After Access Qualitative Study of Gender and Digital Technologies: Uganda report

Consolata Kabonesa, Ruth Nsibirano, Monica Nabukalu, Donnah Atwagala and Sally Nagawa

RESEARCH ICT AFRICA

Workshop 17
17 Dock Road
V&A Waterfront
Cape Town, 8001
Cape Town, South Africa
Phone: +27 21 447 6332

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This qualitative study on gender and digital technologies was made possible by the support received from the Bill and Melinda Gates Foundation. This study was conducted across Nigeria, Ghana, Ethiopia, and Uganda, engaging teachers, adolescents, healthcare workers, and women entrepreneurs. It builds on Research ICT Africa's longstanding After Access project by deepening understanding of how gendered social and economic contexts shape experiences of digital access and use. The study complements nationally representative After Access survey data by foregrounding lived experiences behind persistent digital inequalities.

Authors: **Consolata Kabonesa, Ruth Nsibirano, Monica Nabukalu, Donnah Atwagala and Sally Nagawa**

Project director: **Araba Sey**

Reviewer: **Peter Benjamin**

Project manager: **Naila Govan-Vassen**

Research editor: **Alan Finlay**

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Executive Summary

This report synthesises findings from a qualitative case study on the use of digital technologies by women in Uganda, focusing on four target women and girl groups: adolescents, teachers, health workers, and collectives/entrepreneurs. The research used qualitative methodologies, namely interviews, focus group and group discussions, and life histories, and was conducted across the North-Eastern, Western, Eastern, and Central regions in the country.

The overall aim of the study was to understand the outcomes of the organic use of digital tools, services and platforms by women. The study explored trends in the use of digital tools and resources by women, barriers and challenges and pathways to enhancing women's access to and use of digital resources, the types of outcomes associated with the adoption of digital tools, and the links between the use of digital tools and gender equality and equity objectives.

The results indicate persistent gender inequalities in digital access and use, rooted in socio-cultural, economic, and infrastructural disparities. Despite some progress in access to mobile phones and internet services, women, particularly in rural and disadvantaged communities, remain significantly underserved. While smartphones and digital tools have increasingly become essential in women's lives for communication, in business, for accessing information and education, and service delivery, significant barriers limit their transformative uptake and meaningful use.

Adolescents' experience with digital technologies is dynamic, multifaceted, and deeply woven into the fabric of their daily lives. They emerged as the most enthusiastic and adaptive users across the participants, viewing digital technologies not just as tools but as core to their identity and social connections, and as powerful enablers of communication, learning and entrepreneurship. While digital tools enhance their agency and connection to the global world, they also introduce new vulnerabilities such as digital addiction, online scams, and an exposure to gambling that demand responsive policies and supportive environments.

Women teachers utilise digital technologies for instructional planning, content sharing, tracking student performance, research, and virtual learning. The Teacher Effectiveness and Learner Achievement (TELA) app is a key tool introduced by the Ministry of Education and Sports to monitor teacher attendance and teaching. Teachers in urban settings are more digitally engaged, using the internet, and devices like smartphones, projectors and laptops to enable lesson planning and teaching, research, and student assessment, while rural teachers face constraints due to network and unreliable power, and uneven digital pedagogy skills. Nonetheless, digital tools have enabled professional growth and supported remote learning during challenging times such as the COVID-19 lockdown.

Women in the health sector have integrated digital technologies into patient care, data management, continuous personal and professional development, and professional communication. Tools like mTrac – a mobile phone-based health information system used to strengthen and facilitate the flow of relevant and timely data into Uganda's national health management information system (HMIS) using SMS – enables real-time health data reporting to national systems, enhancing responses to disease outbreaks, health campaigns, referral management, and peer coordination. Smartphones are used in accessing information, professional consultations, and public health campaigns. Digital technologies also support social and personal life activities for health workers. However, rural Village Health Teams, often unpaid, rely more on feature phones, creating a capability gap with salaried health workers. Issues like network

instability, phone and data accessibility and affordability, limited digital literacy and cultural resistance from spouses persist.

Women in informal businesses use digital platforms for marketing, mobile banking, customer engagement, accessing market information, and gaining entry into employment spaces. Phones, primarily basic or feature phones, serve as essential business tools. Some collectives pool resources to buy smartphones for group marketing and administration. Use of apps like WhatsApp, TikTok, and Google have enabled women to expand markets and connect with customers beyond their communities. While practical, peer-led digital skills training, and affordable devices are catalytic, these are typically unavailable to women collectives and informal entrepreneurs. At the same time, cultural resistance to economic freedom and women's empowerment continues to constrain women's access to and use of digital technologies.

Across the groups, the findings indicate mobile phones, especially basic or feature phones ("*Kabiriti*"), remain the primary entry point for accessing digital technologies. Smartphones are essential for professional work among teachers and health workers, and for learning and socialising among adolescents. Affordability and battery longevity drive device choice; Tecno and Itel models are preferred among price-sensitive users and areas with unreliable electricity.

Digital technologies have improved communication, service delivery, financial transactions, and access to information and knowledge across sectors. WhatsApp, Google, and TikTok are the most used apps. Despite improvements factors such as affordability, low digital literacy, and cultural norms and gender-based restrictions fuelled by patriarchal entitlement continue to hinder women's digital autonomy, especially in rural areas and among lower-income women. Finally, there are clear differences in digital usage and access between urban and rural women, adolescents and older women, and between sectors.

This study affirms that digital technologies are materially expanding opportunities for adolescent girls and women in Uganda economically, socially, and professionally. Mobile-led connectivity enables market access, professional service delivery (e.g. mTrac/TELA), financial inclusion, youth expression, and learning. Exposure to digital spaces is also contributing to shifting gender norms, with more women transacting independently, traveling for business, and participating in organisational governance. However, these benefits are not equitably distributed. To ensure women's meaningful participation in the digital economy and public life, structural and cultural barriers must be systematically addressed.

This means not only investing in the hardware necessary for connectivity, but in the social infrastructure that empowers every woman and adolescent to use digital tools with confidence, freedom, and purpose. A coordinated effort between government, development partners, civil society, and the private sector is essential to realising digital transformation that is equitably accessible, and which promotes gender equality and equity, and sustainable development.

Strategic implications for donors, government, and practitioners:

- Promote gender-responsive digital policy to ensure equity in digital access, safety, and ownership, and engage men and women in community sensitisation to challenge harmful norms;
- Invest in infrastructure development like expanding mobile coverage and electricity access in rural areas (for example introduce accessible solar energy solutions and communal phone-charging stations);

- Strengthen and support the integration of digital tools into government service delivery systems as is the case with health and education, ensuring they are user-friendly, require low-bandwidth, and are accessible to all;
- Provide targeted subsidies and credit schemes to improve women's access to smartphones and data;
- Support inclusive digital platforms and apps that accommodate women with disabilities and non-English speakers and promote peer-to-peer learning models and community-based training hubs;
- Scale up digital literacy programmes tailored to women's needs, especially women in the informal sectors and rural areas.

1. Introduction

1.1. Background

Digital technologies are defining a new revolution and have gradually permeated all human activities globally. Yet inequalities in who has productive access to these technologies has for a long time been a topic of concern. The International Telecommunication Union (ITU, 2025) estimates that 2.6 billion people are currently unconnected, the majority being women and girls. Evidence also shows that across countries there are gender variations in access to and use of technologies between males and females (Sey, 2023, Sey and Hafkin, 2019, O'Donnell & Sweetman, 2018, Goswami and Dutta, 2016, and Yahel, 2015). which intersect with age, education, income, class, and location, and are also influenced by cultural norms. These intersectional disparities in women's access to technology reduce their opportunities for social and economic empowerment and need to be better understood in order to develop adequate policy responses that promote inclusive and sustainable development and address underlying structural factors that result in disadvantaged socio-economic conditions for women.

Uganda has developed a robust policy, regulatory and governance framework for digital technologies. Between 2020 and 2024 it established a strong environment for digital development, with the following key instruments put in place

- The Uganda Digital Transformation Roadmap (2023/24-2027/28) aims at enhancing digital infrastructure and connectivity, promoting digital services, empowering through digital skills and literacy, strengthening cyber security, data protection and privacy, and fostering innovation and entrepreneurship;
- The Uganda Communications Commission's (UCC) 2020-2024 Strategic Plan. Its vision is 'An Inclusive Digital Economy' and it aims to develop a robust communications sector that drives economic growth;
- The Digital Uganda Vision (DUV) articulates a 2040 outlook of "empowering citizens through a digitally enabled society". The DUV is operationalised through the Digital Transformation Roadmap 2023/24–2027/28;
- The National Fourth Industrial Revolution Strategy (2020) provides a vision for a Continental Fourth Industrial Revolution hub that enables a smart and connected Ugandan society;

- The Computer Misuse Act (2011) and its 2022 Amendment addresses security concerns by criminalising unauthorised access, cyber harassment, and malicious online behaviours;
- The National Payment Systems Act (2020) provides a legal framework for electronic payments and e-money;
- The National Competition and Consumer Protection Policy (2023) promotes consumer welfare through protection of their rights and guarding them against exploitation; and
- The Uganda National Gender Policy addresses mainstreaming gender into information communication technologies (ICTs) and innovation strategies.

In part due to these policies, there have been notable improvements to the digital infrastructure in the country. Tower coverage countrywide has increased to 5 258 in 2025 from 3 044 in 2019. The fibre-optic network increased to 48 336 km in 2025 from 19 709 km in 2019 (UCC, 2025 and 2023). Meanwhile 4G network coverage increased from 34% to 55% and 3G network from 48% to 72% between 2019 and 2023 . The 2G network was reported at 76% as of 2023.

This improved infrastructure, along with a decline in the cost of communication services, has led to increases in the ownership of digital technologies, reported to now be at 18.4 million for smartphones, 26.9 million for feature phones, and 2.7 million for basic phones (UCC, 2025).[1] The use of mobile money (33.7 million) and mobile internet (22.3 million) had also increased by 2025, alongside the use of digital tools (WhatsApp 7.4 million, TikTok 5.5 million, YouTube 4.6 million, and X (Twitter) 600 000 (UCC, 2023)).

Therefore, Uganda's digital technology landscape has significantly improved in recent years, driven mainly by policy and sector liberalisation, increased UCC investment in the sector, expanded network infrastructure, and increasing consumer adoption.

Research ICT Africa's (RIA) 2022 After Access survey[2] in Uganda found improvements in the gender gap, shifts that reflected an overall trajectory toward greater gender parity in internet access, and underscored progressive, though uneven, advances in digital inclusion. The survey also showed that digital technology ownership had increased in the country. For example, ownership of basic or feature phones increased from 42% in 2018 to 52% in 2022, and smartphone ownership increased from 8% in 2018 to 16% in 2022.

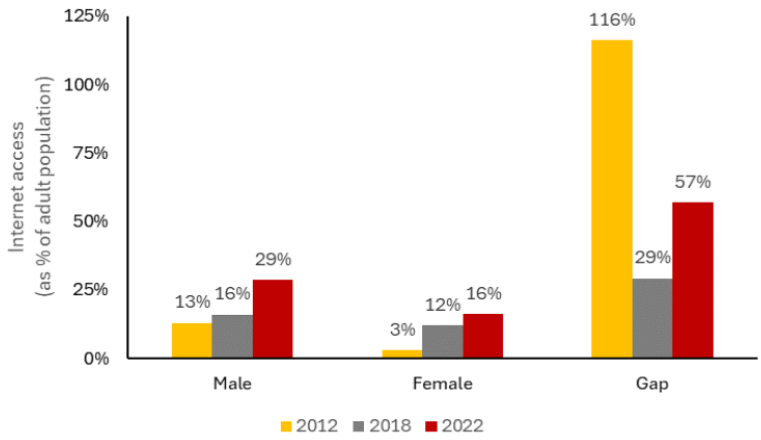
However, the survey found that access remains uneven across urban and rural areas, gender and age groups, and socio-economic classes. While a significant portion of the male population (63%) has access to mobile services, female access stands at 56% (UCC, 2023); and although there has been a marked acceleration in women's access to the internet relative to men, resulting in a substantial narrowing of the digital gender gap that was highly pronounced in earlier years, in 2012 the gap was still at 57% 57% in 2022 (Figure 1). The survey also suggested that the growth in internet access for women had stagnated

[1] The feature phone is in high demand, particularly in rural and low-income communities and in regions with limited access to electricity. It is preferred because it is much cheaper, more durable, and has longer battery life than smartphones.

[2] The RIA After Access survey is a multi-country research initiative in Sub-Saharan Africa that aims to build an evidence base for context-specific policy and regulatory interventions. The 2022 edition was conducted in Ethiopia, Ghana, Kenya, Nigeria, South Africa, Tanzania, and Uganda with a grant from the Bill & Melinda Gates Foundation. The purpose of the survey was to understand the changing barriers to accessing and adopting digital technologies, and the emerging challenges that the continent faces after access has been achieved. The results indicated gender differences in access and use of digital technologies, and argued that the absence of evidence-based data would lead to a misalignment of policy priorities and digital technology needs in Africa.

between 2018 and 2022, which could be explained by factors such as COVID-19, which disrupted livelihoods for many women and reduced disposable income, and the 2018 introduction of over-the-top (OTT) tax on social media services that constrained internet use, particularly for low income users such as women and girls.[3] Moreover, the were sharp differences between access for urban-based and rural-based women – 29% of urban women accessed the internet compared to only 6% of rural women – inequalities attributable to poor network and limited countrywide electricity grid coverage (UCC, 2023).[4]

Figure 1. Internet access by gender and resulting gender gap between 2012 and 2022



Source: RIA (2025:42)

This qualitative study builds on the demand-side data collected in the 2022 After Access survey in Uganda. Given the persistent inequalities in access to and use of digital technologies in the country, it aimed to identify trends and outcomes in access and use amongst four distinct groups of women, barriers and challenges to this access, , and pathways to enhancing their use of digital resources. In this way it aimed to explore the links between their use of digital tools and gender equality and equity objectives.

1.2. Methodology

This qualitative study followed the guidelines by different scholars such as Creswell and Poth (2018), Yin (2018), Baxter & Jack (2008), and Stake (1995). The study was conducted in four regions in Uganda:

- The districts of Kitgum and Otuke in the North-Eastern Region where women's lives have been affected by conflicts. Women in this area engage in shea butter production and use digital technologies for marketing the products.

[3] An increase in phone thefts until the police's "*Tookora*" raid recovered almost 7 000 phones in the central region (The Observer, 1 March 2021) and the police warning about phone explosions and telling the public to be cautious with electronic gadgets (Uganda Police Force, 7 October 2019) may have also played their part.
[4] Urban electricity grid coverage stands at 57.2%, but drops to 10% in rural areas (ITA, 2023).

- The districts of Hoima and Kabarole in the Western region. Hoima district is characterised by oil-related investments that require internet and technology infrastructure that can be leveraged for girls and women's digital inclusion. Women in Kabarole district have access to active civil society organisations, including Savings and Credit Cooperative Societies (SACCO) promoting digital skilling and financial literacy using technology.
- The Luuka and Jinja districts in the Eastern Region which have high mobile phone penetration. In urban areas, women own smartphones and have opportunities to participate in Urban innovation hubs such as the Innovation Village that offers ICT skilling programmes.
- Kampala City and Mpigi District in the Central Region, which are characterised by digital literacy, coding, and fintech training initiatives that target women (e.g. Women in Tech Uganda, and AfriGal Tech), and a growing number of youth-led digital skilling initiatives and community-based ICT centres.

The sample was purposively selected to include adolescent girls, and women teachers, health workers, and women collectives/entrepreneurs. Although not all women in Uganda own phones, a deliberate effort was made to select participants who had access to and were using digital technologies such as phones and computers. As a result, all the women interviewed had access to digital technologies.

The study used interviews and what we called conversational engagements to gather data. A total sample of 292 was reached comprising 120 individual interviews, four life histories, 16 focus group discussions (FDGs) and group discussions involving 134 participants, and 34 key informant interviews. The key informant interviews comprised district health officers (nurses, midwives, trainees and doctors); district education officers (head teachers, teachers, inspectors); community development officers; and executive directors of women's organisations/collectives.

Table 1: Sampled categories

Category	Research methods			
	Individual interviews	Key informants	FGDs/group discussions	Life histories
Adolescent girls	12		7	
Women teachers	51	13	5	2
Women health workers	30	16	1	1
Women collectives/ entrepreneurs	27	5	3	1
Total Number of People	120	34	16 groups (134 participants)	4

All participants were informed about the study, and the aim and objectives of the study. They were assured of confidentiality, privacy and security of their information. Having understood the purpose of the study, they willingly accepted to share their stories with the team. The study adopted an intersectional approach in analysing the data which is important in studying social inclusion or marginalisation in accessing digital

technologies. Data was analysed according to themes (Ahmed, et el. 2025, Braun & Clarke, 2023; Nowell, et al. 2017, and Tackett, 2005) that corresponded with the research objectives.

2. Findings

2.1 Adolescents

2.1.1 Introduction

Adolescents in this study were mostly in school. The few who were out of school were engaged in different livelihoods such as running mobile money businesses and hair dressing in salons, selling sugar cane, serving in restaurants, and working as household helpers and casual labourers of farms. Adolescents are increasingly at the forefront of digital technology engagement, particularly with respect to the use of smartphones. The adolescents in the study had integrated digital technologies into learning and research, entertainment, economic activities, social networking and communication. This section explores their experiences with digital technologies, the outcomes from these experiences, the facilitators or drivers of positive outcomes, the barriers to positive outcomes, and causes of negative outcomes.

2.1.2 Experiences in using digital technologies

All the adolescents we interacted with had knowledge of digital technologies and made use of the digital technologies. The group stands out in the study as the most adaptive, exploratory, active, and digitally immersed digital technology users with smartphones functioning as extensions of their academic, social, economic, and emotional lives. Adolescent experiences are shaped by peer culture, educational demands, socio-economic contexts, and increasing exposure to online lure and risk.

