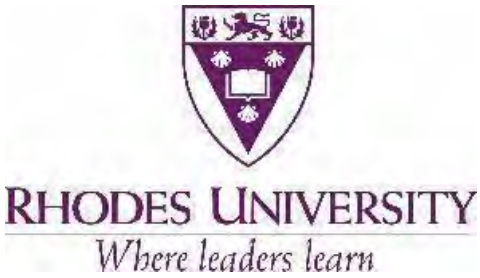

Examining the Digital Disparities among Adolescents in Rural Western Kenya: A Study of Technology Access and Usage among Children of Widows

By

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Thesis

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Supervisor: Dr. Chikezie E. Uzuegbunam

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DECLARATION

I, Evelyn Achieng Odhiambo of student number 24O2066 hereby confirm that this thesis "Examining the Digital Disparities among Adolescents in Rural Western Kenya: A Study of Technology Access and Usage among" is my work and has not been submitted for any degree purposes at any other university. I declare that I am aware of Rhodes University's policy on plagiarism and have taken precautions to comply with the regulations.

Signature: Evelyn **Date: 5th June 2025**

DEDICATION

I dedicate this work to Nyanam International, its widows, and their children, who graciously allowed me to undertake this research study with them. With your support and voices, we have a study highlighting the existing digital inequalities while demanding the intentional inclusion of vulnerable and marginalised populations of children, just like widows' children, in the digital development agenda.

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ABSTRACT

In Kenya, widows' children living in resource-poor and rural locations remain one of the demographics facing limited access to digital technology, as well as other social and economic needs. This study assessed the access to and use of technology among widows' children in the Lake Victoria Region in Kisumu, Kenya. It explored access, opportunities, and challenges of navigating technology in everyday life among widows' children, thus creating a basis for improving and promoting children's socio-educational outcomes in the digital age. To thoroughly examine the extent to which these inequalities were prevalent among widows' children, this study utilised Van Dijk's (2005) theory of Resource and Appropriation which argues that the digital divide is a personal, positional and background inequality. The study employed a quantitative methodology, using semi-structured survey questionnaires and a case study design to study children of widows in rural Kenya, aged 13-18 years and randomly selected using the sampling framework developed in collaboration with Nyanam International. The data were analysed using a descriptive, inferential and thematic analysis method. The findings indicated a significant awareness of communications and information technologies, where 94% of the respondents reported knowing what digital technology was. However, access was either limited or restricted, with only 67% of the 94% who were aware reporting being able to access digital technologies through shared devices. There was also a significant skills gap. These restrictions were reported to be due to poverty, resource-intensive costs, parental restrictions, and respondents' techno-fear. The qualitative data, generated from the open-ended survey questions, demonstrated respondents' desire for more child-friendly, age-appropriate, and safe digital technologies. Notably, the study reported that evidence of socio-cultural factors (widowhood status and stigma interrogated through the lens of financial power) could restrict widows' children's effective use of technology. The study argues that interrogating the digital divide among the differing populations of children, particularly those living in vulnerable and marginalised contexts, offers wider evidence on the importance of technology access and use in improving children's educational outcomes and development in a digital world. One main limitation of the study is that, its findings may not be generalisable to a broader population of children as they are specific to those affected by widowhood.

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CHAPTER 1: INTRODUCTION TO THE STUDY

1.1 Background

In this digital age, there is an assumption that all young people and children are technologically resourced and equipped. Uzuegbunam (2024) observes in *Children and Young People's Digital Lifeworlds* that children's experiences in the digital world have been widely investigated in the Global North; however, a complete picture of children's digital habits and participation in the Global South is lacking (Uzuegbunam, 2024). According to the International Telecommunications Union (2021), children and young people aged 15–24 are more connected online than other groups, particularly in Africa and the Asia-Pacific (International Telecommunications Union [ITU], 2021). Arguably, there is still a greater population of children left behind, especially marginalised populations and those living in rural areas and poverty. Other studies indicate that many children and young people have adopted the internet and other technologies (Jung et al., 2001).

A 2021 news report by Connecting Africa reported that 95% of children in West and Central Africa do not have internet access at home. The report further noted that 13% of people in Eastern and Southern Africa and 5% in West and Central Africa had internet access within that year. This limited access highlights the significant digital divide among children in Africa (Africa, 2023). A 2022 study by the United Nations Children's Fund (UNICEF) in Ethiopia, Kenya, Uganda, Namibia, and Tanzania found that 90% of children in these countries faced at least one barrier to accessing digital technology, including high costs, limited infrastructure, and parental restrictions (UNICEF, 2022).

Even though there is an exponential growth in the use of digital technologies in African economies and the lives of citizens, efforts to bridge the digital divide, combat extreme poverty, and promote social development among rural communities remain limited. Soomro et al. (2020) define the digital divide as the gap between people with adequate access to information and communication technology and those without access to digital technologies (Soomro et al., 2020). With over 1 billion people living in extreme poverty, 584 million of them are children under the age of 18, with

317 million residing in sub-Saharan Africa (United Nations Report on Poverty and Human Development Initiative, 2020). Childhood poverty remains a frequent phenomenon, particularly affecting widows' children, the study population.

Even though technological advancements can provide new educational opportunities for these children, the persistent digital divide between poor and rural populations is severe (World Bank, 2022; Hollman et al., 2021; Reddick et al., 2020). Poorer communities often have limited access to infrastructure resources, hindering their use of digital technologies. Poverty limits these families' purchasing power and children's access to necessary digital technologies (Ge et al., 2022).

As the world of Information Communications Technology (ICT), henceforth termed “digital technologies,” continues to take centre stage in global economic and social development, Chetty et al. (2018) and Scheerder et al. (2017) argue that the growing digital inequality, exacerbated by the development of new digital technologies, requires a relook at how poor communities are integrated into the growth. The term “digital divide,” used throughout this study to highlight digital inequality, was first coined in the United States of America (USA) in the mid-1990s, describing disparities in access to computers and the internet between those who had access and those without (U.S. Department of Commerce, 1999). Although the term can be traced back to the 19th century rather than the 1980s, the phenomenon of unequal access to communicative and information technologies stretches back to the 19th century and was known as communicative inaccessibility (Balbi, 2009).

