To further guide the integration of ICT in all levels of education and training, Kenya has come up with policy frameworks, the most current one being the 2021 Policy on ICT in Education and Training. This policy provides a framework for bridging the digital divide by using computers as a tool for curriculum delivery and education management while improving learning outcomes at all levels of education. However, in order to find out the extent to which this policy has effectively been implemented there is a need to undertake an empirical study in Kenya at all levels of education.

Supporting engaging experiences, in addition to creating spaces to meet women where they are, is a necessity and a requirement. After-school clubs, extracurricular activities and camps focusing on ICT can encourage girls' digital learning to be fun and in a more relaxed environment. Digital learning should be enjoyable, whether at home, school or at a community centre (EQUALS & UNESCO, 2019). Sometimes for adult women, informal learning may be the only pathway available for developing digital skills. For instance, internet cafes and other ICT access hubs are often dominated spaces by men and are off-limits to the majority of women or located far from their homes or in unsafe areas. Public access

points should be those that are women-friendly, such as specially designed libraries, parks and community centres (EQUALS & UNESCO, 2019).

With the implementation of Competency-Based Curriculum, teachers require digital knowledge and skills since most of the activities in teachers' reference books require them to use the Kenya Institute of Curriculum Development website to find the right content, student-centred activities and resources. In addition, there is a need to recruit and train gender-sensitive teachers on how to use ICT in pedagogy. Students cannot effectively learn digital skills if teachers are not competent in ICT knowledge and skills. While gender-disaggregated data are scarce, especially on the effect of teacher quality on students' ICT skills, research suggests that unskilled teachers may disproportionately affect girls' learning in technology-related subjects (EQUALS & UNESCO, 2019). There is a need to incorporate digital skills into pre-service and in-service teacher training programs for all subjects and levels of education to ensure that teachers not only have these skills but know how to effectively incorporate them into pedagogical practices with the aim of supporting men and women students in developing proficiency. Competent and effective women teachers, particularly in ICT-oriented subjects are more likely to build girls' self-confidence in their digital skills while inspiring them to consider technology-related careers.

CONCLUSION

Findings from this study have revealed a glaring gender gap among graduates in ICT-related courses, which is likely to affect their careers in ICT. There is a need to explore various types of innovative solutions and how the integration of digital literacy in education has impacted learners at all levels of education in Kenya. Graduates with ICT knowledge and skills are likely to have better opportunities to leverage global experience with the aim of delivering quality learning for men and boys; women and girls. With the rapid technological advancements across all areas of life and work, men and boys; women and girls

need to be digitally literate and connected. This is likely to lead to unlocking access to new innovations, possibilities and opportunities for all in society irrespective of gender, disability, age and level of education. Digital literacy presents an excellent opportunity to bridge the gender digital divide while bringing quality and equality in education, thus facilitating the achievement of the 2030 Sustainable Development Goals. This can successfully be achieved by integrating digital technology into the curriculum and policy frameworks with the aim of strengthening digital education and making it more sustainable and accessible in line with the developmental goals.

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