Affordability and accessibility

Affordability challenges for adolescents included the cost of smartphones and the high cost of mobile data. While the majority of adolescents owned smartphones and tablets, many – particularly those in school and those unemployed – could not afford to purchase digital technologies themselves. Digital technologies were accessed or acquired through gifting, borrowing friends' phones, buying the phones themselves, or through sharing household devices. Even when adolescents did not own smartphones, nearly all had access to phones through siblings, parents, teachers, or friends, which reflected a deeply integrated digital culture. Many smartphones were received as gifts from friends or from their parents as rewards for good performance. Gifting of phones to adolescents by parents was mainly to support the educational needs of their children and to ensure continued contact with them while they were at school:

> *I got my first phone as a gift, after being given this gift by a friend. (19-year-old, Jinja)*

> *Parents motivated us, because it's my parents that bought me the phone. (18-year-old, FGD, Kampala, Old Kololo)*

My father bought it for me to thank me for the good performance. (17-year-old, Kampala)

Data affordability was a critical issue for adolescents. Most in-school adolescents could not purchase data regularly and instead relied on school Wi-Fi or parental Wi-Fi, indicating that cost remained a barrier to continuous connectivity, as noted by 19-year-old student in Kampala: "*Sometimes the month is done and dad delays to pay for the Wi-Fi, yet I may not have money to buy data for myself."* While non-school going adolescents owned smartphones or button phones (basic phones) or both, they also could not buy data themselves, instead relying on family support or peers.

Many navigated these cost barriers creatively by using free Wi-Fi hotspots or relying on low-cost devices. Rural and low-income adolescents preferred Techno or Itel phones due to battery life/durability and the lower cost of the phone, while urban youth aspired to iPhones and Samsung models which functioned as status symbols and which their parents could afford.

Adolescents considered access to digital technologies, particularly the phone, as a necessity rather than a luxury. Because most in-school adolescents lacked personal income, they were often dependent on their parents' decisions and motivations regarding when they received or accessed a phone. Access was further driven by emotional needs, peer norms, and identity formation.

As mentioned, a number of adolescents received their first devices to meet academic demands such as accessing schoolwork, joining class WhatsApp groups, or participating in online learning during the pandemic:

> *My mother bought it because I told her that our teachers send us work over weekends on a class group WhatsApp group. (19-year-old, FGD, Kampala)*

> *During COVID-19, we are studying online, so my mother bought me a phone to attend classes. (FGD, Kampala)*

However, there was also a need to satisfy personal aspirations, social belonging, and the desire for autonomy. Some received phones as gifts tied to leisure, while others actively contributed financially to obtain a device that reflected their preferences, signalling growing independence:

> *I got my first smart phone when I was in primary school and my mum gave it to me to play games on it. (18-year-old, FGD, Kampala, Old Kololo)*

> *I raised my money and only requested my dad to top up for me so I could get a phone that I wanted. (FGD, Kampala)*

The desire to conform to peer expectations played a significant role in accessing phones. Observing their peers taking selfies, creating TikTok videos, and engaging actively on WhatsApp heightened the desire to also own a phone, not just for functionality, but for social inclusion and identity formation. Digital technologies provided shared reference points that helped young people feel connected and socially relevant. A 19-year-old in Kampala said: *"Without (access to) digital technologies, we'd feel completely left out."* This highlighted that digital access was a prerequisite for belonging.

Box 1: Conforming to peer norms

As soon as I got to Kampala, I used my first salary to buy a small phone. I needed it to fit in the community. Everyone at the fuel station had a phone so I also bought it. Last year, I bought this smartphone because I was inspired by the friends who always discussed football updates, music, and chats, yet I didn't understand anything.

19-year-old, Kampala

Because of this sense of belonging, some of the adolescents saved money and bought phones for themselves, while a few were supported by relatives who were already working.

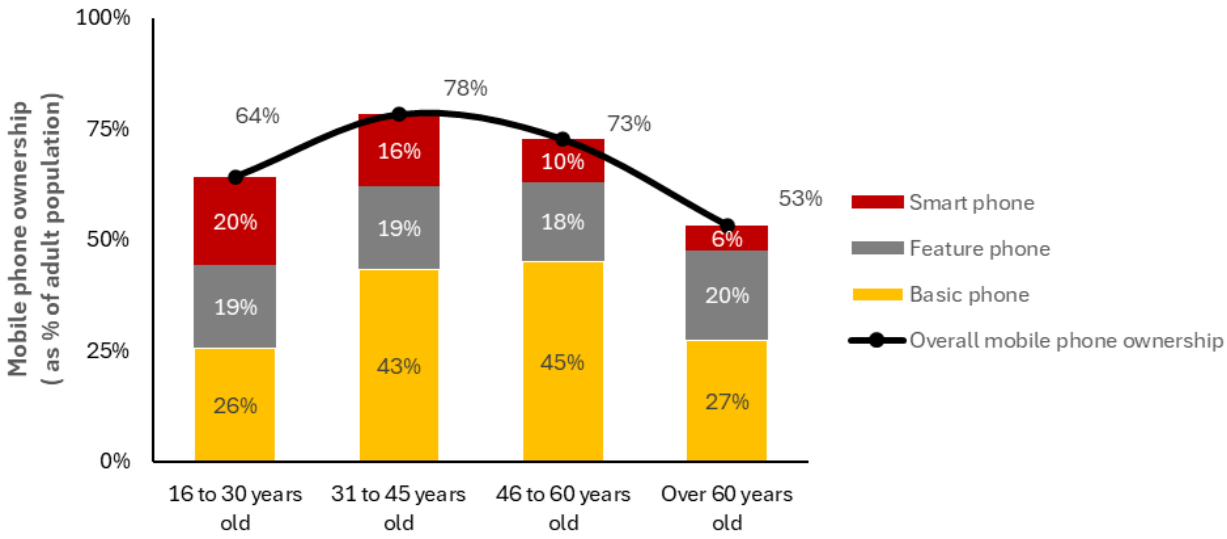
Access to digital technologies among adolescents varied significantly between boarding and day students. Boarding school students, who were not permitted to own or carry phones during school time, primarily relied on access to school computer laboratories during ICT classes for their digital engagement. These students used desktop computers to conduct academic research and complete ICT-based assignments under supervision. Conversely, day students had greater access to phones outside of school hours and tended to use them extensively in the evenings for both academic and social purposes. As a result, day students had more personal access to digital technologies, especially in the evenings after classes and over the weekends, compared to boarding students. They mainly concentrated on accessing TikTok, listening to the radio and to music, on money transactions, and making and receiving calls.

This created an uneven access digital ecosystem: some adolescents accessed devices daily, while others had restricted, scheduled ICT sessions. Inequities in access persisted between resource-constrained students and their more privileged peers. One 19-year-old participant noted, *"It's my mum that bought it [smartphone] for me since I was always bored,"* while another 19-year-old said, *"…I bought it myself…I was working … in senior six vacation, the ka' phone [meaning basic phone] I am talking about was the 'kabiriti'."* Such disparities highlighted how economic capacity determined both access to and quality of digital participation.

Further, inequalities were also highlighted in access to laptops and computers that are a bit more expensive compared to phones. These were, therefore, accessed by adolescents either at school in a computer lab or via their parents. Teaching computing skills is part of the curriculum, therefore school going adolescents were taught computer skills during school days. Some adolescents accessed parents or siblings' laptops at home for school-related activities. However, for the majority of the adolescent participants, phones remained the dominant and preferred device due to portability, familiarity, and multifunctionality.

The extent to which adolescents have greater access to smartphones than other age groups in Uganda is confirmed by RIA's After Access study, as shown in Figure 2. see Figure 2 below for differences in digital ownership:

Figure 2: Age cohort comparison of mobile phone ownership by most advanced type of phone, 2022



Source: RIA (2025: 29)

2.1.3 Purposes of use

The uses of digital technologies are influenced by the affordability and accessibility of the technology itself, for example the type of phone an adolescent can afford to buy or whether an adolescent can access that phone from an alternative source. Amongst the study groups, adolescents exhibited the highest adaptability and enthusiasm to use digital technologies, using phones as central tools for education, self-expression, social interaction, recreation, and entrepreneurship. Smartphones were used for fitting into society and button phones for playing music and listening to the radio.

Adolescents expressed pride in their technological proficiency, particularly in how it enhanced their academic performance. Under the new learner-centred secondary school curriculum, students are increasingly required to engage in self-directed research and inquiry-based learning.

Phones and accessible computers were critical tools to use when accessing online educational resources, completing assignments, and expanding their understanding beyond textbook knowledge. Smartphones were therefore viewed as essential rather than optional, enabling participation in research for the new curriculum, and engagement in WhatsApp study groups. This was noted by a 17-year-old student: "*With this new curriculum, we do a lot of research so I use my Google app to do research for school work".* Another youth from an FGD noted*: "Phones help us to join discussion groups with our teachers".*

Similarly, another FGD participant said:

> *Also with these phones, they have been helpful in academics through group discussions from our class WhatsApp groups, one-on-one discussions…for us in school, we use phones*

> *to do research. In the new curriculum, teachers give us questions and we are supposed to do research so we use Google (Group discussion, Kampala).*

The digital fluency of adolescents allowed them to navigate the educational content easily, making research and learning the main core of their digital routines.

Beyond academic spaces, adolescents actively engaged with digital platforms to remain informed about popular culture, fashion trends, hairstyles, music, celebrity news, businesses, and football. This technological literacy, coupled with cultural awareness, positioned them as a distinctly digitally empowered social group. As one youth aged 20 years from Kampala explained, *"Phones help us to stay up to date with fashion and hairstyles, music and football".*

The use of "us", "some of us" and "we" shows adolescents have a shared youth culture built around digital practices. Technology becomes a communal space where norms, aspirations, and lifestyles are negotiated collectively. Therefore, adolescents are digitally connected, culturally attuned, and economically experimental. Technology does not simply supplement their lives; it structures their social belonging, economic participation, and cultural worldview. This narrative underscores both the empowerment and the vulnerabilities inherent in their digital immersion.

Use of digital technologies such as Google in searching for entertainment exposes adolescents to online risks, ranging from watching indecent content such as pornography to scams and domestic conflict. One adolescent reported, *"…when we are searching for some things and they bring bad content, then we end up watching it,"* while a key informant observed, *"Haven't observed many general challenges apart from a few that have experienced scam and domestic violence because of the phone."*

Despite these challenges, adolescents leverage digital technologies for diverse and often innovative activities. Many youths use the phones for mobile money transactions, small loans, and job searches. A notable trend was the rise of digital gambling and online betting, including sports and foreign exchange 'games', which adolescents described as a way of earning *"quick and soft money".* The allure of these activities is fuelled not only by the promise of financial gain but also by peer influence and social aspiration. One participant proudly said: "S*ome of us carry out advertisements and trade using our phones. We even do foreign currency exchange on the phone [as a form of gambling]; you can put money in the form of betting and you invest either in Euros or Dollars, so if it raises your bet, they pay you money. Sometimes you lose. This is common among adolescents."*

Digital platforms also served as crucial channels for communication, particularly for boarding school students who relied on teachers' phones to contact parents for financial or emotional support. Meanwhile, access to entertainment and social platforms such as TikTok, YouTube, Facebook, and Instagram fostered a sense of inclusion and connectedness. For out-of-school adolescents, however, smartphones were used almost exclusively for entertainment and social networking, with little exposure to other forms of digital technology such as computers. Many out-of-school adolescents viewed these tools as irrelevant or beyond their skills level due to limited digital literacy.

While adult participants, particularly teachers and women collectives/entrepreneurs, tended to prefer to use Tecno and Itel phones for their affordability and long battery life, adolescents exhibited a distinct

preference for higher-end smartphones such as Samsung and iPhone models. This preference was driven by the perceived superior quality of the camera, ample storage space, and overall performance features that are highly valued for capturing photos, engaging in social media, and storing large volumes of media content. Nevertheless, some adolescents in rural areas, where electricity access remains unstable, still favoured Tecno phones due to their long-lasting batteries, demonstrating a practical balance between aspirational preferences and functional realities, as was noted by 20-year-old from Kabarole:

> *Here in our community, power is off and on. Sometimes we spend two days without electricity. So, that's why most of us here have Tecno phones because the battery can take some good time.*

Another youth said:

> *I would wish to have a smartphone, but when I see people here in the village struggling to go to the trading centre to charge their phones in the morning and evening, I feel disoriented. However, I have heard that those who have Tecno phones can go once a day. Maybe if I am to buy a smartphone, I would go for a Tecno one so that I don't walk in the morning and evening. (19-year-old, out of school)*

As another 19-year-old rural youth emphasised, *"Electricity outages affect us in charging our phones,"* reflecting the everyday disruptions that limit the continuity and quality of their digital experiences.

Adolescents have developed adaptive strategies to cope with these infrastructural barriers. However, the reliance on such coping mechanisms underscores a deeper structural inequality in digital inclusion. Youths in areas where unstable power access is common face disproportionate challenges in sustaining digital participation, affecting their ability to study online, access information, or engage in income-generating digital activities.

2.1.4 Ease of use

Adolescents demonstrated high levels of adaptability in learning to operate their phones, with the majority relying on self-discovery and trial-and-error. This intrinsic motivation to understand and utilise various digital tools reflected their comfort with technology and eagerness to explore its full potential. Adolescents reported experimenting with basic functions and gradually mastering more advanced applications. As one adolescent noted:

> "… *haaaaaaaa it was self-discovery. These phones come with a menu so I read the menu and started trying out things one by one" (17-year-old, school going, Kampala).*

This statement highlights learning as an exploratory journey in which adolescents position themselves as curious and motivated to discover how to navigate digital technologies. Technology was not intimidating for the adolescents, but something they could decipher through persistence. Digital technology then became a form of agency and personal empowerment.

In addition to self-learning, peer support played a vital role. As one of adolescent noted "*It was that friend of mine*" (18-year-old, Kampala) who had helped in learning how to use a phone. Elder siblings and school-based ICT teachers also helped bridge skills gaps:

> *For me, I learnt from my ICT teacher...He taught me at Kasubi Church of Uganda Secondary School. One time he gave me work that I didn't know how to work it out. So I requested for his phone to do research and I started learning slowly. (18-year-old, school going, Kampala)*

Hence, the ICT teacher offered both tasks and access to a phone implying that digital competence is built in relationships. The teacher's support illustrated how formal instruction opens gateways for competence-based learning and independent exploration. The teacher was not just an instructor but a facilitator of digital confidence.

In some cases, adolescents who had gained exposure to computers, either at home or through school ICT programmes, were able to transfer digital literacy skills from computer use to smartphone navigation:

> *…before having my smartphone we used to attend computer classes at school. So, I realised later that a phone is almost similar to a computer. It was easy for me to connect. (17-year-old, school going, Kampala)*

In other words, once they mastered one device, they could easily navigate others. This showed a flexible understanding of digital systems and reinforced the narrative of adolescents as adaptable learners. School-based ICT programmes were revealed as structural backbones that supported deeper technological understanding, demonstrating the interconnected nature of digital learning pathways.

Despite the fact that the non-school going adolescents had fulltime access to their phones, they had less knowledge of the many phone applications.

2.1.5 Commonly used apps

Adolescents relied on a broad mix of apps ranging from academic tools to social media, entertainment apps, apps used for digital finance, and business platforms. They were not only used for education, entertainment, staying connected with friends, and accessing information, but for building digital social capital. The apps facilitated different activities. For example, for educational research, adolescents used Google and YouTube; for communication they used WhatsApp; for entertainment and identity needs they used mostly TikTok, Instagram and Snapchat; for business/entrepreneurship they used WhatsApp Status, TikTok marketing; and for financial transactions they used mobile money, mobile banking apps, and quick loan apps.

Their digital engagement was primarily concentrated on social media with a strong preference for Instagram, WhatsApp, X (Twitter), TikTok, YouTube, and Snapchat, with Google also commonly used. As one adolescent noted:

> *I love TikTok so much because it is interesting and takes away boredom. However, with this new curriculum, we also do a lot of research using Google app for school work. (17-year-old school going, Hoima)*

And another said:

> *I use WhatsApp when I have the internet. I also use YouTube. However, I love my small button phone for music. When I am at work, I play music to give myself company and entertain my customers. (20-year-old, not school-going, Kabarole)*

WhatsApp emerged as the most commonly used communication platform, particularly during school holidays. It served multiple functions: maintaining peer relationships, exchanging academic information, organising group discussions, and sharing personal milestones such as birthdays. In addition to peer groups, many adolescents also participated in family WhatsApp groups, through which they stayed updated on family matters.

These digital networks helped sustain both academic engagement and social belonging, offering adolescents a platform to remain informed, supported, and actively involved in both their learning environments and family life.

2.1.6 Positive outcomes of the use of digital technologies.

Adolescents demonstrated natural adaptability and comfort with technology. Their ability to quickly learn new applications and navigate platforms independently positioned them as confident and active digital users. This adaptability not only enhanced their personal engagement with digital platforms but also enabled them to maximise opportunities for communication, learning, entertainment, and financial transactions.

Easy communication and social connections

Consistent with other study groups, adolescents emphasised communication as the most significant benefit of their mobile phones. For young people, phones served as essential tools to maintain close contact with peers, parents, and extended family. Most of the adolescents reported being part of multiple WhatsApp groups, both peer-based and family-oriented, where critical information was shared, experiences were discussed, and emotional support exchanged, as was highlighted by one of the participants:

> *I am exposed. I know many things to do with smartphone applications. I am always in touch with my friends and help each other to accomplish tasks. I have very many online friends whom I chat with and I am never bored. When my parents need to talk to me during holiday time, they just give me a call. (18-year-old, school going, Hoima)*

Adolescents reported feeling connected through their phones and formed virtual communities that strengthened intergenerational ties and promoted continuous social engagement, even during school terms when face-to-face interaction may be limited.