Since then, the world has experienced rapid development of telephones, television, radios, and telegraphs, along with the growing integration of digital communications and computer systems (John, 2008). This growth was further accelerated by the COVID-19 pandemic, which revolutionised access to and use of digital technologies. Growth in telecommunication platforms like Zoom and Microsoft Teams primarily led to increased use for learning, interaction, and maintaining a normal balance in life during challenging times (UNESCO, 2020). Despite this rapid global technological increase, digital inequalities persist on three levels: access, usage, and outcome (Ferreira et al., 2021; Knowledge et al., 2022a; Soomro et al., 2020).

According to UNICEF (2023), there are approximately 2.3 billion children worldwide under 18. The United Nations reports approximately 1.2 billion young people aged 15–24, accounting for 16% of the global population (United Nations [UN], 2023). Africa has the highest youthful population compared to other continents, with 60% of its population being under the age of 25, which is significantly higher than the global average (United Nations Economic Commission for Africa [UNECA], 2017). Despite the growing youth population, only 33% of children under 25 have internet access (WIFI or mobile data) at home. This access is even more limited in low-income countries, where only 6% of children have internet access, compared to 87% in high-income countries (International Telecommunication Union [ITU], 2020). It is estimated that about 2.2 billion children under the age of 25 have no access to the internet at home (Turk, 2023).

The digital divide occurs when there is a gap in access to or use of digital technology resources and tools (Lythreatis et al., 2022). The impending fourth industrial revolution is expected to exacerbate the digital gap, particularly impacting those in remote areas and those who are economically disadvantaged and differently-abled (Elahi, 2020). With rapid growth, there is often a human tendency to exclude those not yet in the global development stage. In the context of Information and Communications Technologies for Development (ICT4D), digital exclusion manifests in the deepened digital divide, where access to digital skills, technological spaces, and meaningful participation is unequally distributed, disproportionately disadvantaging poor and marginalised populations (Avgerou, 2010; Kleine, 2013). While these inequalities undermine the achievement of the United Nations Sustainable Development Goals (SDGs), particularly in inclusive education, healthcare, gender equality, innovation, and reduced inequalities (O'Sullivan et al., 2021; Alhassan & Adam, 2024).

With advancements in new technologies, children are considered active respondents in the digital space and vulnerable users to digital risks and exploitation. Uzuegbunam (2024) emphasizes the need for intentional and child-centric digital studies around different populations of children, centring their social, cultural, and geographical locations as key variables for understanding their digital lives and experiences. This duality recognises children not merely as passive digital technology consumers but also as social actors whose rights and developmental needs must be prioritised (Livingstone et al., 2017). Further, Lamish (2015) argues that children's engagement

with digital technologies is shaped by cultural, social, and political contexts, requiring an intentional framework that moves beyond universal assumptions to address children's diverse experiences (Lamish, 2015). The United Nations Convention on the Rights of the Child (CRC) resonates with Lamish's arguments, stating that the protection, participation, and provision of children's rights in all sectors, including the digital world, is imperative (UNICEF, 2020).

Without child-centric approaches to the digital world, inequalities risk being reinforced, where already privileged urban and affluent children continue to succeed, leaving rural, marginalized, and poor children behind. Child-centric studies and approaches ensure wider coverage of how different children, especially disadvantaged ones, access, use, and benefit from digital technologies.

1.2 Africa's Digital Divide

Africa is the second-largest continent in the world, with an estimated population of 1.5 billion people (Population Reference Bureau, 2024). Despite its size and population, Africa still has the lowest levels of infrastructure and development worldwide (Uzuegbunam, 2024). In addition, the continent faces exclusion and marginalisation resulting from unequal geography (Fuchs & Horak, 2008; Müller, 2021). Africa is often referred to as the "dark continent" (Stanley, 1878), despite its talented population and rich resources. Deeply rooted corruption and poor leadership, combined with existing neo-colonialism, continue to drain the continent's capacity to thrive fully. The continent's low investment and digital development levels further exacerbate the digital divide.

A 2022 report by Digital Data Reportal indicates that approximately 846.9 million people in North, West, South, and East Africa are unconnected, with only 39.3% having internet access (Internet World Stats, 2023). According to the International Energy Agency (IEA, 2021), approximately 600 million people (43%) in Africa lack access to electricity, with the majority residing in sub-Saharan Africa. Lack of electricity limits access to technology, as most digital and information communication technologies, including the internet, mobile phones, and computers, rely heavily on electricity (Owolabi et al., 2021).

The degree of access and usage of digital technology-related resources and skills is sparsely distributed among children (Carabregu-Vokshi et al., 2024). This is attributed to the unavailability of digital technology

infrastructures, such as limited access to electricity, poor network connections, and restricted access to media and technological tools like radios, televisions, mobile phones, and smartphones, which limits children in low-income countries, communities, and families. Infrastructural challenges, including limited electricity, poor network connections, and affordability issues, are central to understanding why digital inequality persists. Hartmann (2017) explains in Circuits of Affective Infrastructure that barriers are not only material deficiencies; rather, they form the core in which lived experiences of exclusion, frustration, and marginalization are produced and reproduced due to existing infrastructural gaps. Clearly, infrastructures are not neutral systems but are embedded in social and emotional realities, shaping how children experience digital connectivity and disconnection. When digital infrastructure fails, it reinforces digital exclusion.

Grimes et al. (2012) suggest that the rapid diffusion of digital and information technologies has led to significant development while simultaneously widening the inequality gap for many, partly due to unequal distribution of resources exacerbating poverty (Ali et al., 2024; Ekorozwoju, 2025). This further deepens the digital divides among children from under-resourced families, including children raised by widows, exemplified in this study's case of rural Kenyan children

Although Africa is considered among continents with rapid growth in access to digital technologies and the internet (Carabregu-Vokshi et al., 2024), this penetration has not translated to equitable access, particularly in essential areas such as health and education (UNESCO, 2023). The digital divide disproportionately affects the most disadvantaged. According to the International Telecommunication Union (ITU, 2020), only 28% of Africans had an internet connection compared to 72% globally. Africa faces challenges in internet penetration, household connectivity, and broadband infrastructure (ITU, 2020).