Improved access to education and academic support

In the academic sphere, digital technologies, especially smartphones and computers, played vital roles in learning and study support. Adolescents frequently used Google and other online platforms for research,

accessing educational content that supplemented what was taught in class. They also used devices to type, format, and print assignments for submission to teachers and lecturers, particularly in secondary schools and tertiary institutions. One head teacher, a key informant in Kampala noted:

> *[Digital technologies are important] for easy information flow and convenience. For example, learners and teachers do research to accomplish their school tasks. Teachers use smartphones and some use laptops to submit learner's results at the convenience of their home without congesting the school computer laboratory.*

The convenience and speed of information access allowed students to complete tasks more efficiently, contributing to improved academic performance. In this context, digital technologies were viewed not merely as a luxury, but as a necessary educational resource that aligns with the modern competence-based curriculum requirements.

Enhanced leisure, entertainment, and emotional well-being

Adolescents also associated digital technologies, particularly smartphones, with improved leisure and entertainment, a central aspect of youth identity and emotional regulation. Participants described widespread use of phones to listen to music, watch videos, follow social media trends, and engage in casual gaming. In urban settings, adolescents frequently moved around with headphones, using music as a coping mechanism or mood enhancer. Those with access to laptops and computers used them for both schoolwork and music downloads, enjoying simultaneous productive use and entertainment. Among the youth in the informal sector, phones were also used to entertain customers and reduce workday monotony, further illustrating the multifunctionality of digital tools in their daily lives.

Financial inclusion and mobile banking

Phones also served as critical enablers of financial inclusion for a few adolescents, particularly those engaged in informal trade or small-scale businesses, and those who sent and received mobile money. Participants revealed that they regularly used mobile money services to send funds to family members in rural areas, receive payments from customers, and conduct personal transactions. Some adolescents were even involved in the mobile money business itself, generating income through service provision:

> *I left my home village and came here to the trading centre. I wanted to start a mobile money business – this one I am operating now. It has helped me to earn some money for survival because now I even rent a house for myself and take care of my mother in the village using the money from this business. (20-year-old, not school going, Mpigi)*

Importantly, as part of promoting a cashless economy, school-related financial processes have become digitalised, with fees increasingly paid through mobile money platforms using unique school pay codes. On joining a new school, each learner is given a private individual school pay code which he/she uses to pay school fees on the phone. This system reduces the burden of long queues in banks and minimises the risks associated with handling physical cash. Adolescents also mentioned using mobile-based loan services, such as NUMIDA (https://ug.numida.com/), and telecom-provided quick loan features (for

example: https://www.airtel.co.ug/airtelmoney/quick-loans), which are particularly relevant for youth who lack traditional collateral:

> *There are apps that lend money. For example, one time I used NUMIDA, an app that lends money that served me immediately and you pay after 15 days. (20-year-old, Kampala)*

These platforms allowed adolescents to respond to emergencies or invest in small-scale business activities, reflecting a growing trend in youth-led financial autonomy.

Digital marketing and enhanced business engagement

A notable number of adolescents were actively participating in digital entrepreneurship, leveraging mobile phones and social media platforms to market goods and services. They took photos of products such as cosmetics, clothing, or snacks and posted them on their WhatsApp status, and on TikTok, Facebook, Instagram, and X (Twitter) to reach potential customers. For many, digital spaces offered low-cost and high-reach marketing alternatives, enabling them to build a client base beyond their immediate physical environment.

Even school-going adolescents were involved in income-generating ventures, particularly during holidays. One participant from a focus group in Kampala explained how she operated a small perfume stall at her mother's shop, but attracted most of her customers through phone calls and social media advertising:

> *I post what I sell on WhatsApp status, Facebook, and TikTok…Most of my customers come through phone calls and messages. (FGD, school-going, Kampala)*

This highlights how digital technologies are redefining youth entrepreneurship for those who hawk goods and use of online platforms to broaden the market for their goods. Digital technologies are also empowering adolescents to merge education with income-generation in innovative ways.

Exposure and global awareness

Adolescents noted that digital technologies offered them unparalleled exposure to global culture and current events. Through internet access, they were able to follow international trends in music, hairstyles, fashion, sports, dance, and celebrity culture, broadening their worldview and shaping their aspirations. Visual content, such as tutorials, documentaries, and entertainment videos, facilitated informal, self-directed learning, allowing adolescents to explore skills, styles, and perspectives beyond what was available in their immediate environment. This access fostered a sense of connectedness to the global youth culture, while also enhancing their ability to navigate increasingly interconnected social and economic spaces.

2.1.7 Drivers of positive outcomes

As mentioned, the adolescent group represented the most digitally active group in the study, navigating technology with curiosity, adaptability, and peer-driven learning. Digital platforms played a central role in the adolescents' social lives, education, creativity, and identity formation.

Access to digital devices

Access to digital devices enabled by parents, relatives, or peer sharing arrangements was crucial in adolescents' achieving positive outcomes. Ready access to digital devices helped them explore, experiment and learn to navigate different digital tools. Early and frequent exposure to digital technologies cultivated familiarity and confidence enabling adolescents to integrate digital tools seamlessly into their daily routines. Shared access models to digital technologies democratised digital participation by reducing individual cost barriers, thus enhancing positive outcomes.

High uptake and adaptability

Adolescents demonstrated the highest levels of digital uptake across all study groups, reflecting their natural adaptability and comfort with technology. Phones were acquired through parents, relatives, or sharing arrangements, creating early entry points into digital spaces. This combined with their ability to transfer skills from one device to another positioned them as highly adaptable to new digital technologies. This adaptability not only enhanced their personal engagement with digital platforms but also enabled them to maximise opportunities for learning, communication, and entertainment to achieve positive outcomes.

Creativity and exploration

Digital platforms provided adolescents with powerful spaces for creativity, exploration, and skills development. Whether through creating videos, exploring new technologies and applications, or learning digital skills these adolescents used technology to broaden their horizons. Exploration of entertainment platforms such as TikTok encouraged creativity, self-expression, and social connection, and this strengthened adolescents' engagement with digital technologies. These exploratory behaviours nurtured innovation, confidence, and self-expression, contributing positively to their personal and business development.

Entertainment and social interaction

Platforms such as TikTok and WhatsApp served as important spaces for social connection and self-expression among adolescents. These digital environments allowed them to form and maintain friendships, participate in trends, and explore aspects of identity through creative content. Entertainment-driven engagement strengthened their sense of belonging, provided emotional outlets, and contributed to the development of social skills.

Peer-to-peer digital literacy

Adolescents displayed strong peer-to-peer digital literacy where they learned to navigate new apps and features by teaching one another. This peer-driven culture of exploration and learning new digital skills accelerated their confidence in using digital technologies.

Educational use

Adolescents used digital tools not only for socialising but also as valuable educational resources. Google and other online platforms supported research, the completion of assignments, and continuous learning, especially during the COVID-19 period when physical schooling was disrupted. Digital access expanded their exposure to information, improved their academic competencies, and offered alternative pathways of competence-based learning beyond the traditional classroom environments.

2.1.8 Barriers to positive outcomes

While digital technologies have transformed how adolescents engage with education, seek entertainment, and socialise, their increased usage also presents significant limitations and risks. The findings revealed that despite high mobile phone ownership, many young people faced substantial barriers in accessing wider digital ecosystems, and they remained vulnerable to a range of socio-technical challenges.

Limited access to digital technologies and digital skills

Although smartphones are common among adolescents, access to other digital technologies such as laptops and desktop computers remained limited. However, when doing school assignments, it would be easier for the adolescents to type and edit using laptops and computers in comparison to phones. Adolescents highlighted the disparity between theoretical and practical digital literacy, particularly in school settings where computer labs are poorly equipped. In many institutions, the number of computers was insufficient to serve the growing student population:

> *You know madam, to be honest with you, for me I don't really know how to use a computer. You know here at school we have computer classes but the computers in the laboratory are not enough for us. When we go for lessons, not all of us can access desktops. Now if you put a computer in front of me I can even fail to type anything because I don't know, although I attend classes and do theory computer exams. (19-year-old, school going,Kampala)*

This results in missed opportunities for hands-on learning. As a result, many adolescents reported being "computer literate" in theory, but lacking the actual skills and confidence to navigate digital systems in real-world contexts.

Network instability and data limitations

Poor network connectivity was another recurring barrier. Adolescents commonly purchased daily data bundles meant to last for specific periods, only to be disrupted by inconsistent signal strength. Many felt disillusioned by service providers, citing wasted resources when connectivity failed before tasks such as school research or communication were completed. The high cost of mobile data further limited sustained engagement. While university students and urban adolescents benefited from institutional or home-based Wi-Fi, most adolescents depended on parental support or resorted to limited daily bundles. Unreliable internet access, compounded by power outages, diminishes the overall effectiveness of digital technologies in their academic and social lives.

Power load shedding and infrastructural barriers

Widespread load shedding continued to compromise digital access, especially in rural and peri-urban schools. Power cuts often occurred during ICT classes, abruptly halting lessons and denying learners critical exposure to digital tools. Most schools lacked alternative power sources such as generators, making it impossible to complete computer-based assignments. At home, similar challenges persisted. Adolescents were unable to charge phones regularly, limiting their capacity to engage consistently with digital tools, even when they were available.

Restricted phone access in schools

Adolescents in boarding schools faced further limitations due to restricted phone access during term time. Phones were typically prohibited, and students had to rely on school teachers to make urgent calls. This limited access posed challenges in situations requiring immediate communication, such as financial emergencies or family crises. For day students, phone use was typically confined to evening hours after returning home, constraining their ability to engage fully with digital platforms during the day.

Gendered expectations continued to shape how adolescent girls use digital tools. Many girls faced social criticism for spending time online at the expense of domestic responsibilities: *"… girls have failed on their household chores, since they spend more time on their phones" (Youth, aged 19-25).* These gendered norms restricted leisure and learning opportunities, reinforcing offline inequalities within digital spaces.

2.1.9 Negative outcomes

While mobile phones and social media platforms have expanded how adolescents communicate, learn, entertain themselves, socialise, and work with money, their increased usage also presents significant limitations and risks such as exposure to inappropriate content, online scams and digital fraud, and to some extend addiction to the use of digital technologies.

Exposure to inappropriate content

Adolescents voiced concerns over unregulated access to harmful content, particularly on social media platforms. The lack of age-based content controls or parental supervision exposes them to pornographic material, indecent language, and hyper-sexualised portrayals of youth culture. While these platforms served as key sources of entertainment and information, they also became gateways to content that can distort social behaviour and emotional development.

Online scams and digital fraud

One of the most serious risks raised by participants was the proliferation of scams and digital fraud, particularly targeting adolescents. Driven by the desire for quick financial gains, many adolescents fell victim to fraudulent promotions, often impersonating mobile service providers or companies offering fake rewards. These scams exploited the limited financial literacy and emotional maturity of adolescents. During the COVID-19 period, one participant described being conned out of UGX 50 000 by someone posing as a representative from a mobile company who claimed to have sent UGX 900 000 to their account:

> *A lot of scams are associated with the phones. One time during COVID-19 time, a man called me by my name and said had sent UGX 900 000 on my phone. He demanded that I send him UGX 150 000 first to access the UGX 900 000. I told him I had only UGX 50 000 and he said send that, only to realise later they had taken my money. The scam is mainly done by MTN and Airtel service providers. (Individual, Mpigi)*

This experience generated fear, shame, and diminished confidence in using digital financial services. Such scams not only caused financial loss but also eroded trust in digital platforms and service providers.

Digital addiction and time mismanagement

The study also documented increasing signs of digital addiction and behavioural distraction. Many adolescents reported spending excessive time on phones watching irrelevant videos or scrolling through social media feeds, often at the expense of their academic responsibilities. Holiday periods, in particular, revealed poor time management: students neglected schoolwork until the final days before reopening, resulting in low-quality submissions and declining academic performance. This raised concerns about the self-regulation capacity of adolescents in digital environments and the need for structured guidance on responsible use.

2.1.10 Causes of negative outcomes

While digital technologies had created significant opportunities for adolescents, this study also revealed how certain contextual and structural factors caused negative outcomes. These outcomes were driven by a combination of social norms, economic pressures, infrastructural deficits, and personal behaviours that shaped how adolescents adopted and used digital technologies.

Unsupervised digital technology access

Adolescents, as the most active digital users, also faced significant negative outcomes facilitated by their patterns of access and use. They engaged in behaviours such as accessing inappropriate content. An 18-year-old in a FGD said, "*Some phones contain very bad content",* while another 18-year-old commented, "*They [phones] are used to promote sharing of pornographic materials".*

Peer pressure

Peer pressure allowed adolescents to encourage one another to explore digital spaces in ways that were not always safe or constructive. The adolescents' desires to conform peer norms in some cases drove them to negative digital technology outcomes. This exposure to global culture via the internet and social media raises concerns about adolescent identity and values as well as adherence to local values.

Addictive nature of entertainment applications

The addictive nature of entertainment apps such as TikTok affected adolescents' time for study and reduced concentration while studying. As stated by an 18-year-old in an FGD: "*Phones are time wasting.*" Another 18-year-old in the same FGD said: *"Phones often become very addictive."* A 17-year-old said: *"…*addiction*, we always have arguments with parents over spending time on the phone. One time food burnt terribly because I was concentrating on my phone."*

2.2. Teachers

2.2.1 Introduction

This section discusses experiences of women teachers using digital technologies. Women teachers participating in this study were mostly working in public schools. They had integrated digital technologies such as mobile phones, projectors, and computers into instructional planning, content sharing, student performance tracking and assessment, research, virtual learning and professional development, and communication.

2.2.2 Experiences in using digital technologies

All the teachers we interacted with were adopters of digital technology and made use of the digital technologies for professional, social, and personal lives. The teachers' experiences in using digital technologies were shaped by educational demands, and socio-economic contexts, among others.

Affordability and accessibility

Affordability was crucial in contributing to digital technology uptake among teachers and shaped their ability to access and use devices meaningfully for professional and social engagement, and in their personal lives. Although smartphones were increasingly essential for accessing teaching materials, communicating with colleagues, and pursuing further studies, many teachers reported that both devices and data remained prohibitively expensive relative to their salaries. This limited the teachers' ability to use technology meaningfully:

> *Reflecting back when I was [due] for upgrade, the first time I did my degree I had a lot of challenges because my phone got spoilt. I couldn't afford both tuition and buying a phone, so I wasn't updated and the cafés were costly. I struggled even to write and my assignments were very bulky. So when I bought the new phone from Garden City I now improved. I even guided colleagues because I knew how to use the phone. (44-year-old, teacher, Kitgum)*

The high cost of smartphones were prohibitive for many teachers, often ranging from UGX 250 000 to 400 000 (between USD 70 and USD 113) for reliable brands like Tecno and Itel.

> *…you could get a smartphone…at 250 000 [UGX] but when it is not at a good level. Then the best one is at 400 000/= which is expensive; and data, that is a challenge.* (*Head teacher, FGD, primary school)*

Considering that a primary school teacher earns between USD 74 and USD 219, this is expensive. This forced teachers to make difficult decisions between purchasing a device, paying tuition for further education, or meeting household needs. This financial strain was compounded by the recurring burden of buying data and airtime, which teachers described as "*costly, yet unavoidable*", thus limiting the use of their digital technologies. Where possible the teachers used a school's Wi-Fi.

While smartphones are indispensable for modern teaching, the cost of replacing or repairing them remains a financial burden for teachers. Some teachers also gifted their smartphones to their children because

they could not afford to buy one for them. Consequently, the teacher reverted to a basic feature phone. Usually teachers prioritised basic communication needs, leaving limited resources for purchasing advanced digital tools to meet professional demands. This was particularly the case in rural schools.

In a resource-constrained family, passing a phone on to a family member who needs it more is a profound gesture. In this case, decisions around access and ownership are often guided not by preference but by necessity. In some families, children become the primary users of mobile phones because their academic needs take precedence. Parents often forgo their own use to ensure that their children can participate in online learning, or they are able to access school-related information. It is an adaptive strategy that families employ to navigate economic limitations in a digital age.

The major brands of phones used by teachers, especially in rural areas, were Techno and Itel because they were affordable and had a long battery duration when fully charged. Due to either frequent load shedding or being off the electricity grid, teachers found phones with long battery duration more effective. However, some teachers with internet-enabled brands like Samsung received them as gifts from relatives abroad, or from husbands.

Affordability challenges restricted teachers' capability to engage with digital learning platforms, access updated pedagogical resources online, or to participate fully in the technology-enabled education reforms. This ultimately constrained the transformative potential of digital tools in teaching, and professional development of the women teachers.

Access to digital technologies among teachers was also marked by a pronounced urban–rural divide that shaped how they engaged with digital tools in their professional duties. Urban teachers had access to smartphones, projectors, laptops, and in some instances school Wi-Fi which provided reliable internet, while rural teachers relied only on smartphones.

Together, these dynamics highlight how affordability and the urban/rural divide, as well as policy-driven digitalisation shape teachers' access to and use of technology. A number of these factors, such as affordability or network access reinforce unequal experiences across different educational contexts.

2.2.3 Purposes of use

In this section we highlight the technologies that were used and the purpose of their use. Women teachers used the phone as their primary digital tools. While there were those who owned a feature/basic phone because they could not afford a smartphone, the majority of teachers had internet-enabled phones.

Teachers used their phones for different purposes, both professional and personal:

> *The teachers have phones at all levels of education and the majority of the teachers are female. And, by the way, men are reluctant about buying and using smartphones, but for women this is mandatory here [to balance their gender roles, such as keeping in touch with children at home]. You know for us*

this is a city and ladies like smart things like photos, TikTok, so they buy the phones. (47-year-old, Key Informant Interview (KII), Hoima).

These patterns of adoption and use both for work and communication meant that many women teachers were proficient at using their phones:

As far as technology is concerned, the majority of the women here have embraced it. For example, in our offices here and elsewhere the majority are computer literate because they use computers to write daily reports, make presentations and they also use the phones … The majority of the women here are better than men in using technology. (49-year-old, KII, Kabarole)

Teachers, especially in urban centres, used phones to facilitate the teaching and learning process (e.g. through research and peer support through WhatsApp groups), and for professional development.

Box 2: Uses of digital technology

When I am teaching, I look out [search] for what I don't understand from Google and always update myself on new developments in the profession.