Most research has long concentrated in developed nations, gradually shifting attention to Level Two usage (Scheerder et al., 2017; Van Deursen, 2017; Van Deursen & Van Dijk, 2019). The digital divide remains largely unexplored in Africa (Kalmus, 2013; Ragnedda, 2013; Scheerder et al., 2017). The 2013 United Nations Human Development Report underscores Africa's status as the least developed continent, highlighting shortages in infrastructure, education, income, school enrolment, and access to digital technology. Fuchs and Horak (2006) note that Africa's exclusion

from fundamental development standards indicates the urgency for more comprehensive research and interventions to bridge the digital gap.

Across the continent, mobile phone use has surged, potentially bridging the technological gap. The 2018 Afrobarometer survey on sub-Saharan African adults aged 18–65 in 31 African countries reported that 76.6% of respondents owned mobile phones (Okano et al., 2022). Regional prevalence varied: West Africa 45.9%, Southern Africa 35.8%, Central Africa 9.7%, and East Africa 8.5%. However, the study also revealed a stark contrast between mobile phone ownership and internet usage: only 11.4% use the internet daily, and 61.8% never do. Other studies, such as Galal (2024), report that as of 2021, 4 out of 10 Africans had internet access, with Northern Africa exhibiting the highest rates.

The World Economic Forum (2019) highlights persistent discrepancies: approximately 800 million people reside in areas without internet coverage, creating an access gap, and 3.2 million individuals within covered areas still need internet access. According to UNESCO (2023), approximately 90% of children in sub-Saharan Africa lack access to computers at home, and 82% lack internet access. Other reports estimate that only 13% of children and young people in Eastern and Southern Africa have internet access at home (Connecting Africa, UNICEF, & ITU, 2021). Internet access is almost non-existent among the poorest populations in West and Central Africa. Only 3% of people aged 25 and under from the poorest families in Eastern and Southern Africa have access to the internet, compared to 40% from wealthy families (UNICEF & ITU, 2021).

Children raised by widowed women are among the populations left behind. Widowhood, defined as the state of being a widow or widower whose spouse has died and who has not remarried, poses significant social challenges for women, often resulting in social and economic disadvantages for them and their children (The Loomba Foundation, 2015; Ngugi, 2012; Tshaka et al., 2023). Globally, approximately one in ten women is a widow, and around 180 million children aged 0–17 are being raised by widows (Djuikom & van de Walle, 2018; The Loomba Foundation, 2015).

Despite widespread access to the internet and mobile phones, universal access remains unachieved. Only 30% of Africans have access to electricity, while internet penetration remains low at 10% (Al

Jazeera, 2016). This gap contributes to limited technology access among different populations, including widows' children.

1.3 The digital divide in Kenya

Kenya, where this study is situated, has seen an increase in access to and use of internet-based technology, and the country has been dubbed the *"tech hub of Eastern Africa*" and *"Silicon Savannah,"* partly because it is home to the prominent mobile money platform MPESA (Wamuyu, 2017). Over the years, mobile and mobile broadband network penetration has increased in the country, with approximately 37.4 million mobile data subscribers (Communications Authority of Kenya [CAK], 2016). In 2019, mobile internet accounted for 48% of web page views worldwide, with early-adopter markets in Asia and Africa (Statista, 2023). Kenya, along with Nigeria, Ghana, and India, reported the highest registered internet traffic from mobile devices (Clement, 2019). Statista (2023) further reports that Kenya ranked 35th worldwide, with an internet penetration rate of 32.7%. According to Datareportal (2024), there were approximately 22.7 million internet users in Kenya as of January 2024.

The country's Vision 2030 agenda aligns with key Sustainable Development Goals (SDGs), prioritising equitable access to technology and the internet for all Kenyans. Against this backdrop, the Ministry of Digital Technologies adopted the African Union Vision 2050 agenda, including its three key pillars: infrastructure development, industrialisation, and environmental protection and sustainable development (Kenya's Ministry of Information, Communications and the Digital Economy Strategic Plan 2023–2027, 2023). These pillars, including digital technologies in the Kenyan agenda, serve as roadmaps to ensure equitable access to digital technologies while advancing Vision 2030 and the global SDG agenda. The ministry prioritised four SDGs as the primary focus for the 2022–2027 digital technologies mission, namely SDGs 4, 8, 9, and 16. For this study, SDG 4 (Quality Education) and SDG 9 (Build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation) are particularly relevant, as they intersect with the digital divide.

- **SDG4** (Quality Education): The ministry's commitment is to ensure improved access to quality education by enhancing the training quality for mass media practitioners and on the-

job journalists. This includes promoting digital literacy by leveraging digital platforms and technologies, bridging the digital divide, and strengthening educational access.

- **SDG9:** (Build resilient infrastructure, promote inclusive and sustainable industrialisation, and foster innovation): The Ministry will increase universal access to information and communications technology by expanding broadband connectivity and 4G/5G internet, especially to the unserved and underserved areas.

Despite these government efforts, as of January 2024, approximately 52.9% of Kenyans did not use the internet (Datareportal, 2024). This gap stems from limited access to digital devices, gender inequalities, poor infrastructure, including limited electricity, and high poverty, which significantly affect access to digital technology and skills (Okello, 2023). Children raised by widows, who often live in rural areas or informal settlements due to low economic status, are disproportionately affected. Widow-led households exhibit significantly higher poverty rates than other households, leading to insecure housing, limited formal livelihoods, and reliance on subsistence farming or informal work, perpetuating intergenerational socio-economic disadvantage (KNBS, 2023). The Kenya Poverty Report (2021) notes that widow- and polygamy-headed households had poverty rates over 40%, compared to lower rates for monogamous or never-married household heads.

Kenya has a population of approximately 54 million, of whom 24.4 million are children under 18 years of age (UNICEF, 2023). A 2019 report by Seow et al. (2019) found that 70.7% of this population resides in rural areas, many being pastoralists or agriculturalists who struggle with access to technology and the internet (Agrawal, Khan, & Ansari, 2022). As of January 2022, internet access in Kenya had reached only 42.0% of the urban population, with rural areas particularly underserved (KNBS, 2022). Of approximately 43.7 million mobile internet subscribers, 82.7% have an internet connection, indicating significant mobile internet usage and connectivity in the country (CAK, 2019). According to UNICEF (2022), 90% of children surveyed in Kenya, Ethiopia, Tanzania, Namibia, and Uganda reported at least one barrier to internet access, including infrastructure constraints, resource limitations, parental restrictions, and high costs.

Studies on Kenya's digital divide have mainly examined Level One, focusing on access to technology and the internet. Before COVID-19, only 17.9% of households had internet access

(KNBS, 2019). Approximately 70% of Kenyan learners live in rural areas, including children raised by widows (Muyaka, 2019). Of these households, only 26% have access to electricity (KNBS, 2019). According to CAK (2019), of the 52 million people with mobile phones, only 25 million had mobile broadband. Poor electricity distribution and uneven internet connections disproportionately affect rural communities. A post-COVID-19 study on online learning in Kenya (Ochieng & Ngware, 2023) indicated that learners from remote areas, urban informal settlements, and low socioeconomic households faced greater challenges engaging in online learning during the pandemic, further marginalising already disadvantaged learners. Despite these disparities, access to advanced digital technology services and broadband adoption remains much lower in rural areas compared to urban areas (Salemink, Strijker, & Bosworth, 2017; Graves et al., 2021).

1.4 The digital divide of the study location

This study is conducted in Kisumu County, West Sub-County, along the Lake Victoria Region. It aims to assess access to and use of technology among children of widows in the region. Kisumu County has a population of over 1 million, reflecting the persistence of the digital divide. According to the 2019 census by the Kenya National Bureau of Statistics (KNBS, 2019), the county had 1,155,524 people, including 344,730 adolescents and young people aged 15–29 years, a number expected to rise to 396,453 by 2027. The population of widows in the county is estimated at 100,000. Although Kisumu is Kenya's third-largest city, a large proportion of the population resides in rural villages and peri-urban informal settlements, where access to digital technology is limited. Widow-headed households face compounded vulnerabilities due to poverty, disinheritance, and insecure livelihoods, which restrict their capacity to access, use, and participate in the digital world.

As indicated in the Kisumu County Fact Sheet (2018), there are over 5,936 telephone connections and 89% mobile network coverage in the county. However, access to digital infrastructure is higher in urban areas than in marginalised communities, where 80% of youth lack digital skills (Nyalenda Breadpower, 2019). Despite numerous studies on the digital divide, there remains a significant opportunity to explore technology access among vulnerable populations, such as children raised by widows.

"I never knew being a widow would strip me of my worth as a woman and a human being. After the death of my husband, I committed myself to providing the best I could to raise and educate my children. Being that he was the sole breadwinner, I had to resort to manual jobs like washing clothes and farming for others. One day, with my children, we visited a farm to meet a woman. A whole day of labour in the hot, scorching sun. After finishing the work in the evening, we were excited to get paid and plan our evening meal, only to be told, 'The porridge I gave you was the payment for your work.' I was lost and confused about what I could tell my children who spent hours with me in the field."

— Nyanam International's widow

1.5 Widow-led households and the digital divide

Widow-led households are particularly impoverished (The Loomba Foundation, 2015). Children of widows are highly vulnerable, facing child labour, hunger, malnutrition, and hazardous employment, which can lead to mental health issues, substance abuse, and sexual exploitation (KMOH, 2020; Ngugi, 2012). These children also encounter barriers to education and economic opportunities, including limited access to learning technologies and digital illiteracy (KMOH, 2020; Ngugi, 2012). Consequently, widows' children are disadvantaged not only by structural divides but also by cultural divides, which further restrict access, use, and positive outcomes from technology.

The category of widows' children includes total orphans, children of widowers, and children with both parents but raised by a widowed grandmother or aunt as the sole breadwinner. Widow-led households are among the most impoverished in Kenya, meaning children growing up in these homes face additional difficulties accessing technology. Widows-led households concentrated in low-income and informal areas of Kisumu often rely on subsistence farming or informal livelihoods, limiting disposable income for digital access (Murithi & Muthuki, 2016).

A 2019 Civil Society Organisations (CSOs) report noted that urban areas have better access to digital infrastructure than marginalised areas, where 80% of youth lack digital skills (Nyalenda Breadpower & KNEOMA, 2019). Despite extensive research on the digital divide, there remains a need to investigate its effects on vulnerable populations such as children of widows to understand their technology usage patterns and needs.

According to internal data from Nyanam International (the study gatekeeper), approximately three in four widows they serve are living with HIV and experiencing extreme poverty. Stigma and stereotypes further restrict their access to social services and amenities. Widows often must assume dual parental roles despite grief and trauma, with limited or arduous employment options. Consequently, they face trade-offs between providing basic necessities for their children and introducing them to technology, limiting access for many children of widows.

Widows' children experience multiple barriers to education and economic opportunities due to poverty. Social stigmatisation and the economic disempowerment of their mothers contribute to heightened risks of mental health issues, substance abuse, and sexual exploitation. Many children in the Kisumu area fail to enrol in or complete primary education due to financial constraints, which also limits their access to and efficient use of technology, perpetuating intergenerational poverty and vulnerability.

The digital divide, the gap between those with and without access to technology, the internet, and digital literacy, is a key factor exacerbating these challenges (Hoffman et al., 2001). It includes unequal access to smartphones, tablets, laptops, and the internet. As such, widows' children are disadvantaged by both structural and cultural divides, which hinder their access to technology and its benefits (KMOH, 2020; Ngugi, 2012).

As the world continues to advance technologically, with artificial intelligence (AI) and other emerging resources, it is crucial to consider their impact on populations lacking access to technology, electricity, and digital skills. The digital divide also hinders economic growth and educational development by preventing proper access to educational technologies (Mossberger, 2003). Moreover, internet culture and language can further marginalise populations struggling with basic education, reinforcing digital exclusion.