We even have a professional teacher WhatsApp group where we share knowledge and support as colleagues, so we learn from each other. We also meet and interact with experienced people who give us advice and help us develop professionally.

52-year-old Teacher Kampala

In some urban schools, computers were accessible and teachers used other technologies such as projectors which they and the learners operated for smooth study. Technologies had made teaching more convenient. IT systems had been set up that allowed teachers to complete work assignments, such as recording leaners' marks, remotely, as one of the participants reported:

Technology has enhanced information flow and convenience. For example, teachers do research, conduct classes using computers and enter the learner's results at their convenience in their homes without congesting the school computer laboratory. With our school WhatsApp group, all communications are made very fast and conveniently. (40-year-old, KII, Kampala)

Box 3: The transformative experience of first technology use

… [D]uring COVID-19, when I started using Zoom, because my last coursework was on Zoom, my son prepared me very well; but what excited me much was being able to talk to people in Nkozi [about 288 kms away from Hoima] – *I could even see them, so the scenario was so amazing.*

Another thing was that I had friends who had left Uganda so we could trace them with the guidance of my son. We traced a colleague who was a friend and we interacted again and that was so exciting.

I learnt how to post work on the internet because they were strict on not going to the university physically.

I had time enough because we were home to learn the meaning of the different icons on the phone and laptop, so my son was always supportive. I would run to him that I am no longer hearing and he would tell me you are muted, so I learnt all experiences … during COVID lockdown.

42-year-old, head teacher, Life History, Hoima

A key finding unique to the education sector was that the Teacher Effectiveness and Learner Achievement (TELA) system, a biometric attendance system, had been introduced by the Ministry of Education and Sports to monitor the performance of teachers at the school level.

Head teachers access the TELA app through a smartphone. Teachers are required to sign in and out through facial recognition, making digital tools central not only to teaching but to public-sector accountability. The app was described by one participant as "*an attendance tracking application where teachers present themselves for capture as they enter and log out They enrolled our faces… when we arrive, we sign in using our faces." (KII, Kabarole)*

Despite the challenges of using TELA, such as technical and infrastructure limitations (particularly poor networks and/or power outages) the system is a good monitoring system and teachers emphasised that it is one of the consistent applications in use in schools.

Box 4: The TELA app

The Teacher Effectiveness and Learner Achievement (TELA) application is a biometric attendance tracking system introduced by Uganda's Ministry of Education and Sports to enhance accountability and performance in the education sector. TELA was designed to address the persistent challenge of teacher absenteeism in public schools. Its core objective is to ensure that classroom time, as outlined in official timetables, is effectively utilised for teaching and learning. By the 2022–2023 financial year, TELA had been formally integrated into the Ministry's Education Standards Directorate as part of the national school inspection and quality assurance framework.

How it works

The TELA system operates through smartphones provided to head teachers in public schools, each preloaded with the application. The tool captures teacher attendance and classroom engagement through biometric registration, using facial recognition and fingerprints to record when a teacher reports to or leaves school. Schools upload their timetables into the system, allowing the app to track lesson delivery in real time. As lessons take place, headteachers or designated supervisors log them into the platform, and the data is automatically transmitted to district and national education offices for analysis and reporting.

Benefits

TELA offers real-time oversight of teacher attendance and classroom activity. It provides an objective and verifiable digital record of teacher presence and performance. This transparency strengthens accountability at the school level. TELA enables education authorities to identify patterns of absenteeism, allocate support where needed, and uphold instructional standards. It improves teacher effectiveness and learner achievement through technology-enabled governance.

The teachers revealed that the major reason for them having phones was communication, both in the workplace and in their personal and social lives. In the workplace this included communication with students about coursework or assessments, and communication among teachers about meetings and new developments. Digital technologies were also useful for preparing and managing social programmes such family meetings, marriages, burials, baptisms, and graduations. Arrangements were made with family and friends using WhatsApp groups, saving time and money in addition to being convenient.

The desire to communicate professionally with fellow teachers and socially with family who are often distant was a great concern:

> *It has changed the way we communicate, and as I said the way we organise meetings, discussion groups, even family functions such as organising weddings and introduction meetings, and others. As teachers we communicate on WhatsApp, we meet on Zoom and discuss our needs or the new*

> *competence-based curriculum. My brother's preparations for the wedding were organised on Google meet. It was such a happy moment to see some older people online. (33-year-old, teacher, Mpigi)*

For some of the teachers, the use of digital technologies was a job requirement, and essential to the work they did, for example, developing learner school pay codes which are used in the payment of school fees, or researching and preparing teaching materials, and sending materials to students. All these motivated the teachers to learn and utilise digital technologies individually without any facilitation from the school. This was an advantage to the teachers because even outside school they applied these skills.

Digital technologies also allowed teachers to develop themselves professionally, minimising the geographic barrier when they could not live apart from their families or abandon their domestic responsibilities. Teachers who needed to further their studies needed phones to attend online classes, and to conduct research using Google and similar applications:

> *I had enrolled for my diploma, and there were some course works that needed us to go online to do research, so I needed to at least be on board. (29-year-old, Hoima)*

Lastly, digital technologies were used to run side-businesses including mobile money businesses and ICT services and skills training and were used to advertise their businesses online. As one participant in an FDG in Mpigi stated: *"Computers for some women are a business. … [they are used to] train other people on how to use them, they provide internet café services, typing, printing and scanning services at a fee."* These teachers have a ready market in learners who use these services allowing them to earn extra income.

2.2.4 Ease of use

How did the teachers learn how to navigate digital technologies? Like other participants in the study, for many of the teachers, learning to navigate mobile phones was a journey of self-discovery. Through trial and error and persistence, the teachers would stumble on a platform, some experimenting with different features until they became confident users. Other teachers, however, credited friends and family such as husbands, daughters, and sons with guiding them through the process of navigating different platforms. The teachers transformed their moments of confusion and despair, into opportunities for learning.

Among older women, children often became the teachers, bridging the generational gap with patience and their familiarity with digital technology. This often created the confidence for teachers to continue learning on their own. As 42-year-old head teacher from Hoima reflected, *"Leaving my sons aside, I have done self-discovery. Every time I go to Google, I learn something new. I do my own research and I discover a lot."*

Spouses also played an enabling role,, as highlighted by a participant from Kitgum*: "Since I am at school and we have Wi-Fi, I don't overuse data so I rarely buy data. My husband just hotspots me usually [laughing]…not actually, my husband promotes me to use my phone because he is good at ICT so he is exposed." (36-year-old, teacher, Kitgum)*

For some, the teachers' navigation of smartphones was a natural extension of their computer literacy. A 52-year-old teacher from Kitgum explained how, while relying on her children, foundational training in

computer skills made her exploration of technologies easier: *"I had learnt little computer skills so it was easy to do self-discovery on my phone. Other things I was taught by my children. My firstborn is a girl, 24 years old, and the second one is 18 years old, and they are computer literate."*

Staff at schools with formal computer training, often employed as secretaries or office assistants, were similarly able to transfer their digital competencies to mobile phone use with relative ease.

2.2.5 Commonly used apps

The usefulness of digital technologies was reflected in the selection of the apps the teachers used and how they used those apps. The most commonly used apps were WhatsApp, Google and TikTok.

Each application was selected with a purpose. Women teachers mainly enjoy WhatsApp. It was the most preferred app because it made communication easy, especially using the groups feature. They could leave voice notes in the group chats.

TikTok was mainly used for relaxation when teachers were tired or bored. Many teachers resorted to TikTok in the evening after work. This is when they had leisure time. They reported that this was time when they could laugh and enjoy funny stories and jokes on the app. Many also listened to music in order to relax.

Google was a crucial app for teachers and was mainly used for research.

While each app met a specific need, as one participant emphasised, the overall digital experience of teachers entailed navigating seamlessly across different features and apps on their phones:

> *I love Google so much because as teachers we use it for research; and then WhatsApp is for communication, both at work and maintaining other social ties. With my phone I also use the camera, torch, calendar, calculator and discovering other apps as I practice. (35-year-old, Mpigi)*

2.2.6 Positive outcomes of the use of digital technologies

Digital tools had improved educational content creation, communication with colleagues and students, and engagement in professional forums. Phones supported remote learning leading to improved skills and material delivery, and economic empowerment via mobile banking.

Improved communication and connectivity

Teachers had experienced seamless communication with colleagues, students, and family members through using different applications such as WhatsApp and Facebook, and through making regular calls. As one teacher stated: "*It has improved communication. My family is in Kyenjojo district but I always communicate with my mother and siblings any time."* Besides communication, another outcome for

teachers was an enhanced ability to coordinate meetings, training, and social events online. This had resulted in efficiency and timeliness in organising functions and events.

Enhanced professional growth and access to knowledge

Digital tools had improved lesson planning and the delivery of courses. Teachers used Google, Chat GPT, and YouTube for lesson preparation, researching new methods of teaching, curriculum enrichment, and continuous learning. These applications had enhanced pedagogical innovations among teachers, allowing them to research new topics, update lesson notes, and clarify complex concepts before entering the classroom. For example a teacher in Mpigi said: *"When I am teaching, I look out on what I don't understand from Google and always update myself on new developments in the profession."* The teachers have also created professional learning communities, thus enhancing peer-to-peer mentorship.

This outcome reflects a shift from dependence on printed textbooks and workshops to on-demand, digital learning, giving teachers greater flexibility and immediacy in improving their professional competencies.

Enhanced school administration and job performance

Head teachers, and supervisors at the district and national level used phones to monitor and evaluate performance. The TELA system was used to capture the teachers' attendance and performance providing direct feedback to the Ministry of Education and Sports.

TELA tracks lesson delivery in real time and the data is automatically transmitted to district and national education offices for analysis. This has improved on the delivery and teacher/student engagement. Digital tools have also streamlined record keeping, school payment systems, and data management, making administrative work more efficient.

Easier financial transactions through mobile banking

Teachers used phones to either send or receive money to or from relatives and friends both within Uganda and abroad. This money helped them and their families survive. Many women no longer had to travel long distances to a bank to deposit or withdraw money, but rather used mobile banking to transact. As mentioned below, phones were also used to financially transact for business purposes.

Enhanced economic and social empowerment

The use of mobile phones and social media platforms like Facebook, WhatsApp, and TikTok supplemented teachers' incomes through small businesses such as selling food and crafts, advertising clothing, baked goods, and other products to a wide network of friends. An example was given by a 42-year-old teacher in Kitgum: *"[I use the internet for] marketing, selling products like ground nuts; you know I also have a side business outside teaching. I roast ground nuts and sell them…"* This digital visibility allowed teachers to promote their products in a way that would otherwise be unaffordable. As one teacher in Mpigi noted, "*Advertising on TV is expensive, but with your phone, you only buy data and advertise."* The ability to use computers has also created the potential for teachers to offer IT services to others. As a teacher highlighted during an FGD in Mpigi: "*Computers for some women are a business. They use them in stationery centres to*

train other people on how to use them, they provide internet services, typing, printing and scanning services at a fee, so these teachers earn a living from technology."

These activities have opened new income-generating avenues, and enabled teachers to supplement their income and support their families better.

Access to mobile money and mobile banking has increased the teachers' financial inclusion, enabling them to save money, and transact for business purposes. Through mobile money and mobile banking, teachers enjoyed improved financial autonomy and convenience. A teacher could save, send, and receive money, pay for goods and services, and even manage school-related finances without relying on banks or traveling long distances. This accessibility also provided teachers with a sense of financial control and independence, especially for women who historically had limited access to formal banking.

Access to digital technologies had also reduced social isolation and enhanced social capital for teachers, particularly for the teachers in rural areas who are able to maintain ties with urban peers and professional networks.

Access to new employment opportunities

Teachers responded to job advertisements and study opportunities circulated on WhatsApp groups and other social media platforms. Through digital technologies the teachers could therefore access new employment opportunities.

2.2.7 Drivers of positive outcomes

Professional and social WhatsApp groups were formed for peer learning and knowledge exchange. In these digital communities, teachers shared lesson plans, exam formats, announcements, and solutions to everyday tech challenges. Some groups also hosted virtual workshops/meetings to discuss their professional needs. These networks not only expanded access to informal ICT training but also nurtured a sense of professional solidarity.

Integration in teaching practice

In the classroom, technology had become a practical tool for lesson preparation, research, assignment assessment, and communicating with students. Teachers reported using Google to search for teaching notes, YouTube to find demonstrations for science concepts, and PowerPoint to structure lessons for projector-based delivery where equipment was available. During COVID-19 lockdowns, these digital practices became even more critical. Some teachers described sending assignments via WhatsApp and using borrowed laptops to prepare learning materials. These examples illustrated how digital integration not only improved efficiency but also ensured continuity of learning during periods of disruption, reinforcing the value of digital competence in crisis resilience.

Professional and social networks

Professional and social WhatsApp groups were formed for peer learning and knowledge exchange. In these digital communities, teachers shared lesson plans, exam formats, announcements, and solutions to everyday tech challenges. Some groups also hosted virtual workshops/meetings to discuss their professional needs. These networks not only expanded access to informal ICT training but also nurtured a sense of professional solidarity.

2.2.8 Negative outcomes

A number of negative outcomes from digital technologies were noted in our study.

Online abuse

Digital technologies had also exposed women teachers to forms of online abuse, such as insults and threats of blackmail, some of which have been defamatory. This had created a sense of mistrust of technology:

When one cannot face you for an argument, they use social media platforms like WhatsApp, TikTok, X [Twitter] and Facebook to insult you. (*Individual, Hoima)*

Theft and loss

Some teachers had lost their phones through theft. This had meant not only a loss of contact with relatives, parents, friends and colleagues but a loss of mobile money they had saved. For teachers who did not have a national identification (ID) card, this loss was amplified because an ID card was required by mobile providers to recover contacts. Some without an ID card mentioned that they had to use phones registered in other relatives' names due to the requirement of a national ID card to register a phone.

Distraction and loss of physical and social ties

Some teachers experienced excessive phone use or addiction and their phones distracted them from other activities, often leading to reduced face-to-face interaction with peers and family. Some teachers with phones reduced the time they were physically available to fellow teachers, children, husbands, relatives, and friends. Teachers in staff rooms often concentrated on their phones instead of talking among themselves.

Conflict and domestic violence

Digital technology use had led to domestic conflict, with suspicions arising from private phone activity. Domestic violence was reported to be one of the major challenges that resulted from phone ownership. Some families had broken up due to a failure to understand each other as far as private phone usage was concerned. Teachers raised the issue of being falsely accused of extra-marital relationships when 'mysterious' phone calls were received – such as calls from unknown numbers – sometimes from their students or their parents. However, in instances adultery was exposed through the use of the devices,

leading to quarrels, fights, separation and even divorce. The use of passwords and pins also created a lot of suspicion among married teachers.

Cultural diffusion

Some teachers raised cultural diffusion as a negative impact of digital technologies. Through social networks, Ugandans had been exposed to different cultures and the teachers felt that this had changed the country's culture. For example, teachers mentioned changes in dress codes, the food Ugandan's preferred, and even changes to languages, among others.

2.2.9 Causes of negative outcomes

Women teachers operated within a rapidly digitalising education sector where professional expectations increasingly relied on technology. Yet the integration of digital tools into both their work and social environments had created conditions that created negative outcomes. These were shaped by the demands of their profession, domestic relations, cultural perceptions of women's phone use, and the wider social risks inherent in digital platforms. Teachers' experiences demonstrated how technology could deepen inequalities, particularly between urban and rural spaces. Teachers' engagement with digital technologies was closely tied to both professional responsibilities and personal lives. However, the causes of negative outcomes originated in the intersection of these domains.

Patriarchy

Some husbands were uncomfortable and suspicious when women teachers received calls or messages, especially when they answered calls in private or where passwords or unexplained calls were involved, as highlighted by the different key informants:

> *The husbands are strict at night. Some men give their wives time, [for example] that between 10pm and 7am you are not supposed to use your phone. So you don't receive calls or even make calls but it is not general for the community. (KII, Hoima)*

Another added:

> *The majority of my teachers are experiencing divorce because of phones. Even two days back on Friday I was here with teachers of a secondary school fighting terribly over a message… [she was with] son and the phone and they had come to report… Men are not in support of women using phones… as they fail to attend to their husbands, especially the educated women. Actually, marriages were more settled before the coming of these phones. I bumped into the probation office this morning and I found in his office two men and three women crying over domestic violence and it wasn't easy. (District education officer, Kabarole)*

The increasing use of digital technology within households had introduced new tensions in gender relations, particularly around issues of control, privacy, and trust. The restrictions that resulted from these reflected deeper patriarchal anxieties over women's growing autonomy and access to information. Private

phone activity was frequently associated with secrecy or infidelity. As such, the mobile phone became more than a communication tool; it created a contested space where power, control, and trust within intimate relationships were constantly negotiated.

These narratives suggested that digital adoption was disrupting established social norms, particularly among educated women whose active phone use challenged traditional expectations of obedience and availability to their husbands. The perception that *"marriages were more settled before the coming of these phones"* underscored a sentimental view that linked technological change to moral and relational instability. Educated women, while benefiting most from digital inclusion, also faced heightened surveillance and resistance, revealing the intersection of gender, education, and technology as critical fault lines in domestic life. The mention of men and women seeking help from the probation officer at the district office for education over phone-related disputes illustrated how digital transformation extended beyond private households and became a broader social and governance concern. This highlighted the need for community sensitisation and gender-responsive digital literacy initiatives. Curtailed use of digital technologies only served to reduce the positive outcomes of digital technologies for teachers.

Poor networks

Almost all the teachers talked about limited networks or no network coverage in certain parts of the country, especially those far from the urban centres. This in turn limited their use of digital technologies. Cases were reported where data had been loaded by had expired by the time a network became available. It was a particular challenge when a teacher needed to make an urgent call.

Expensive mobile data

Teachers also reported unaffordable data and airtime charges for all networks in the country. Given their monthly earnings, airtime and data were costly; yet it was an unavoidable expense because they needed the phones to access teaching materials and keep up to date with news from their schools.