1.6 Children and the Digital Divide

The digital divide is characterised by digital illiteracy, unequal access to rights, inadequate infrastructure, limited access to physical technology, no internet access, and economic challenges

(Meiqi et al., 2023). Studies on children and digital technologies have been homogenous (Njagi, 2023). These studies have looked at children as a homogeneous group, limiting a deep interrogation of the diverse and different populations of children. Even though there have been studies focusing on the geographical location of children, children impacted by hardship, and children in war zone areas, including children with disabilities, there has not been any study that has explored the experiences of widows' children on the digital divide (Livingstone et al., 2017; Uzuegbunam, 2024). This study aims to systematically describe the challenges and opportunities in accessing technology, its usage, and outcomes among children of widows in the rural Lake Victoria region of Kisumu, Kenya, specifically in Kisumu West Sub-county (UNICEF, 2022).

With little existing knowledge, particularly on widows' children and digital technologies, this study provides initial data for such comparisons and offers insights that could be useful beyond the study population (Dafna, 2015; Blay, 2008).

1.7 Study Aim, Objectives, and Questions

This study assessed access to and use of technology among children of widows in the Lake Victoria Region, Kisumu, Kenya. Specifically, it explored the level of access to, opportunities for, and challenges of technology among widows' children, creating a foundation for local organisations to promote and improve their educational outcomes.

1.7.1 Research questions:

1. What types of technology are widows' children aware of and have access to?
2. How do they access and use technology?
3. What are the outcomes of using technology?
4. What are the barriers that hinder widows' children from accessing and using technology?

1.7.2 Study hypotheses:

H1: Sociocultural factors, including widowhood, can further restrict widows' children's access to and effective use of technology

H2: Economic challenges, such as the high cost of devices and internet connectivity, are the most significant barriers to widows' children's access to and use of technology.

H3: Using technology can positively contribute to widows' children's educational achievements, which may be associated with improved academic performance and self-efficacy among widows' children.

H4: Children of widows' access to technology is primarily limited to shared resources at home or within the community, such as school facilities or cybercafés, rather than individual ownership.

This study employed a quantitative methodology and a case study design to achieve its aim. It used a cross-sectional design to assess technology access, usage, and outcomes among children of widows in rural western Kenya, allowing for a snapshot of the digital divide (Porta, 2014). The study is rightfully situated within a quantitative approach because the study's core objective seeks to measure relationships and test hypotheses. The research questions are designed to be answered through numerical data and not explorative experiences (Creswell, 2014).

This method effectively described patterns and identified risk factors associated with the digital gap (Porta, 2014). Data collection utilised questionnaire surveys that enabled statistical sampling techniques for broader generalizability (Nardi, 2015) and provided insights applicable beyond the specific region of the study. Data was collected through face-to-face survey administration using a tablet as a key tool, which ensured data consistency, immediate entry, and streamlined the data collection process (Blay, 2008). The data collected was statistically analyzed using sampling techniques, ensuring findings are generalizable and statistically sound (Creswell, 2014).

To enhance participants' comprehension, the questionnaire was translated into two widely spoken languages among the respondents, Dholuo and Swahili, with an English version for those fluent in it (Blay, 2008).

The study further explored an intersectional examination of how various forms of oppression within widowhood had impacted access to and use of technology among widows' children. The layers of oppression explored included child labour, inadequate housing, food insecurity, sexual violence, child marriage, and societal exclusion faced by widows' children (Blay, 2008; KMOH, 2020).

The study was conducted in Kisumu County, specifically in Kisumu West Sub-county, Kenya, in partnership with Nyanam International, a non-profit organisation focused on restorative justice. This region is predominantly occupied by the Luo-River Lake Nilotes, whose main economic activity is fishing. Access to necessities such as food, shelter, and education is still challenging due to increased poverty, child labour, sexual abuse, HIV infections, and substance abuse (Edward & Horseman, 2005; Camlin, Kwena, & Dworkin, 2013; Mojola, 2011; Fiorella et al., 2015). The researcher's youth account in an earlier publication further describes jaboya pressures on adolescent girls in Kenyan fishing beaches (Odhiambo, 2024). Elevated HIV risk among widows and through widow inheritance practices in western Kenya is also documented (Agot et al., 2010; Perry et al., 2014).

Jaboya cultures encompass all genders and ages, including young men, women, and children. Due to gender inequalities, this tradition further marginalises widowed women, as they are forced to offer sex in exchange for fish, limiting social and economic ability and increasing HIV risk (Mojola, 2011; Camlin, Kwena, & Dworkin, 2013). In addition to sex-for-fish practices, the Luo cultural practice of wife inheritance marginalises widowed households. This practice strips widowed women of economic and social capital through forced wife inheritance, performance of sexual rituals, property and child disinheritance, and community exclusion (Ngugi, 2012; Tshaka et al., 2023). Due to stigma and stereotypes, i.e. *"You are a witch," "You murdered your husband," "You are a bad omen," and "She will steal our husbands and kill them," many* widows cannot reintegrate fully into the community (The Loomba Foundation, 2015).

Nyanam International's comprehensive programmes aim to equip widows and their children to be leaders of positive community transformation through holistic and integrated programmes in leadership, health, human rights and justice, livelihood, and youth education initiatives, using their unique solution, the *Voice of Change curriculum*. Their work alleviates widowhood poverty and

stigma, mitigates the impact of HIV/AIDS, and gives widows and their children the tools to tackle oppressive cultural, economic, and social practices that undermine their dignity and limit their agency.

Their youth education programme currently benefits 1,500 children of widows aged 10-24 years, organised into 63 youth mentorship groups. It is guided by a three-year strategy with the following objectives: first, to provide comprehensive health education; second, to offer need-based scholarships for secondary and post-secondary school; third, to deliver technology education, including robotics training; and finally, to provide education on sustainable livelihoods and environmental justice.

In their work with widows' children, Nyanam International uses a peer-to-peer learning approach. A selected group of young leaders is trained annually in a thematic area, which is then expanded the following year to all widows' children through monthly 1–2-hour sessions. In addition, they host annual youth camps that facilitate community interaction among their youth population, creating a network of young people who are motivated to grow and thrive despite the challenges they face (Nyanam International, n,d).

In 2025, Nyanam International aims to provide widows' children with essential computer skills, internet access, and robotics training, fostering confidence, creativity, teamwork, and innovation (Nyanam International, n.d.). This study provides key recommendations for supporting technological investments and leveraging technology for improved educational outcomes, social inclusion, and career advancement for widows' children.

The study included children of widows aged 13-18 to assess their access to, use of, and outcomes from technology in Kisumu West Sub-County. Approximately 300 participants were randomly selected from Nyanam International's database. The inclusion criteria specified children served by the organisation, while the exclusion criteria included those exposed to advanced technology, those without assent or consent, and those without parental consent (Blay, 2008; Nardi, 2015). The sample included children raised by widowed mothers and total orphans raised by widowed grandmothers or widowed aunts, representing a broader population of children in widow-led households (Ngugi, 2012; The Loomba Foundation, 2015).

1.8 Rationale of the study

This study examines technology access, use, and outcomes among children of widows aged 13 to 18 in rural Kenya. While extensive research exists on children and digital technologies (Organisation for Economic Co-operation and Development [OECD], 2023), there is a critical gap in studies specifically focused on widows' children, who are part of a larger population of children faced with infrastructural and digital inequalities, denying them the opportunity to thrive in the current digital world (Meiqi et al., 2023; Njagi, 2023). This study population represents a small group of vulnerable and marginalised children who cannot access technology, and studying them offers a greater opportunity for them and others to have access (The Loomba Foundation, 2015; Ngugi, 2012).

The absence of academic inquiry into this population overlooks their unique vulnerabilities and the compounded structural barriers they face. This study highlights the need to examine digital disparities among different child populations by addressing this gap, ensuring that no group remains invisible in digital inclusion efforts (Blay, 2008; UNICEF, 2022).

My personal and professional experiences further reinforce the urgency of this research. Raised by a widowed mother and serving as the Youth and Communications Manager at Nyanam International, I have spent the past three years leading the Nyanam International youth programme. During this time, I have witnessed the stark technological inequities among rural and impoverished young people. The lack of access to technology and digital spaces limits their opportunities and stifles their potential to envision futures beyond their structural disadvantages (Blay, 2008; Meiqi et al., 2023).

The findings from this study will catalyse advocacy for equitable access to technology for vulnerable children. This will be achieved by developing an open-source fact sheet highlighting digital disparities, presenting abstracts at conferences, and advocating for children's digital rights and protection policies (OECD, 2023; UNICEF, 2022). Additionally, these insights will inform grassroots organisations on programming priorities, ensuring that interventions are tailored to the specific needs of widows' children. Beyond academia, this research will create pathways for widows and their children to engage with technology, empowering them to explore new

opportunities and pursue aspirations beyond their immediate challenges (Blay, 2008; Nyanam International, n.d.).

This study fills a critical gap in the literature, significantly contributing to academic discourse and practical interventions. It also ensures that widows' children are recognised and prioritised in matters such as digital inclusion, empowerment, and literacy efforts (Njagi, 2023; Meiqi et al., 2023).

1.9 Positionality

The researcher is a young woman raised by a group of widows. I grew up partly in the village and also in the city. Radio and television were the first technological devices I encountered; however, due to limited knowledge and skills, they primarily served as entertainment tools until my early twenties, when I realised they could serve many purposes, including education (OECD, 2023; Njagi, 2023). I first encountered a mobile phone at home but saw and used a computer with minimal skills in secondary school. This shows the limited access for me and the children raised in similar households (Meiqi et al., 2023).

As a part-time staff member of Nyanam International and the daughter of a widow, I am both an insider and an outsider in this study. I approached this study as a learner, aiming to generate knowledge collaboratively with the respondents, whom I regarded as experts (Blay, 2008). I clarified to the respondents that my role in the study was that of a researcher, not a Nyanam International staff member. Furthermore, I ensured that respondents participated in the study voluntarily and could decline without giving a reason (Creswell, 2014). However, understanding the nature of the community I have served for the past three years and my dual role as Nyanam International staff and researcher presented a significant ethical dilemma. Specifically, there was the risk that respondents might feel compelled to participate in the study to maintain their relationship with Nyanam International and ensure continued access to programmes. This potential for coercion compromised the principles of voluntary participation and informed consent, which are fundamental to ethical research (Creswell, 2014; Nardi, 2015).

To navigate this challenge, I employed four strategies. These included setting a clear and transparent communication channel where I continuously emphasised to respondents that this research was independent of Nyanam International's operational activities – explicitly stating that participation or non-participation would not affect their relationship with the organisation (Blay, 2008). Subsequently, I reinforced the importance of independent consent, ensuring that the consent process was conducted to allow respondents to express their true wishes without feeling pressured or unsafe (Creswell, 2014).

Equally, I let respondents have time to consider their participation and ask questions. In addition to consenting, I emphasised voluntary participation by repeatedly bolstering that participation was voluntary and respondents had the right to withdraw at any study stage without consequences. This could be through verbal or written withdrawal to me as the researcher or to Nyanam International (Blay, 2008; Nardi, 2015). Finally, I ensured thorough documentation of the consent process and all communication with respondents to ensure transparency and accountability. Of these, only one participant mentioned that, after reading the consent, they did not want to continue with the study, and the spot was reallocated to find another participant.

Despite all these efforts, I recognise that the power dynamic could not be entirely eliminated. As the researcher, I was aware of this limitation and took extra care to protect respondents' rights and welfare, as stipulated in all relevant ethical documents (Creswell, 2014; Blay, 2008).

1.10 Conceptual framework

Access to digital technologies is a prerequisite for fully participating in the digital world. Digitally disadvantaged individuals reflect the extent to which unequal access to opportunities exists. According to Wang et al. (2006), the affordability and usability of digital technologies equate to individual benefits after use. Therefore, free or low-cost public access can compensate for affordability while providing valuable and essential skills and content to digitally disadvantaged individuals or groups. This could help increase digital education and use (van Deursen & Helsper, 2015).

This study assesses the digital divide among children of widows aged 13-18 in Kisumu, Kenya, in the Lake Victoria region. The topic of children and digital technologies has widely been studied. This is because this population is considered the largest consumer of digital technologies (OECD, 2023). At the same time, studies aim to understand how digital tools and services affect their social, physical, and psychological well-being. This study is located in digital, youth, and media studies, prioritising a population aged 13-18. Although 'children', 'adolescents', 'youth', and 'teenagers' are often used interchangeably to refer to the same group (Uzuegbunam, 2024), their usage varies depending on the context. In the context of this study, the term 'children' is used consistently.