Absence of electricity/load shedding

In most rural areas, electricity supply was a big cause of limited digital technology use. It was noted that people had to move to trading centres where they could access electricity to charge their phones. Most of the teachers residing in rural areas used solar energy for lighting but some teachers claimed it was dangerous to use for charging the phone. As a result, they quite often had to spend many hours without their phones when it was charging. Even in the urban areas with electricity, load shedding was very common, meaning that often teachers had low or no battery charge at all for their phones.

Addictive behaviour

Addictive behaviour also emerged as a recurring cause of negative outcomes of the use of digital technologies. Some of the teachers admitted to being addicted to their phones and said it was really hard for them to do without them. The addictive nature of digital technologies was however treated lightly by both those who claimed to be dependent, and those listening:

> *I will be like locked in a coffin. Even if I don't eat food as long as I have my phone all is well. I am now addicted. [All laugh]. (44-year-old, head teacher, Kitgum)*

> *I think I cannot survive because I am a mother and I have to talk to my child at home, so it is hard for me to just go. I am actually addicted [laughter]. (36-year-old, teacher, Kitgum)*

Teachers reported that their phones sometimes distracted them from work: attention to other work.

> *Sometimes I get addicted to it and it interferes with my work and you keep procrastinating [putting off] other jobs. (33-year-old, teacher)*

Some supervisors encountered challenges in contacting teachers who were busy with their phones during work time.

This sense of addiction was combined with the phone serving as an essential communication tool in a new digital reality:

> *I can't [be without my phone; maybe in the holidays when the children are home, but during school time, I badly need it for research. Even at home the phone is my husband and children. I don't stay with my children and my husband comes back only over the weekend. Truly I am now addicted…I would miss WhatsApp. (41-year-old, teacher, Kabarole)*

2.3 Women health workers

2.3.1 Introduction

This section explores experiences of women health workers in the utilisation of digital technologies. Women health workers represented in the study are divided into two categories: women health workers working in government hospitals and health centres, and village health teams (VHTs). The VHTs are community-based volunteer groups who act as a link between their local communities and the formal health facilities. The VHTs mobilise people for health programmes such as health education, manage common illnesses like malaria, conduct home visits, and refer patients to health centres. Women health workers have integrated digital technologies into patient care, data management, continuous personal and professional development, and communication.

2.3.2 Experiences in using digital technologies

Findings show that women in the health sector used digital technologies for a number of professional and personal activities. The digital technologies most available to many and also used were mainly phones.

Affordability and accessibility

Mobile phones were the most common digital technology accessed by health works. In comparison, computers were not commonly used. However, affordability was a major structural concern. As mentioned earlier, the cheapest smartphones cost UGX 200 000 (USD 55) and above, which is costly relative to health workers' salaries. For example a nurse receives UGX 596 000 (USD 168), medical personnel (U7) UGX 1 421 634 (USD 400), and medical personnel (U6) UGX 1 558 476 (USD 438). Thus the cost of smartphones remained significantly high and a challenge for many health workers, especially the low-level cadre nurses

and midwives, the majority of whom are women. Except in very rare circumstances, the health sector did not provide health staff with devices and this reduced accessibility to smartphones. Therefore, limited opportunities to purchase a smartphone affected their ability to own and maintain smartphones:

> *Haaaa, phones are very good but they are expensive…smartphones, are even more expensive… …When you want to use the phone to provide you with different services you have to buy an expensive phone … A cheap one, may not do what you want. (29-year-old, health worker, Otuke)*
>
> *Sometimes data is expensive for me. I can't manage to subscribe daily because here we are not given data. You have to have your own money and you subscribe. (33-year-old, health worker, Hoima)*

Mobile data was also expensive, and as such women health workers did not prioritise the use of online resources for health provisioning services because data was not provided by the institution. Thus their data was reserved for personal use or, in very limited circumstances, they used it for more critical work-related activities, reducing their ability to use smartphones for health system improvements.

A 52-year-old member of a VHT said she used UGX 5 000 (USD 1.36) on internet data and UGX 7 000 (USD 1.91) on calling and sending messages per week. This cost was high for women who did not have formal employment (VHTs do not receive a salary) This aligned with a Kitgum District Community Development Officer's statement that women mostly have low uptake of technologies compared to men due to the cost involved.

It was evident that the use of the internet was limited due to the challenge of accessing data:

> *I have a Tecno phone which I got to communicate with my children while they are at school. However, I have never connected to internet because my phone is not a smartphone (37-year-old, Luuka)*

Besides work, digital technologies were accessed and used to maintain relationships. Health workers found themselves posted to areas sometimes very far away from their homes and this was when technology came in handy, as stated during one FDG:

> *It [technology] helps in relationships. It helps a lot in long distance relationships. For example, the husband can be in another location, let us say [in two different cities]. The two of you make video calls and you get to talk and even see your wife, husband, and children… And you can also have [family] meetings online. (Health worker, Kitgum)*

Women health workers had institutional access to digital tools, but the use of these were practically limited because of rural infrastructure constraints. . Access to mTrac was mandated by the health system: *"It is a requirement to recruit Village Health Teams who own phones"* (KII, Mpigi). However reliable usage was inhibited because *"our network is so poor… data is wasted… and we suffer with a shortage of electricity"* (FGD, Kitgum). The Ministry of Health provided data subsidies only for mTrac, not for general phone use.

Gender norms also produced covert barriers limiting access to digital technologies: *"Some men restrict their women from using smartphones claiming that use of smartphones is destructive."* (FGD, Kitgum). This showed that formal access or ownership did not equate to functional access or freedom of use.

Women health workers, just like other groups, acquired their first phones in different ways. Here is a story of a VHT participant who owned her first phone in 1999 and a second one in 2008 through gifting. What makes the story interesting is that her husband gifted her the two phones for professional and business use, whereas in some other cases husbands act as gatekeepers to access to and use.

The phone was central to the VHT's work, supporting health education, medicine distribution, and coordination through WhatsApp and Facebook, while Phoenix kept her informed-on news and current affairs. Beyond health work, digital connectivity benefited her poultry business through advertising and customer communication, supported social interaction, facilitated school fee payments, and linked her to savings and professional groups, illustrating how mobile technology had become an integral tool for community service, livelihood, and everyday life.

2.3.3 Purposes of use

Given the nature of women health work, which requires accessing current and correct information in medicine, the health care workers had integrated digital technologies into their professional roles. Women health workers noted that phones were useful in a number of ways. The majority of women health workers had phones which were used for communication. However, health workers were also more likely to use smartphones in situations where they perceived clear benefits of using a smart phone such as improved patient outcomes, better communication, or easier access to medical information.

Similar to the education sector, a key finding unique to the healthy sector was the use of mTrac information system used by the health workers to transmit reports to the ministry headquarters. The system had made it easier to respond to disease outbreaks.

Box 5: mTRAC Information System

According to the District Health Officer (DHO) in Mpigi District, mTrac is a national a mobile phone-based health information system that innovatively uses SMS to transmit weekly Health Management Information Systems (HMIS) surveillance reports from nearly 5 000 health facilities in Uganda. mTrac is used to report data on disease outbreaks, health facility stock of essential medicines, and maternal and neonatal deaths. Thus mTrac is a vital platform in the health sector. mTrac is also used to access health-related policies and strategies, to refer fellow medical practitioners to opportunities for further studies and conferences, to access health services in a timely manner, and to learn and exchange information.

How it works

mTrac uses basic phones to send text messages with health data which are then integrated into the national database (DHIS2) to create alerts. For example, if a specific number of typhoid cases is reached or a single case of a viral haemorrhagic fever is recorded in a particular district, the system automatically sends SMS alerts to the relevant district health management team for immediate action.

Benefits of using mTrac

mTrac replaced a paper-based reporting system, making reporting faster, cheaper, and more accessible. It provides an opportunity for the district health teams to respond quickly and efficiently to public health issues. The system enables the rapid and cost-effective collection of health data, which enhances the quality of the data available to the Ministry of Health. It strengthens the capacity of health practitioners and district officials to use real-time data to improve health outcomes.

The government sometimes provided Wi-Fi at health facilities or individual data bundles for members of VHTs. This was done to ensure easy access to mTrac. This was emphasised by the District Health Officer in Mpigi:

> *The health workers [VHTs] have to access phones… then they are provided with some cash for airtime. The Ministry of Health has now gone e-cash (sic) to enable health workers to use phones for implementation of health activities. (47-year-old, KII, Mpigi)*

Findings confirmed that a phone was considered vital technology in many ways in the lives of healthcare workers. First and foremost, they had to access information for their work:

> *One of the benefits of the phone is that it is very helpful in understanding health issues. For example, if you have problems, including having a sick person in the family, you can easily search for information*

about the disease and know about it. If you have any other problem, you can contact and talk to your friends or colleagues to help you out of the problem. (28-year-old, Luuka)

As for me, I know that using the internet helps us to find some hidden information required for our work. With technology, one can just access it easily from smartphones and other technologies. (FGD, Kitgum)

In another instance, a midwife shared that she used digital technologies to understand new health conditions:

You know for me, for instance, when I am in a delivery room, when I see a new condition, after helping the woman to deliver, I go straight to my phone and use Google to read about it and understand it more so that in case I find it again I know what to do. (46-years-old, KII, Kabarole)

Digital technologies were also used for community mobilisation, raising health awareness, logistics coordination and managing health crises. Digital technologies were critical during disease outbreaks, helping to raise awareness about the disease, mobilise communities for health sensitisation activities, and to make quick health interventions:

Bio-statisticians, health officers and health assistants all use phones to report data to the Ministry of Health. The advantages this has is the timely reporting of health status in communities. Even in times of disease case outbreaks, they are able to address the outbreak. Because of technology, a lot of change has happened and now, you do not have to travel to Kampala where the ministry is located even if there is an outbreak like measles. Samples are easily sent to Entebbe laboratories and reports sent back to the source for action. With digital technologies, it is easy to manage referrals. For example, I receive phone calls about emergencies and I use that information to communicate to all concerned parties, including the ambulance drivers. Hence, interventions are quicker. (51-year-old, KII, Jinja)

Similarly, a 55-year-old member of the VHT in Otuke district acknowledged that because she is the link between the hospital and the community, she used the phone to send health information to the community members, both women and men, and also to send information regarding the community needs to the ministry's head office.

WhatsApp, Facebook, Tik-Tok, X (Twitter), and mTrac were the platforms most used by the health workers.

Through the use of digital technologies like phones and associated apps, health workers were also able to broaden their networks. WhatsApp, Facebook, Zoom, X (Twitter), and TikTok were used for professional collaboration and training, marketing, and social networking. Further, mobile money apps or digital wallet platforms were used when conducting financial transactions or mobile banking.

2.3.4 Ease of use

Community health workers, including hospital staff and VHTs, have increasingly integrated digital technologies into their work. Tools like mTrac were central to data reporting, outbreak response, and accessing health policies. Smartphones were used for professional consultations, public health campaigns, and personal communication. Digital tools had notably improved service delivery and emergency responses, and supported continuous education among health workers. Women health

workers generally learned to navigate digital technologies with ease. It was noted that the majority of the health workers learnt how to use their phones through self-discovery. However, a few were taught by their relatives or colleagues:

> *To navigate, it was just training on the job. You know, on getting the phone, as you scroll you discover new stuff. I actually taught myself how to use a phone. (25-year-old, health worker, Kitgum)*

While the majority of the health workers were self-taught or relied on informal networks to develop digital skills, digital literacy was also acquired through the help of family members or peers. As one health worker said: "*Sometimes my neighbour taught me, sometimes my niece, just like that."*

Another health worker added*: "Some of the things my son taught me when he brought the phone, but others I saw colleagues using the phone and also saw guidelines to learn to use."*

This informal, relational mode of learning reflected resilience and adaptability but also underscored the absence of structured digital training within the health workforce. The lack of systematic capacity building limited the ability of health workers to exploit the full range of digital tools available to them.

2.3.5 Commonly used apps

Health workers demonstrated a broad and purposeful engagement with digital technologies, combining professional tools with social media platforms and financial services to support clinical decision-making, peer coordination, and their everyday personal lives. Their digital practices reflected a practical response to workflow demands, gaps in health information, and the need for real-time collaboration in resource-constrained settings. Research and searching online for health information was crucial in the professional practices of the health workers:

> *Sometimes I first Google the health challenge we are faced with. For example, when I have pain I type into my Google search the type of pain I am feeling; then I go ahead for consultation with an idea in mind. (28-year-old, individual, Kabarole)*

Using mTrac: A key role in public health surveillance

As already noted, mTrac was accessed for HMIS reporting by submitting routine health data, allowing real-time disease tracking that enabled quick detection of outbreaks.

The mTrac's real-time functionality reduced delays in data transmission and facilitated faster public health responses. Health workers' engagement with mTrac reflected the institutionalisation of digital technology tools into national health system operations. mTrac was also used to access policy updates which ensured that health workers worked within the Ministry of Health guidelines.

WhatsApp

WhatsApp was accessed for rapid coordination of professional activities, consultation with fellow health workers on emergencies or other health related information, and for participating in professional groups. It was used in emergencies for consultation across facilities, for example, sharing patient cases,

medication availability, or lab results. It was also used for setting up professional peer groups that supported continuous learning, task coordination, and the sharing of guidelines or training materials.

Google search as a clinical and pre-consultation tool

Google was a core resource for both professional and personal health purposes. For clinicians, Google filled information gaps by enabling rapid searches on clinical symptoms, on health emergencies, or emerging health conditions. Google functioned as a pre-consultation tool for some of the health workers seeking care for themselves. Health workers noted that they used search terms describing symptoms such as "*the type of pain I am feeling*" to form a preliminary understanding before meeting a clinician. This practice built a sense of preparedness and supported more informed engagement during consultations.

This practice pointed to self-directed digital health literacy which was crucial to supplement professional judgement or prepare for medical encounters. Beyond clinical use, digital platforms supported career development and personal interests. Google was used for job searches, scholarship opportunities, and personal health research.

Facebook and TikTok

Facebook and TikTok were mainly accessed for personal use to watch videos and for social connections. They provided entertainment, social bonding, and stress relief, which was important given the heavy emotional burden of health work.

Digital financial services as everyday utilities

The health workers used mobile money to send and receive money, and mobile banking. These tools supported salary withdrawals, bill payments, remittances, and everyday purchases. Their routine use indicated a high level of financial digital literacy, facilitated by the ubiquity of mobile money in Uganda's financial ecosystem.

2.3.6 Positive outcomes of the use of digital technologies

The findings showed positive benefits that accrued to those who used digital technologies. Digital technologies, particularly mobile phones, had transformed how health workers communicate, collect data, and engage with communities.

Enhanced communication and work efficiency

Digital connectivity had significantly improved communication among health workers, patients, and supervisors. Phones facilitated faster access to information, enabled remote consultations, and reduced the need for physical travel. A VHT described the transformation in her work life:

> *My life has transformed so positively because I get information faster than before, I save transport and energy; I no longer ride the bicycle so much like I used to do before I got this phone.*

Health workers' delivery of service was enhanced through the use of digital platforms to relay patient data, mobilise community meetings, and consult medical personnel in emergencies. The ability to "*talk to friends and neighbors to get what you want*," as one participant put it, extended beyond social interaction; it reflected the centrality of communication in health delivery. Digital tools also offered access to professional learning and health information online, improving both responsiveness and knowledge sharing within the health system.

Access to information has enhanced health care

Digital technologies had reduced time for sharing information and increased efficiency in the health sector. They had enhanced access to information and there was an improvement of service delivery. Health workers were able to collect, share and disseminate information. They were also able to access personal information for follow-ups with the patients, improving medical care for individuals.

The few health workers that said they used and benefited from computers were mainly in urban Kampala: *"Okay, first of all, we are in the dot-com world where everything is computerised. Therefore, I personally do everything on the computer, including prescriptions at the hospital." (31-year-old, individual, Kampala)*

Personal development and empowerment

Digital technologies have made health workers more confident and empowered when managing cases. This was referred to as "digital client management":

> *If you get challenges when handling a client, you need not panic, you simply resort to the digital tools, reach out to colleagues and you are quickly helped when you share the experience on these platforms. So, we have digital client management. For instance, one time I was in theatre and got out a distressed baby and I did not have enough knowledge on how to manage the mother and the baby. I linked up with colleagues on the platform, provided details, then the specialists responded immediately and guided me on what to do. … As health workers we are able to consult as quickly as possible with the digital technologies and save lives. (49-year-old, KII, Mpigi)*

The use of digital technologies improved access to continuous professional development with participants enrolling in online courses. Younger health care workers who were still training used technology for learning, as one nurse explained: *"[Technology] is adding more knowledge to us…sometimes we do research on questions and we are able to understand more about our courses." (30-year-old, health worker, Kabarole)*

Preserving personal relationships

Digital technologies were used to maintain relationships, especially for those who were married. Health workers found themselves posted to areas sometimes very far away from their homes and this is when technology came in handy, as stated during interviews:

> *It [technology] helps in relationships. It helps a lot in long distance relationships. For example, the husband can be in another location…The two of you make video calls and you get to talk*

and even see your wife, husband, and children… And you can also have [family] meetings online. (36-year-old, health worker, Kitgum)

Economic benefits

Women in the health sector indicated that the use of digital technologies opened opportunities through which they were empowered economically as they engaged in side businesses promoted via mobile platforms.

2.3.7 Drivers of positive outcomes

Women health workers occupied a critical frontline role in the health sector, serving as the first point of contact for many households. Their engagement with digital technologies was shaped by both the demands of the health sector and the realities of community-level service delivery. Smartphones and digital platforms had become integral to how they reported, coordinated, and accessed information. Yet these same tools introduced new pressures, dependencies, and tensions in their professional and personal lives.

Institutional integration of digital technologies

Women health workers had benefited from a strong institutional integration of digital technologies in the health system. Government platforms such as mTrac and the HMIS had enabled timely disease surveillance, patient referrals, and reporting. This structured integration created a professional necessity for women health workers to own and use mobile devices.

Peer-to-peer digital networks

Another driver of positive outcomes was peer-to-peer digital networks, particularly WhatsApp groups. Health workers consulted colleagues in real-time, received guidance from specialists, and coordinated emergency responses, which directly improved patient outcomes.

Access to information

Access to information was another key driver of positive outcomes. Smartphones and internet access enabled health workers to research medical conditions, keep updated on treatment guidelines, and support continuous professional learning.

Informal technical support

Women health workers received informal technical support from children, spouses, and peers, further strengthening their digital literacy. Some women health workers received their first phones from their husbands, a critical entry point into digital engagement.

2.3.8 Barriers to positive outcomes

Cultural and gender norms

Social and gender norms constituted the background force that saliently impacted women's ability to freely use technology. Due to patriarchal controls and expectations that women had to submit to their spouses and be responsible for all care work, some women in health facilities faced restrictions from their male family members with respect to the use of their smartphones. The justification for this control and restriction was that the women could be distracted from their work or fall into sexual temptations. This was highlighted by many health workers:

> *The attitude of the men is a challenge. There are men that restrict their women from using smartphones claiming that use of smartphones is destructive. (FGD, Kitgum)*

> *I hear some men here don't want their wives to own phones, however…some women own them secretly and once the man gets to know, the women [is] beaten which leads to domestic violence. (50- year-old, KII, Jinja)*

> *[It] is because they fear men, some [women] buy phones and hide them in their friend's houses. If she needs to talk to someone, she runs to her friends' home, she talks and leaves phone there. (28- year-old, individual, Luuka)*

> *[Y]ou know men are very funny; I can't say that they are jealousy, but they just don't want their wives to have phones. In fact, some women buy them and keep them at their friends' or parents' places. They go there make calls to their people…The problem comes when the husbands get to learn of the phone and the place where it is kept. In most cases domestic violence arises at home. To some it even leads to breaking up the marriage. (43-year-old, KII, Kitgum)*

Women had come up with a number of strategies to overcome male control. As suggested by participants, they hid phones in their house, or at the neighbour's house, and only accessed it when they want to use it. Some also contributed data to a friend's phone and used it secretly. Another approach was to behave transparently by telling the spouse who they were talking to and encouraging him to think about the benefits of the phone in handling family emergencies. All these strategies nevertheless rob health workers of the freedom to use the technology freely and privately if necessary.

Technological infrastructure

The mobile network and electric grid are key infrastructures for using digital technologies; however these are greatly inadequate or absent in most rural areas where many health workers are stationed, limiting connectivity, including in health centres. Some health staff reported that they were not able to access the internet due to overloading or the network being unstable:

> *Our network is so poor; I hope someday the government will construct boosters, at least to boost the available networks to make it easier for the users. With poor connectivity, network is very slow and data is wasted. This is a big problem particularly for us in the rural areas; yet, we also suffer with a shortage of electricity. Thus the government should try to provide electricity as well because you cannot use technology without electricity. (FGD, Kitgum)*

It is important to note that the government has provided some rural electrification in the form of electric poles which reach certain parts in rural areas. The residents along the electric grid are simply required to wire their homes or business structures to the grid in order to connect to electricity. However, the majority of the people in the rural areas cannot afford to wire their houses nor pay for electricity, and so they remain without electricity. In some rural communities the residents used solar to power their phones. Some of the health workers, particularly VHTs, were working in areas where electricity was non-existent. The lack of or inadequate infrastructure affects the health care workers' professional role.

Digital skills

Women health workers with higher levels of digital literacy were more likely to use smartphones effectively. However, some health workers did not have the requisite skills to use different platforms. This was particularly the case in rural areas. Training programmes on how to use smartphones for health-related tasks can increase usage and improve work outcomes. Access to formal training or self-taught knowledge about smartphone use (for both work and personal use) is crucial. A lack of adequate training may lead to underutilisation of the device for professional tasks:

> *In these rural areas people do not know the benefits of technology. [There is need to] sensitise people about the importance of technology and how to use them… I think they should train people mostly in rural areas. Sometimes they may not be able to use smartphones and even computers. Majority of women in rural areas don't know how to use computers. (FGD, Kitgum)*

Nevertheless, women health workers are resilient and look out for individuals to teach them how to use digital technologies and tools, and sometimes lean to navigate technology themselves through trial and error.

Workload and time constraints

The health sector in Uganda is inadequately staffed, which leads to work overload. The health workers very busy work schedules impacted on the use of digital technologies. In busy healthcare environments, women health workers sometimes failed to consult online apps even when it was essential and helpful for improving service delivery or communication. Busy health care workers also had little time for relaxation and could not enjoy and explore their phones for personal purposes.

Cost of digital technologies

The cost of phones and data affects access, and was often a challenge for health workers. Except in very rare circumstances, the health sector does not provide staff with devices. Currently, smartphones are expensive. As mentioned, the cheapest can be obtained at UGX 200 000 (USD 55). Cost therefore remains

a significant challenge for many health workers, especially low-level cadre nurses and midwives, the majority of whom are women:

> *Haaaa, phones are very good but they are expensive…smartphones, are even more expensive… When you want to use the phone to provide you with different services you have to buy an expensive phone…a cheap one, may not do what you want. (Health worker, Otuke)*

> *Sometimes data is expensive for me. I can't manage to subscribe daily because here we are not given data. You have to have your own money and you subscribe. (Health worker, Hoima)*

Mobile data is expensive and women health workers did not prioritise the use of online resources for health provisioning services because data was not provided by the institution. Instead, their data was reserved for personal use, or, in very limited circumstances, they used it for more critical work-related activities. This reduced their ability to use smartphones for health system improvements generally.

2.3.9 Negative outcomes

While beneficial, digital technologies can foster overdependence, leading to distraction and reduced productivity. Excessive phone use can make employees appear disengaged from their work, and compromise on outputs. Health care workers expressed concern over individual staff who spent a lot of time on social media or responding to calls while attending to a patient. They were of the view that this distracted the health career's capacity to listen and give meaningful attention and treatment to the patient.

Some health workers reported anxiety and stress when unable to access their phones, indicating psychological dependence on digital technology.

Access to digital technologies also exposed health workers to scams, with one participant lamenting *that "scammers always try to steal from us [in the form of] airtime... sometimes it is not only airtime but also money" (KII, Jinja*). This vulnerability increased the psychological stress of owning a phone.

The digital divide between rural and urban health workers as impacted outcomes. Limited connectivity, high data costs, and a lack of digital literacy hindered women's participation in online spaces. Respondents described the burden of maintaining smartphones as costly and disruptive: *"This phone takes a lot of my money since the data charges are very high... it can distract you like you can be working on a patient... and end up wasting the patient's time*" (Health Worker, Kitgum)

The findings also revealed persistent gender-based restrictions and cultural anxieties surrounding women's ownership of phones. Although some participants claimed *"there are no social norms…because originally technology came after our culture"* (KII, Luuka), others recounted strong male resistance: *"Some men don't want their wives to have phones" (KII, Kitgum).* Others noted that women conceal their phone use: "*[Women] buy phones and hide them in their friend's houses…The problem comes when the husbands get to learn of the phone… in most cases domestic violence arises"* (KII, Kitgum).

Such accounts illustrate that patriarchal control has adapted to the digital era, where technology becomes both a site of empowerment and repression. The accounts of women secretly using or hiding phones

highlight how fear, jealousy, and social surveillance continue to constrain women's access to communication.

Furthermore, parents' concerns that *"phones have destroyed our children… they are addicted...you can hardly control them"* (health worker, Kitgum) underscore broader social anxieties about technology's moral and generational impact. Collectively, these testimonies depict a complex landscape where digital inclusion is fraught with psychological stresses, work and economic strain, moral tension, and gendered power struggles.

2.3.10 Causes of negative outcomes

For women community health workers, digital technologies have become indispensable tools in service delivery. However, the same features that enable efficiency and connectivity have also created pathways for negative outcomes. The digital experiences of women health workers revealed how dependency, economic strain, and gendered power dynamics shaped digital engagement in ways that could undermine both professional performance and personal wellbeing.

Over-reliance on smartphones

Among women health workers, digital technology became both a vital tool and a source of strain. The over-reliance on smartphones created dependency, with some health workers reporting feelings of anxiety and loss when deprived of their devices due to power outages or lack of data:

> *I cannot survive because I am now addicted; everything I do rotates on my phone. For one day I can [be without it] but it will be in pain. (31-year-old, nurse)*

> *Yes [I am addicted]; I am because I use it [the phone] to call and receive calls all the time. (32-year-old, VHT, Otuke)*

This attachment to their phones, while underscoring the centrality of digital tools in their professional and personal lives, facilitated an unhealthy dependence.

Time management

Women health workers said time management was as another challenge. Without self-regulation, health workers could spend excessive time on digital platforms, diverting attention away from patients, and reducing productivity.

Economic pressures

Economic concerns were highlighted by the women health workers, particularly the unpaid VHT members who struggled to meet recurring costs of airtime and data. This inhibited their meaningful use of technologies.

Cultural and gender norms

Cultural and gender norms also facilitated negative outcomes. Some women health workers reported that their spouses associated phone use with infidelity or a lack of respect, which resulted in restrictions,

mistrust, and in some cases direct control over women's access to devices. These dynamics deepened existing gender inequalities.

Weak infrastructure and digital skills

Finally, unstable networks and unreliable electricity limited the effective use of digital tools, often leaving women frustrated and disempowered rather than supported. Limited digital literacy compounded these challenges, especially in rural areas where women lacked exposure and training in navigating smartphones or health-specific platforms.

2.4 Women collectives/entrepreneurs

2.4.1 Introduction

This section explores the digital experiences of women collectives and entrepreneurs. The enterprises represented in the study span sectors such as agriculture, tailoring, craftwork, hairdressing, market vending, and cosmetics production, with regional variations including shea butter processing and bee keeping in the North, and rice and sugarcane trading in the East. Women collectives and entrepreneurs in the informal sector were increasingly leveraging digital technologies, predominantly mobile phones, to facilitate business operations, marketing, financial transactions, and communication.

2.4.2 Experiences in using digital technologies

For most women collectives and entrepreneurs, the mobile phone, particularly the feature/basic phone was the primary and often only digital technology they used. While smartphones were becoming more common, especially in urban areas or among group leaders, many women were constrained by cost in owning phones. They also lacked the digital skills or language fluency (English) required to navigate these devices effectively.

Affordability and access

The affordability of digital technologies was the most prominent barrier to access for women in the informal sector. Many women collectives could not purchase smartphones or maintain regular data subscriptions because of the cost. This was even more prohibitive for women with disabilities. As one participant put it: *"Only three [of nine] own smartphones. The rest… use basic phones due to cost."* Credit-based platforms like M-Kopa have been used to overcome cost barriers, enabling women to acquire devices on instalment. Data costs also constrained usage, especially when digital tools were needed for business operations, marketing, and sourcing merchandise.

Access to digital technologies was crucial to achieving positive outcomes. Women collectives primarily used basic/feature phones, with limited access to smartphones due to cost, literacy, and infrastructure barriers: *"[For] most women…the feature/basic phone is the primary and often only digital technology they*

use." In rural regions, irregular electricity further limited access to mobile phones and internet-enabled devices.

Despite these constraints, women demonstrated creativity in accessing digital tools. Some women collectives practiced phone sharing, pooling funds to purchase one smartphone for product marketing, managing group communications, accessing social media, and for coordination of organisation operations: *"We contributed money as a group to buy one smartphone. The chairperson uses it to advertise our shea butter…and lotions through our WhatsApp group and even on a website"* (40-year-old, Individual, Otuke).

During the interviews it was evident that the phone was used entirely for the purpose of managing the collective operations and not individual businesses. Discussions were jointly made by the group members on when and how much data or airtime to purchase and the purpose of its use.

In situations where the group had limitations in accessing information or navigating the phone, they jointly made a decision to contact more experienced phone users for help:

> *None of us knows how to operate a smartphone. We always contact Ben [Not real name] to assist us. He comes and reads the messages we have received on our phone, and he helps us respond back to our customers. (36-year-old, member of the collective)*

Positive experiences using phone applications such as WhatsApp and TiKTok were shared (see Box 7).

Box 6: A tailor's experience with digital technologies

The phone is good; it is a blessing because it makes my work easy. I need the phone for communication with other people and my customers. I make sweaters I have tenders with schools, so I have to communicate with those people so that they buy the products I make.

In fact, the phone has made my work so easy because when I need something or my customers need me, they just call me and tell me, "Rose, send me a picture of a sweater".. I just watch on TikTok and make the sweater they need, then I take it to them. The fact is it helps me when I need a new fashion. I make clothes, I go to the apps on the phone and I get fashions of a dress, and then I make for someone when it is a new fashion. I sell that fashion for some time like three months, then I get another fashion.

Digital technology helps me to get new friends. It helps me to understand things which I didn't know from the phone…I go to WhatsApp and find it. It has helped me a lot in my life.

Tailor, Hoima

Women collectives also used digital technologies to form online social networks. The social networks supported their uptake of digital technology, as well as business management by providing technical and moral support.

2.4.3. Purposes of use

Digital technologies, especially smartphones, had become indispensable tools for women entrepreneurs, transforming how they communicated, marketed, and grew their businesses. Women collectives engaged in dress and sweater-making marketed their final products online. Women used digital technologies to sell their produce: "*I use the phone to sell rice*" (Individual, Otuke); *"I sell groundnuts, beans and soya"* (Individual, Kitgum); "*I sell shea butter"* (Individual, Otuke). Digital technologies allowed women real-time communication with clients and suppliers, facilitated the advertising of products across social media platforms, and supported research by allowing women users to search for new designs and techniques. Women increasingly invested in smartphones not just as tools of convenience but as strategic business assets that were used to source merchandise, identify new markets, and coordinate with customers across and beyond regional boundaries.

The devices were also used to mobilise group members, coordinate collective activities, and advocate for community needs.

Beyond business, digital technology also played a critical role in women's personal and emotional lives. Phones were used to maintain contact with children, friends, and health professionals, especially in moments of distress or illness. As one woman explained, *"I talk with my children and friends when I need comfort…when I am not feeling well, I raise my doctor on the phone and find help."* (Individual, Luuka). Importantly, digital platforms served as safe spaces for women to seek support in cases of gender-based violence, offering avenues to connect with family, peers, and even government services. As one participant shared: *"With domestic violence, you can pick up your phone and share something outside…someone will say 'don't worry, that has also happened to someone else'"* (KII, Mpigi).

Such interactions helped women navigate trauma with solidarity and support.

In essence, digital technologies had not only redefined how women do business, but how they connected, organised, and sought safety in a rapidly evolving social and economic environment.

2.4.4 Ease of use

Women collectives and entrepreneurs faced a complex interplay of gender norms, economic constraints, and household priorities in accessing mobile phones. Often, their ownership of phones, especially smartphones, was made possible through gifting by their children or husbands. Some women were motivated to acquire a phone by the demands of their work, recognising that maintaining employment or running a small business increasingly required digital communication. One woman from Jinja shared how she convinced her husband to purchase a smartphone on hire purchase after explaining that her new job required her to report sales updates regularly: *"My husband bought the phone for me on hire purchase arrangement from one of his friends who had a phone shop"* (individual, Jinja).

Some women collectives continued to prioritise immediate household needs over digital investments. This was particularly noted in the Eastern and Central regions where participants were hesitant to spend money on smartphones, data, or phone-related accessories, citing financial responsibilities such as paying school fees and ensuring basic family welfare:

My priority is my children, not smartphones. (Individual, Jinja)

Personally, I believe a smartphone has few benefits. I would rather buy my family's needs than buy phone utilities like phone covers. (Individual, Kampala)

For women collectives with disabilities, the challenge of accessing digital technologies was even more pronounced. According to the Executive Director of the Women with Disabilities Association (WDA), cost remained a primary barrier. Among the nine board members of the organisation, only three own smartphones. The rest of the board members, including many regular members, were unable to afford smartphones. The majority of the members owned feature phones or basic phones, locally referred to as "*kabiriti*". In such contexts, organisational outreach relied on calls and SMSes to communicate with members, particularly those with hearing impairments. Digital exclusion among this group was structural and systemic, requiring targeted interventions in affordability and assistive technology.

Some collectives had pooled resources to jointly purchase smartphones used for organisational purposes such as marketing, customer engagement, and managing sales. For instance, women's groups selling shea butter used a shared smartphone to advertise products, coordinate delivery, and maintain contact with clients. In urban centres, a few entrepreneurs, typically those operating in better-resourced environments, owned personal smartphones (e.g. Samsung or Nokia) for sourcing goods and engaging with broader markets.

The process of acquiring digital skills was largely informal and self-driven. Most women reported learning through peer support, children's guidance, from neighbours, or through trial and error, though some also gained skills through training sessions and workshops:

Yes, there was a time we had Uganda Communications Commission...train about 25 people here … It was a one-day training on how to use WhatsApp, and how to join the different social media platforms. There is an NGO that provided training for us. (KII, Mpigi)

Not all women were digitally literate; several relied on assistance from relatives, children or community members when specific digital tasks arose. Women with visual impairments had adapted to phones which had audio feedback features, allowing them to dial numbers by memorising keypad positions and confirming entries via voice cues:

Women who are blind know … one is here, two is here … and the phone gives voice feedback like 'zero-seven-seven', so they know what number they're pressing. (KII, Mpigi)

Digital exclusion due to cost or limited literacy was strongly evident in this cohort. Yet through collective ownership, informal learning, or work-based necessity, women collectives and entrepreneurs were actively seeking ways to integrate digital technologies into their livelihoods, underscoring the vital need for inclusive digital empowerment programmes.

2.4.5 Commonly used apps

The majority of the phone brands used by the business women were Itel and Techno feature/basic phones because of their affordability and good network connection, especially in rural areas where power supply is irregular.

Women collectives who owned internet-enabled phones used various platforms for different activities. Amongst the commonly used platforms and apps were Google, WhatsApp and TikTok (for advertising), and Facebook and Messenger. Other social media apps were used for business functions such as accessing merchandise/products, advertising, accessing hair and dress fashions, and selling products. The M-Kopa platform was used by women collectives to acquire phones on credit and pay either twice a week or once a month. The Jumia platform was used to order merchandise for businesses. Some of the platforms were used for social entertainment and having fun; for example, a participant used Wi-Fi to watch films with the family. This was an important family activity for her. TikTok helped some relax at the end of a busy day.