This is backed by a legal understanding of the definition of a child in the African region and the study country, as outlined in the Convention on the Rights of the Child (United Nations, 1989) and the African Charter on the Rights and Welfare of the Child (African Union, 1990). These policy documents define a child as any person under the age of 18. Kenya also defines any person below the age of 18 as a child (Republic of Kenya, 2001).

To demonstrate the critical factors affecting access, usage, and outcomes of digital technologies among the study population, the researcher uses a conceptual framework commonly used by scholars to discuss digital inclusion. A conceptual framework is a structured representation of how economic, social, and technological factors interact to shape digital technologies. In the context of this study on the “digital divide,” the framework maps out the relationship between structural barriers such as poverty, infrastructure, and digital outcomes like access, usage, and benefits, offering a lens to analyse digital inequality (van Dijk, 2020; Adom, Hussein, & Agyem, 2018). This framework is crucial for understanding how various factors affect technology access, usage, and opportunities. Similarly, access to and use of technology cannot be examined without its capacity to create meaningful opportunities. Therefore, key factors such as accessibility, affordability, skills, and socio-cultural influences must be considered and systematically measured. These concepts emerge from multi-dimensional years of scholarly work. For instance, Van Dijk’s model of the digital divide (2005–2020) argues that digital inequality is not just about physical access but also about skills, usage, opportunities, and tangible outcomes (van Dijk, 2020).

This study explores critical determinants of the digital divide among widows' children, including affordability, digital technology skills, digital literacy, the availability of essential technologies, access to relevant content, and socio-cultural influences on technology adoption and use. In this context, affordability is primarily reflected in household income, while access and usage are key indicators of a person's ability to afford something.

The study conceptualises these relationships through the digital inclusion framework, as illustrated in the figure below. This framework offers a structured approach for analysing the interplay of economic, technical, and social factors that influence digital access and usage among widows' children.

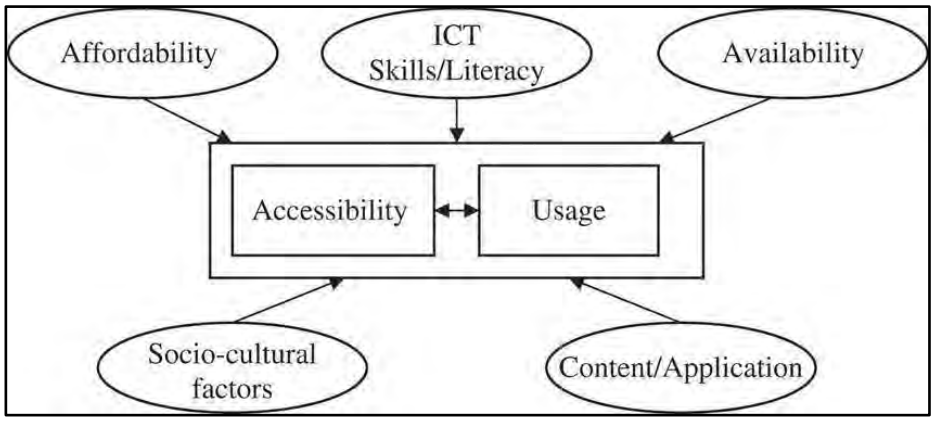

Figure 1: Conceptual framework of digital inclusion

1.10.1 Accessibility

This study defines access as the availability of technological devices at home or other locations, such as phones, televisions, computers, and internet connectivity. It also considers an individual's ability to connect to and use the internet independently. Key indicators examined include:

- Awareness of technology and the internet
- Availability of internet or technological devices at home
- Personal ownership of a technological device

- Ability to use a device and access the internet without requiring permission

1.10.2 Usage

It refers to the actual usage of the technological device and its enabled services. This included commonly available and essential services, such as sending and receiving messages and interacting with others. The indicators we looked at here included:

- Whether one used a device
- Duration of use
- Frequency of use

1.10.3 Skills and Literacy

This refers to evaluating an individual's ability to use technology-enabled devices and services. It captures self-perceived competence in technology use and any training received to enhance practical skills. Key indicators examined include:

- Training received and its source (who/where)
- Knowledge of various technology-based activities

1.10.4 Affordability

This refers to the ability to afford the devices and services necessary for participation in the digital society. Given the open nature of the digital technologies market, this study measures affordability based on household income rather than individual income. In this context, household income, primarily that of a widow, is the key indicator of a family's capacity to access and maintain technology use.

1.10.5 Availability

This refers to the availability of digital technologies infrastructure at home, including tech devices and services. This study examines key indicators, such as device availability and internet connectivity.

1.10.6 Content application

Understanding the role of existing content and its contextualisation to generate a positive impact on digital technologies. For this study, we sift whether the study respondents know the importance of digital technologies and what the usefulness and helpfulness of digital technologies are in their lives and education as the primary indicators

1.10.7 Sociocultural factors

It investigates cultural norms, social influences, and gender differences as key digital divide or inclusion factors. For this study, we examine the correlation between the social status of respondents' households and their impact on their access to and use of technology and the Internet. Here, we explore four hypothesis questions outlined in the analysis section.

1.11 Language

Language which is core to all human interaction pays a critical role in research especially in multilingual context. This study acknowledges that language goes beyond merely as a toll foe communication but also is a fundamental element of research ethics. That is why the researcher made the conscious decision of ensuring all research instruments were translated into respondents' native languages to ensure data collection wasn't compromised or misinterpreted thus enhancing study validity (Harkness, 2003)

1.12 Breakdown of the dissertation

This introductory chapter examines the global, regional, national, and local contexts of the digital divide among children, with a particular focus on the children of widows. Within the introduction, I present an outlook on the digital divide among children, comparing Africa with developed countries, rich and poor communities, and the inherent disadvantages faced by those without access.