2.4.6 Positive outcomes of the use of digital technologies

Enhanced business and family communication

Digital technologies were at the centre of women's collective and entrepreneurs' business engagement. Mobile phones, whether basic/feature handsets or internet-enabled smartphones, first and foremost enable constant, multi-directional communication. Women used voice calls, SMSes, and WhatsApp groups to coordinate family crises such as illness or bereavement, and to mobilise members for training or community meetings. Women tracked raw-material supplies across districts to keep production lines running. This instant reach had replaced slow relay systems and ensured that orders were filled, transport booked, and customers kept informed. This kind of engagement safeguarded both social bonds and business continuity.

Mobile money transactions/digital banking improved businesses

The participants described mobile money as the financial backbone of collective trade. Large orders of produce and merchandise placed from Kampala were paid for via the phone; produce farmers were paid remotely before deliveries were despatched; and small personal remittances flowed home at the tap of a button. Even women who used only feature phones relied on Unstructured Supplementary Service Data (USSD) menus to place wholesale orders for *matooke* (the staple food in Uganda) or to schedule a truck pick-up, demonstrating that sophisticated apps were not necessarily a prerequisite for businesses to thrive:

> *I don't have a smartphone, but I use my button phone to makes orders in the villages for matooke. I also call the truck man to book when to go and pick them. (*Individual, Kampala)

Expanded economic opportunities

The ability to market products digitally allowed women to expand their businesses beyond their local villages and parishes, reaching customers and soliciting support across districts and even outside Uganda:

> *…Yeah, digital technology is really taking women to different levels; actually many have even got friends abroad…Recently, we got a volunteer. We just applied. We had a chat. We had a number of communications, and then the lady came.(KII, Mpigi)*

Digital technologies (mainly phones) were powerful marketing engines for women collectives and entrepreneurs. Entrepreneurs posted photos of new dresses, salon styles, or shea-butter lotions on Facebook and TikTok, or created simple WhatsApp status updates which instantly widened their market beyond village borders. Website storefronts, sometimes managed on a single shared handset, extend this reach internationally. As the Executive Director of the WDA noted, Facebook analytics now showed women exactly how many viewers and potential clients interacted with each post, turning visibility into measurable demand:

> *The advantage of Facebook [is that] many people get to know about you, and your products…if, for example, you share a chat on Facebook and you keep checking how many people have viewed, and how many people have made comments in a day. You can see that there's a big number that has really reviewed the post, and some people have been contacted by clients, and customers who seek their businesses online. (KII, Mpigi)*

Economic empowerment and social inclusion

Digital technologies result in economic empowerment for women collectives and entrepreneurs. Digital banking reduces costly trips to town, as noted by one participant: "*The phone has simplified my life; imagine where I would use transport of 50,000/= to 60,000/= to go I just use a phone" (53-year-old, farmer, Luuka).* This woman said she saved up to UGX 60 000 (USD14) on transport, which she could use for reinvestment. Online exposure kept entrepreneurs abreast of global fashions, hair trends, and product innovations that would once have been inaccessible. The phone also expanded social capital: every new sale, tutorial, or friendly exchange added a contact to an ever-growing business network.

Some women used digital platforms to recruit sales agents or forge partnerships, increasing both visibility and income.

For women living with disabilities, particularly those with visual impairment, smartphones provided critical access to information, business networks, and social inclusion.

2.4.7 Drivers of positive outcomes

There were several different drivers of positive outcomes for women's collectives:

Collective resource pooling

Collective resource pooling and shared ownership of devices proved a powerful facilitator. Groups often purchased a smartphone for their chairperson to manage marketing and online outreach, making digital engagement a collective asset rather than an individual burden.

Access to digital platforms

Digital platforms such as WhatsApp, TikTok, Facebook, and Jumia were pivotal in enabling business expansion, market access, and customer engagement. These platforms allowed women to advertise products, connect with distant clients, and diversify their businesses. Exposure to new fashions, innovations, and business ideas through online platforms modernised their enterprises and kept them competitive.

Mobile money services

The availability of mobile money services was particularly transformative. Women conducted financial transactions, received payments, and minimised transport costs through mobile banking, which improved efficiency and safety. Credit-based access models like M-Kopa also expanded opportunities for women to own smartphones.

Social empowerment

Importantly, digital technologies supported not only economic advancement but also social empowerment and protection. Women collectives emphasised that they used phones to seek help in cases of domestic violence and to mobilise support within their communities. Digital visibility strengthened women's sense of empowerment, self-worth, and participation in economic life.

2.4.8 Barriers to positive outcomes

Although women's collectives were progressively using digital technologies in their daily engagements, their digital progress remained uneven and contested. There were several barriers to positive outcomes.

Limited access to smartphones and cost

Where collectives lacked smartphones, members had to rely on a chairperson's single handset, limiting individual advertising reach. Data-hungry smartphones were unaffordable luxuries for many rural women collectives and entrepreneurs. Even basic airtime became a daily expense weighed against household essentials. Meanwhile second-hand phones, though cheaper, broke often, draining already scarce resources. Device loss was common on crowded trading journeys.

Structural constraints

Structural constraints deepened these gaps. A lack of electricity and unstable power forced women to pay for charging their phones in trading centres. This exposed their phones to theft and battery swaps. On the other hand, poverty limited the purchase of data, laptops, computers, printers, and scanners. Because of this, time and money was wasted printing reports at trading centres. It is important to note that most rural workplaces had no Wi-Fi access

Low literacy

Lastly, low literacy and English-only interfaces turned simple text messages into puzzles that had to be read aloud by neighbours, eroding confidentiality over health, land, or family finances.

Gender norms and control

Patriarchal control remained strong; for example, some husbands confiscated or monitored their wives' phone use, equating digital autonomy with moral risk.

2.4.9 Negative outcomes

Women collective narratives revealed a complex interplay between empowerment, morality, and exclusion regarding their use of digital technologies. While mobile phones and social media platforms had expanded communication, autonomy, and income-generating opportunities, they had also intensified social tensions around morality, family relations, and gender power dynamics.

Gender-based conflict and violence

Digital tools sparked domestic violence when phone use was judged excessive or suspicious. Some husbands exercised excessive power over their wives and stopped them from owning phones. Some allowed their wives to own phones but monitored their communications. Box 10 below presents extracts from different voices on how women's use of digital technologies is controlled and can lead to violence in the household.

Box 7: Narratives on domestic control and violence

There are some men who limit their wives to using the phone. I have my brother. My real brother has never allowed his wife to own a phone, not even a "kabiliti"[basic phone]

The husband will say, "You won't do this"; yet [he] is using it, which is so patriarchal kind of behaviour in our society… The man says, "If I find you with a smartphone, you will pack up your everything and go." … The wife accepts and that is it.

If you want to cause problems, you buy for her a phone. He breaks it into pieces … No, actually, some men even check who called you. What time? What was it about? … For some men …you don't talk in private; a man is a man … People abuse you because you are a woman!

There should be some kind of limitation on what men can do to and talk about women …

Enough with limitations put on women because of who they are!

Cyber harassment and gendered Abuse

Digital platforms also exposed participants to online gendered attacks. The rise of social media has amplified women's visibility but also their vulnerability. Women public figures and active social media

users report facing disproportionate online abuse, often rooted in patriarchal attitudes that police women's behaviour and success. Participants expressed similar experiences:

> *There is no way I can save myself as a woman against those people who are abusing me because of social media… mostly men. (KII, WDA, Mpigi)*

These experiences revealed how digital spaces mirrored and magnified offline gender hierarchies, perpetuating stigma against women who expressed independence or asserted their identities publicly. Cyber harassment had a chilling effect on women's participation in online platforms, reinforcing exclusion from the digital public sphere.

Misuse, morality, and family conflict

Although smartphones had become a symbol of progress, they also represented sources of moral anxiety. Women collectives described how phone use sparked family conflicts, jealousy, suspicion of infidelity, and mistrust within households, as narrated by a member of one of the organisations in Luuka:

> *There is nothing that hinders a woman from using a phone except bad habits…that compel their husbands from hindering or denying most women from using or owning phones. Some of the women it is because of adultery. (Farmer, Luuka)*

She added*, "You find one is married but still has so many men on her phone… that brings in more conflicts in marriage."*

The perception of "misuse" is deeply gendered. As indicated above, digital engagement is often scrutinised through moral and cultural lenses with women's use of the phone tied to notions of decency, respectability, and family harmony.

Phones have clearly been presented as tools of connection, but phones have also become divisive in some households, eroding communication between partners and reshaping the meaning of intimacy: *"We no longer talk to each other… you come back, you are on your phone, and I am on my phone." (KII, WDA, Mpigi)*

This duality underscores the shifting boundaries of control, autonomy and cohesion, where the same device can be experienced as liberation for one woman and a threat to family unity for another.

The moral paradox

Women collectives' voices show moral tension between digital empowerment and perceived moral decline. While many acknowledge the benefits of mobile connectivity for business and social interaction, fears of 'moral decay' and 'domestic neglect' were noted by women collectives:

> *Phones are good, but something that I can't do is be on TikTok because it makes me annoyed… There are things that they post that are bad… I rarely use TikTok. (40-year-old, trader, Mpigi)*

> *Some women can afford to buy smartphones, but they cannot buy them because they can cause them problems. (KII, WDA, Mpigi)*

These reflections show that technology adoption is filtered through cultural and moral frameworks, where women must navigate between modern aspirations of being technologically connected and traditional expectations and preferences.

2.4.10 Causes of negative outcomes

Among women entrepreneurs and members of collectives, digital technologies offered the promise of economic inclusion and market expansion. Yet their adoption occurred within a context of financial precarity, gendered expectations, and uneven access to devices and skills. These conditions facilitated negative outcomes that limited the transformative potential of digital tools. Barriers such as affordability, cultural resistance, and low literacy intersected with structural challenges such as theft, device breakdowns, and language constraints to reinforce exclusion and dependency. The digital engagement of women collectives remained shaped as much by constraints as by opportunities, underscoring the need to understand the systemic factors that hinder safe and equitable technology use.

For women entrepreneurs and collectives, digital technologies were central to business growth, but the causes of negative outcomes reflected their socio-economic vulnerabilities.

Affordability

Affordability was a major issue. Smartphones, airtime, and frequent repairs were expensive, forcing many women to rely on cheap second-hand phones that frequently broke down. Shared ownership models where only the collective chairperson had access to a smartphone created dependency and reinforced digital exclusion within groups.

Cultural norms

Cultural resistance also played a role. Husbands and community members sometimes limited women's use of digital tools, viewing them as a threat to traditional gender roles or to male authority.

Loss or theft of phones

The loss or theft of phones was particularly damaging, as it led to the loss of business contacts, disrupted supply chains, and resulted in missed opportunities.

Low digital literacy

For many women, especially in rural areas, low digital literacy and language barriers further facilitated negative outcomes. Phones and apps configured in English were inaccessible to those with limited education, leaving them unable to fully benefit from available opportunities. This reinforced exclusion and limited women's ability to access markets or advertise products effectively.

3. Broader trends

3.1 Cross-cutting issues

3.1.1 Introduction

This section presents the links between access to and the use of digital tools and gender equality and equity objectives. It draws comparisons and highlights similarities and differences in the challenges faced by the different groups.

3.1.2 Linking digital tools to gender equality and equity objectives

This report highlights the multifaceted ways in which digital tools have been leveraged by both mature women and adolescent girls to address and overcome the persistent gender inequalities and inequities they face in their daily lives. Digital technology has emerged not merely as a tool for communication or productivity, but as a critical enabler of women's empowerment and a catalyst for gender-transformative change. Across the study, the use of digital tools was closely associated with advancing women's agency and amplifying their voices in both private and public spheres.

To frame this analysis, the study selected a range of empowerment and voice-related dimensions through which to assess gender equality outcomes. These include women's agency, financial inclusion and economic empowerment, the promotion of equal opportunities, voice and representation in decision-making, equitable access to education and learning, protection from gender-based violence, reduction in social isolation, the alleviation of the care burden on women, and the transformation of harmful social norms.

In practice, digital tools supported women's financial inclusion and economic empowerment by opening up access to mobile banking, digital savings groups, and online marketplaces. These platforms enabled women to earn income, manage finances independently, and engage in entrepreneurial ventures that were previously inaccessible due to mobility restrictions or cultural norms. Through these mechanisms, women gained greater economic agency and a stronger voice in household and community-level decision-making.

Digital inclusion also promoted more equitable learning opportunities. E-learning platforms, educational apps, and mobile-based training enabled women and adolescent girls, especially those in rural or marginalised areas, to access education that had been historically out of reach. The digital tools enabled learning to continue during the COVID-19 lockdown. Digital tools had helped bridge the gap created by geographic, economic, and/or social barriers, contributing to greater parity in knowledge, skills acquisition, and professional development.

Moreover, digital platforms played a crucial role in reducing women's isolation, providing protection from gender-based violence. Online support networks, and information portals allowed women to seek help

discreetly, share experiences, and access critical services. In contexts where discussing gender-based violence remained taboo, digital anonymity created safer spaces for dialogue and resource-seeking.

Technology also played a significant role in alleviating the traditional care burden placed on women. Through access to time-saving mobile applications, information on health and childcare, and online coordination tools, women could better manage their responsibilities while freeing up time for income-generating or educational pursuits. This reallocation of time and responsibility contributed to a more equitable distribution of labour within households.

Perhaps most significantly, digital tools served as powerful agents in the transformation of social norms. Exposure to broader digital communities, narratives of empowered women, and alternative ways of living helped challenge entrenched gender norms. Women increasingly began to travel alone, make independent decisions, and assert their rights in ways that defied traditional expectations. For adolescent girls, digital expression facilitated identity formation and civic engagement, creating early experiences of agency and participation.

To illustrate these impacts concretely, refer to Table 2 which maps specific uses of digital tools to key gender equality and equity objectives, drawing directly from examples in the study findings. These real-life applications underscore the potential of digital technologies not only to mitigate existing inequalities but also to reimagine a more just and inclusive future for women and girls across diverse contexts.

Table 2: The link between digital tools to gender equality and equity objectives

Digital tool use	Gender equality and equity objective	Illustrative examples from Uganda study
Access to information & knowledge	Empowerment and voice: Improve women's agency through informed decision-making.	Community health workers used Google and mTrac to access medical information; teachers and adolescents used the internet for research. Access to digital information increased women's and girls' knowledge, confidence, and decision-making power, thereby enhancing their agency and voice in health, and education spaces.
Economic participation	Financial inclusion & economic empowerment: Expand access to income-generating opportunities.	Women entrepreneurs used WhatsApp and TikTok for marketing, mobile money for transactions and M-Kopa for asset acquisition.
Professional development	Equal opportunity: Build women's capacity and competitiveness in professional spheres.	Teachers used digital tools for teaching, online training, and performance tracking through the TELA app. The TELA app and other digital tools provided transparent performance metrics and flexible skill-building pathways for both women and men, hence these digital tools supported fairer and transparent evaluation, and equal access to professional growth opportunities.

Social and civic engagement	Voice & representation: Promote inclusion in public discourse and civic life.	Women used social media to share opinions, participate in community mobilisation, and report on public service gaps.

Sources: Interviews 2024/2025

Have the women been empowered?

Empowerment was mentioned across all groups as one of the positive outcomes from accessing and utilising digital technologies. Digital technologies increased access to digital tools which enhanced women's autonomy and decision-making. All groups explained with great passion and enthusiasm how the phone had changed their lives for the better. Here are some examples of how technology empowered the women:

- Digital technologies provided global visibility to some women collectives and entrepreneurs. The use of the different platforms connected the women with broader markets, allowing them to sell their products and services to a wider audience. As a result, they got better income generation opportunities and chances for job creation;
- Community health workers and teachers reported increased efficiency and better service delivery, access to employment, and professional growth;
- Adolescents experienced social empowerment and identity formation through digital expression, although sometimes coupled with digital addiction and exposure to scams;
- Digital inclusion enhanced participation in different sectors and promoted women's voices in education, the economy, and governance of organisations;
- For equity, the use of tailored digital tools helped to bridge gaps caused by geography, disability, income, and education (for example e-learning tools, mTrac, voice technologies for the blind);
- Digital technologies had transformed women's lives. Exposure to digital spaces helped reframe traditional roles and normalise gender equality. Women were involved in trading, travelling long distance without their husbands, and creating social networks beyond boarders;
- For financial transactions digital technologies contributed to increasing individual or collective incomes and financial independence, thus empowering the individuals to have better control over their lives.

3.1.3 Comparisons

The study highlights a number of similarities and differences in access to and use of digital technologies by the different groups of women and adolescents. The table below presents the overall comparisons in terms of the main devices the groups use, the key uses of the digital technologies, the major challenges faced by women groups, and unique features associated with each group.

Table 3: Overall comparisons

Overall comparisons in access, use, and challenges faced and unique group features				
Category/ group	**Main device**	**Key uses**	**Major challenges**	**Unique feature**
Health workers	SmartPhone	Data reporting, consultation, health campaigns, and communication	Affordability, poor network in rural areas	Use of mTrac, health-specific tools
Teachers	Smart phone, laptop	TELA, and communication	Power issues, cost, tech knowledge gaps in rural areas	Use of TELA app, projectors in urban schools
Women collectives and entrepreneurs	Basic/ feature phone	Business communications, marketing, mobile banking, and communication	Digital illiteracy, language, affordability	Used for collective marketing on social media
Adolescents	Smart phone	Research, social media, betting, entertainment, communication	School restrictions, cost, internet access	Highest smartphone use, use of Wi-Fi

Sources: Interviews 2024/2025

Similarities in access and use of digital technologies

Across all the groups studied, a striking commonality was the widespread access to and use of mobile phones, both smartphones and basic phones (commonly referred to as "Kabiriti"), as the primary form of digital technology. Among these, basic and feature phones were the most commonly used, reflecting their affordability and practicality in resource-constrained settings. Mobile phones, regardless of type, were mainly employed for everyday communication, enabling women to stay connected with family members, friends, customers, and clients. This baseline utility of phones for communication formed the foundation of digital engagement across all demographic categories.

Cost-effectiveness emerged as a key factor influencing the choice of device. Many women opted for Techno and Itel brand phones, citing their affordability and long battery life which is an essential feature in areas with unreliable electricity. In addition to communication, mobile banking services such as sending and receiving money, paying bills, and managing savings were among the most frequently used digital functions. These services not only offered convenience but also contributed to greater financial inclusion and autonomy for the women.

The professional demands of specific sectors shaped the necessity for smartphones. Community health workers, teachers, and businesswomen relied on smartphones to perform their work efficiently. For health workers, digital tools were indispensable for tasks such as remote consultations, accessing medical guidelines, and sharing patient information with colleagues. Teachers and adolescent girls used smartphones for educational purposes, particularly for research, e-learning, and uploading coursework. For many adolescents, smartphones were not optional but essential to participating in digital education and peer learning environments.

Digital literacy was generally acquired informally. Most participants either taught themselves how to use digital technologies or learned from family members, particularly husbands, children, or close friends. This informal peer-to-peer learning model highlighted both the resourcefulness of women in adapting to new technologies and the central role of social networks in digital inclusion.

Differences in access and use: An intersectional perspective

While there were clear similarities in the types of digital tools used and their core functions, an intersectional analysis reveals significant differences in how various groups experienced access to and use of these technologies. This perspective considers the interplay of multiple social categories such as age, sector, geographic location, class, marital status, and disability, and how their intersections create unique advantages or barriers for different individuals.

In applying this lens, three key factors – age, professional sector, and geographical location – emerged as particularly influential in shaping digital experiences.

Age played a critical role in determining digital proficiency and purpose. Younger women and adolescents were generally more fluent in navigating digital spaces, often using phones for a broader range of functions such as social media, e-learning, and content creation. Older women, while increasingly engaged, tended to limit usage to communication and basic financial transactions due to unfamiliarity or discomfort with more complex applications. For details, refer to Tables 4 and 5 below.

Table 4: Differences in access and use of digital technologies by groups

Digital differences in digital technology use, unique tools and key barriers			
Group	**Primary uses**	**Unique tools/apps**	**Key barriers**
Health workers	Patient care, mTrac reporting, referrals	mTrac, WhatsApp, Google	Network issues, affordability
Teachers	Lesson planning, e-learning, TELA application for attendance tracking	TELA, Zoom, Google	Load-shedding, digital skills gaps
Entrepreneurs	Marketing, mobile money, sourcing products	WhatsApp, TikTok, Jumia, M-Kopa	Language, cost, low smartphone access
Adolescents	e-learning, research, entertainment	Instagram, X (Twitter), YouTube, Snapchat	Data cost, limited time, unstable power

Sources: Interviews 2024/2025

Table 5: Differences in access and use of digital technologies by age

Access and Use	Adolescents	Adult women (health workers, teachers, women collectives/ entrepreneurs)

Device ownership	More likely to have personal smartphones	Personal phones, but some women often shared devices or used work-issued phones
Usage patterns	Heavy use for entertainment, social media, research	Use was task-oriented (teaching, health, business) and for social connections
Ease of use/learn to navigate	Are digital natives –have grown up with the digital technologies	Learned from children, spouses, or formal training, self-discovery.
Freedom of use	Often restricted by parents/school regulations	For some women restricted by spousal or institutional norms, and economics (affordability)

Source: Interviews 2024/2025

Geographical disparities between urban and rural settings were also significant. Urban participants had greater access to internet connectivity, a wider range of digital tools, and more opportunities for digital literacy. In contrast, women in rural areas faced infrastructure limitations, including poor network coverage, unreliable electricity, and limited access to affordable devices. These barriers not only restricted the frequency and quality of digital engagement but also exacerbated existing inequalities related to education, health, and economic opportunity. For details refer to the table below.

Table 6: Differences by location

Dimension	Urban women	Rural women
Device access	More likely to own smartphones	More reliant on basic or feature phones
Internet use	Higher usage due to better network and electricity	Limited by poor infrastructure and power access
Digital literacy	Higher, especially among professionals (teachers and health workers)	Lower due to fewer training opportunities
Affordability	Better purchasing power, occasional subsidies	Phones and data often unaffordable

Source: Interviews 2024/2025

Other intersectional variables that influenced access and use were the level of literacy and the type of technology used. The table below shows that a teacher, adolescent, and trained staff member in urban areas was more likely to be confident in using various applications or platforms. This is compared to older, rural women and untrained study participants who were less likely to be confident with application platforms, thus relying on SMSes and voice calls.

Table 7. Differences by digital literacy

Digital literacy level	Behaviour/usage	Demographics

High	Confident use of apps, online research	Urban teachers, adolescents, trained staff
Moderate	Use of WhatsApp, voice calls, occasional internet	Rural teachers, some entrepreneurs
Low	Basic calls, SMS, struggles with navigation	Older rural women, untrained collectives

Source: Interviews 2024/2025

Lastly, differences in technology use showed that the characteristics of the technology shaped access and use. For example, smartphones led to varied use of applications and platforms, whereas feature phones, commonly used in rural areas, were primarily used to send SMSes and make voice calls. The table below summarises the type of technology used by participants and the device characteristics.

Table 8: Differences in access and use by type of technology

Device type	Characteristics	Typical users
Feature phones	Affordable, durable, limited internet access, used for voice and SMSes	Common among rural women, older adults
Smartphones	Used for apps, internet, social media	Urban youth, professionals, group leaders, generally well-off women
Laptops/tablets	Used for advanced tasks (e.g. teaching)	Teachers in urban schools, NGOs, some adolescents

Source: Interviews 2024/2025

Digital accessibility, affordability, and use among the targeted women groups was, therefore, shaped by intersecting factors namely location/geography, age, education, profession, income, and cultural norms. By examining these intersecting variables, the study highlights how access to digital technology was not uniformly experienced. Instead, it is shaped by a complex web of social and structural factors that must be acknowledged in the design of inclusive digital interventions. Recognising and addressing these differences is essential for ensuring that digital empowerment reaches all women and adolescents, regardless of their background or circumstances.

4 Conclusion and recommendations

4.1 Conclusion

Digital technologies hold transformative potential for women and adolescents. While they enhance economic participation, learning, health service delivery, and social networking, their use is unequally distributed and shaped by intersecting socio-economic and cultural barriers.

Across all groups involved in the study, there was a clear and consistent acknowledgment that access to and utilisation of digital technologies had led to significant empowerment for women. Participants spoke passionately and enthusiastically about the transformative impact of digital tools, particularly mobile phones, on their daily lives, livelihoods, and their agency. This empowerment was manifested in diverse yet interconnected ways, reshaping economic, professional, social, and personal spheres.

One of the most visible forms of empowerment was economic. Digital technologies opened new pathways for women collectives and entrepreneurs by providing them with platforms for global visibility. Through social media and e-commerce platforms, women were able to market and sell their products and services to broader audiences beyond their immediate communities. This expanded market access led to improved income generation opportunities, job creation, and in some cases business growth, giving women greater financial independence and control over their economic futures.

Professionally, community health workers and teachers reported a significant boost in efficiency and service delivery due to digital tools. These technologies not only streamlined their work processes such as record-keeping, data collection, and communication, but also opened new opportunities for employment and professional advancement. Digital literacy and competency became assets, enhancing women's roles and contributions in their respective sectors.

Among adolescents, digital empowerment took on an educational, personal, and social dimension. Young women reported using digital platforms for self-expression, identity formation, and social connection. Although this came with risks such as digital addiction and exposure to online scams, the overarching experience was one of enhanced confidence and social belonging. Digital spaces served as avenues for youth to articulate their opinions, assert their identities, and participate in contemporary discourse.

Participation in public life also increased due to digital inclusion. Women were more actively engaged in educational pursuits, economic decision-making, and even the governance of local institutions and organisations. Their voices were being heard more widely and frequently, thanks in part to mobile communication, online forums, and virtual communities that enabled broader civic engagement.

Digital technologies to some extent played a role in advancing equity by helping to close longstanding gaps created by geographical remoteness, disability, low income, and limited educational attainment. Tools such as mTrac for healthcare reporting and consultations, e-learning platforms for remote education, and voice technologies for the visually impaired offered tailored solutions that expanded opportunities for all categories of women, regardless of their background or limitations.

However women who had access to and use of digital technologies faced a complex and often contradictory landscape in which their engagement with digital technologies simultaneously enabled empowerment and reinforced exclusion. Whereas women had accrued benefits from accessing and using

digital technologies, they had also intensified moral scrutiny, family tensions, and unequal gender power relations. Women's phone use was frequently framed through gendered moral lenses, fuelling jealousy, suspicion, and mistrust within households and reshaping intimacy and communication between partners. While for some women phones offered privacy, peace, and connection amid domestic pressures, for others they became sources of conflict and control in the home. Social media had amplified women's public presence but at the same time exposed them to online harassment rooted in patriarchal norms that police women's behaviour and success, discouraging participation and reinforcing exclusion from digital spaces.

There is a category of women and girls who did not have access to phones, could not afford to buy a phone or lacked internet connectivity and digital literacy skills. These women were often excluded from critical health updates and financial inclusion services such as mobile banking, while some missed opportunities for remote learning and online training, could not access information that supported income generation, and could not participate in digitally facilitated social networks. Therefore, there is a high risk that digital innovations will deepen existing gender and social inequalities if these women without access to digital tools are left behind. Limited connectivity, digital illiteracy, and lack of affordable devices is bound to further marginalise women in remote, low-income, or low-literacy contexts, excluding them from critical information, services, and opportunities for participation and empowerment.

Perhaps most transformative was the shift in traditional gender norms. Exposure to digital spaces contributed to a reframing of women's roles. Women are increasingly engaged in economic activities such as trade or marketing beyond their community and country borders, financial transfers, and management that would have previously been constrained by cultural expectations. These changes helped to normalise gender equality and reinforced the perception of women as autonomous and capable actors in society.

Digital platforms facilitated financial transactions that directly contributed to individual and collective income growth. Women reported gaining greater financial independence, which, in turn, enhanced their autonomy and capacity to make decisions about their lives. This financial empowerment was a cornerstone of broader empowerment, reinforcing the idea that access to digital tools could serve as a catalyst for long-term transformation. The findings suggest that women across diverse groups experienced tangible economic, social, professional, and personal empowerment through digital technology. The digital space acted not only as a tool but also as a terrain for negotiating new forms of agency, inclusion, and equality.

Taken together, the evidence shows that mobile technology is a double-edged sword: it dramatically amplifies women's commercial reach, financial agility, and collective voice, but it also brings new vulnerabilities rooted in cost, infrastructure, literacy skills, and entrenched gender norms. Policy interventions that subsidise devices and data, expand rural power and network coverage, promote local-language interfaces, and engage men in the creation of supportive digital norms are critical to ensure that women harness the benefits of connectivity while mitigating its risks.

4.2 Recommendations

Even though the country has made progress on its commitments as outlined in its Uganda Digital Transformation Roadmap, the evidence of this study indicates that women and adolescents face unequal access to digital technologies driven by infrastructural and structural barriers, device and data

affordability, and limited digital literacy. Further, the findings highlight that social and gender norms continue to hinder inclusive digital participation.

To address these barriers and challenges, we suggest a comprehensive and gender-responsive approach towards the implementation of the roadmap. This implementation should recognise the diverse realities of women, particularly community health workers, teachers, collectives and entrepreneurs, and adolescents. Hence, we suggest general, and sector or group-specific recommendations.

General recommendations

- *Reinforce gender-sensitive digital policy framework interventions.* Deep-rooted gender norms and patriarchal attitudes continue to constrain women's freedom to access and use digital devices. Gender-sensitive digital policy frameworks must be reinforced to ensure equity in digital access, safety, and ownership. In addition, emphasis should be put on community sensitisation and male engagement, shifting perceptions about women's use of technology from suspicion to support.

- *Strengthen digital infrastructure through a multi-pronged strategy*. As suggested in the roadmap, expanding digital infrastructure is essential. Implementation of the roadmap should involve prioritising investment in reliable electricity and internet connectivity in underserved rural and peri-urban communities. In areas without grid coverage, accessible solar energy solutions and communal phone-charging stations should be promoted to bridge the power divide.

- *Creatively address the high cost of data and devices*. The cost of smartphones and mobile data remains prohibitively high for many low-income women and adolescents. To mitigate this, the government and its development partners should consider targeted subsidy programmes, microcredit schemes (such as M-Kopa), and tax incentives for digital tools. These measures will enable marginalised groups to acquire and maintain the devices and connectivity needed to fully engage in the digital space.

- *Create accessible digital skills training opportunities focusing on women and persons with disabilities.* A lack of digital skills prohibits digital technology adoption. Therefore, training programmes must be expanded and tailored to the unique needs of women, particularly those in rural or informal sectors. Digital skills training should be practical, culturally sensitive, and accessible to persons with disabilities and non-English speakers. Peer-to-peer learning models and community-based training hubs can help scale these efforts.

- *Improve digital security and safety for women online and address patriarchal control of digital access in homes*. As women and adolescents increasingly rely on mobile technologies for education, health, business, and social connection, safeguards must be instituted to address cyberbullying, online harassment, and digital surveillance, particularly from intimate partners.

- *Integrate digital technologies into all government services.* Platforms such as mTrac in health and TELA in education have shown promise and should be scaled and improved to ensure they are user-friendly, low-bandwidth, and accessible to all.

Recommendations for specific groups

Adolescents

Adolescents are the most enthusiastic users of digital technologies, viewing them as integral to identity, social connection, education, and economic opportunity. To support their development, government should promote safe, structured, and youth-friendly digital engagement.

Schools should integrate comprehensive digital literacy programmes into the curriculum, focusing on both technical skills and critical thinking. Given the rise of adolescent-led online learning during the COVID-19 pandemic, there is strong evidence that young people adapt quickly to digital platforms. This readiness should be harnessed through investments in school-based ICT labs and youth innovation hubs in both urban and rural areas.

Adolescents also face vulnerabilities, particularly online exploitation, gambling, and addiction. Programmes to promote mental health awareness and responsible digital behaviour must be integrated into school curricula and community youth programmes. It is also important that the government enforces digital regulations that limit access to gambling apps.

To channel adolescent creativity and entrepreneurship, there is need for government and private sector partnerships to develop skills-building platforms and virtual mentorship programmes, and create innovation challenges that offer young people opportunities to engage in meaningful digital work. Youth voices must be included in designing these interventions by establishing digital youth councils or involving adolescents in the development of youth-targeted apps and services.

Teachers

Teachers are actively using digital technologies to enhance lesson planning, learner assessment, and professional development. The government should invest in equipping rural schools with laptops, projectors, and steady internet, thereby reducing the digital divide between urban and rural teachers.

In-service digital pedagogy training is essential, especially for teachers navigating new curriculums and virtual learning models. These trainings should also promote ethical, professional digital conduct to counter issues such as screen addiction or device misuse during class hours.

TELA, the biometric attendance tracking system, has improved accountability but faces challenges with network and electricity reliability. These must be addressed through improved infrastructure support and simplified digital systems.

Some women teachers experience domestic conflict and suspicion due to their phone use. To mitigate this, holistic programmes that include gender sensitisation and promote shared digital responsibility within households should be prioritised.

Lastly, digital tools have proven indispensable for research, continuing education, and accessing job opportunities. Teachers should be further encouraged to explore these opportunities, with dedicated platforms that support career advancement and secure online collaboration.

Health workers

Community health workers have already demonstrated significant integration of digital tools into their professional routines. However, this integration is not without constraints. To support community health workers effectively, the government should consider the provision of smartphones and regular data allowances, especially for those involved in surveillance and the use of health reporting through tools like mTrac.

Training programmes should be developed to ensure community health workers can use these platforms confidently and efficiently. These trainings must include both basic digital skills and application-specific modules such as telemedicine, the use of online health records, and outbreak response coordination. Where resistance to phone use exists due to patriarchal attitudes at home, interventions should include engagement with spouses and male household members, highlighting the benefits of digital tools in improving family and community health outcomes.

Rural community health workers face additional challenges related to infrastructure. Improved mobile tower coverage and solar-powered charging points are essential to ensure connectivity and consistent device usage. Additionally, as community health workers juggle demanding schedules, digital tools must be simplified for quick, reliable use under pressure.

Lastly, there is an urgent need to address psychosocial risks such as overdependence on mobile phones, anxiety, and workplace distraction. Guidelines for the balanced, professional use of technology should be developed and shared with healthcare providers.

Women collectives and entrepreneurs

Women engaged in informal businesses represent one of the most dynamic yet underserved digital user groups. For many, the basic or feature mobile phone is a lifeline for communication, marketing, and mobile banking. However, barriers remain in terms of affordability, literacy, and cultural norms.

Programmes that provide access to affordable smartphones and digital credit facilities should be prioritised. Microloan arrangements, particularly those targeting women's cooperatives, can help facilitate group purchasing of shared smartphones for marketing and customer engagement. Training programmes should be developed that are practical, peer-driven, and business-oriented, with a focus on platforms such as WhatsApp Business, Facebook, and Google Search for market research.

Digital platforms also serve as critical tools of empowerment and emotional support. Women use them to cope with isolation, report gender-based violence, and seek advice. Therefore, expanding secure digital

safe spaces, helplines, and community WhatsApp groups can enhance both economic and psychosocial resilience.

For women with disabilities, accessibility remains a core challenge. Targeted investment in assistive technologies such as screen readers, voice-command features, and audio-based applications are necessary, as well as efforts to improve affordability and inclusive design in digital services.

Lastly, women entrepreneurs require support in creating online business profiles and navigating digital marketplaces and secure digital payment solutions. NGOs and local governments should facilitate access to digital advisory services, including marketing mentorship and cybersecurity awareness advice.

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