The following section is the literature review, where I explore the study topic in depth. Here, I present different scholarly arguments on the digital divide, highlighting what has been studied on the subject while explaining the rationale behind my study niche (Meiqi et al., 2023; van Deursen & Helsper, 2015).

The third section describes the study's theoretical approach and conceptual framework, including why it was selected to investigate the digital divide among the study population. The framework offers a lens through which the study problem can be examined and the findings interpreted (van Dijk, 2020; Adom, Hussein, & Agyem, 2018).

The fourth section describes the study methodology, explaining and justifying the selected approach and its application during data collection (Creswell, 2014; Porta, 2014). The fifth section presents the study results, showing the findings in statistical graphs and tables. This section focuses on the study participants/respondents' general views regarding technology access, usage, and outcomes, including perceived barriers.

The sixth section discusses the findings against the backdrop of existing literature, highlighting the scholarly significance of the results and their alignment with the study objectives. The seventh section summarises key findings, presents conclusions, provides actionable recommendations, and offers directions for future studies. The eighth section outlines the researcher's reflections and those of the study assistants, offering insights into the research process and positionality (Blay, 2008).

CHAPTER 2: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

This chapter reviews the literature on the digital divide at both the global and regional levels. It also examines children and the digital divide, laying the groundwork for understanding the issue. Additionally, the chapter presents the theoretical framework guiding this study, clarifying how the digital divide is conceptualised and its relevance to the study respondents (Castells, 2002; Van Dijk, 2006; Wilson, 2006).

2.2 Understanding the Digital Divide

The digital divide concept includes various dimensions, such as demographic factors, personal elements, and types of technology, digital training, rights, infrastructure, and large-scale events (Van Dijk, 2006; Wilson, 2006; Fuchs & Horak, 2008). These aspects are widely acknowledged in academic literature and discussions. The term "digital divide" was initially coined in the 1990s to describe the gap between those with access to computers and the internet and those without (Hoffman et al., 2001). This divide has negatively affected different populations' access to and proficiency with technology, hindering their ability to fully engage in social, educational, political, and economic discourse in today's e-world (Fuchs & Horak, 2008).

Scholars have offered various definitions of the digital divide. Manuel Castells describes it as "unequal access to the Internet" (Castells, 2002, p. 248). Jan van Dijk outlines it as "the disparity between individuals with access to computers and the Internet and those without" (Van Dijk, 2006, p. 178). Ernest J. Wilson III characterises it as "disparity in access, distribution, and usage of information and communication technologies among different populations" (Wilson, 2006, p. 300). According to Fuchs and Horak (2008), the digital divide refers to the unequal access to and use of emerging technologies. It represents a global issue and reflects the principles of Western capitalist apartheid (Fuchs & Horak, 2006).

According to Wilson (2006), the digital divide is characterised by eight aspects that affect access and use of digital technologies. These aspects include physical access, the capacity to use digital technologies devices like computers and phones; financial access, relating to the affordability of digital technology tools and services; and cognitive access, which involves the skills needed to use technology effectively. Design access emphasises the accessibility and user-friendliness of digital technologies, devices and platforms, while content access ensures that relevant and valuable information is available to users. Product access refers to creating personal content, and institutional access looks at organisations supporting access to digital technologies. Lastly, political access involves the laws, policies, and regulations governing access to and usage of digital technologies (Wilson, 2006; Van Dijk, 2006).

Over the years, studies have shown that the factors that cause the digital divide have been extensively studied at three primary levels (Van Deursen et al., 2017). Level (one) Access – examined factors such as race, age, gender, economic status, and geographical location. Level (two) Usage – focused on the accessibility of the internet and proficiency in operating technological devices, processing online information and content, and connecting with others among internet users, all of which contribute to the digital divide. Level (three) Outcome – centred on the utilisation of the internet and online resources to achieve specific goals, individual, educational, and career (Van Dijk, 2006; Helbig et al., 2009; Scheerder et al., 2017; Erezi et al., 2021). This concept has significantly evolved and has summarised the three levels of the divide: level one divide is about connectivity, level two is about individual skills and use, and level three is a measure of outcome and technology usage (Hidalgo et al., 2020).

Van Dijk and Hacker (2003) further categorise the digital divide into four types of barriers to access. These barriers include 1) lack of MENTAL access, a state in which individuals lack elementary digital experience; 2) lack of MATERIAL access, a state where individuals do not possess computers or network connections; 3) lack of SKILLS access, when individuals have zero digital skills; and 4) lack of USAGE access, when the individual is unable to use technological opportunities meaningfully (Van Dijk & Hacker, 2003). Wilson (2006) discusses eight aspects: physical access, financial access, cognitive access, design access, content access, product access, institutional access, and political access. According to Norris (2001), the digital divide is a

multidimensional phenomenon distinguished between the global digital divide, the social divide, and the democratic divide (Norris, 2001).

Table 1: Pippa Norris's dimensions of the digital divide (Norris, 2001, p. 4)

Types of digital divide	**Signified by**
Global divide	The divergence of internet access between industrialised and developed societies
Social divide	Is the gap between information-rich and information-poor in each nation
Democratic divide	The difference between those who do and do not use the opportunities of digital resources to engage, mobilise, and participate in public life.

The multidimensional digital divide prompts us to recognise that societies marked by structural inequalities often centralise information, knowledge, and power. In such contexts, those already affluent tend to accumulate more resources, while the gaps in usage among divided social structures will likely widen (Fuchs & Horak, 2008).

Although the digital divide has been extensively discussed and analysed, most research has concentrated on developed regions such as Europe and the USA (Cruz-Jesus et al., 2012; Scheerder et al., 2017). Consequently, numerous studies have focused on the first level of the divide (Van Dijk, 2017; Montagnier & Wirthmann, 2011). Similarly, the second level is gaining traction (Scheerder et al., 2017; Van Deursen, 2017; Van Deursen & Van Dijk, 2019).

Unfortunately, Africa and its inhabitants have received limited attention in this global discourse (Kalmus, 2013; Ragnedda, 2013; Scheerder et al., 2017). The UNHDR (2013) notes that Africa has the least development in infrastructure, education, income, school attendance, and digital

technologies. This situation indicates that Africa ranks lowest in overall human development, with its population excluded from standards considered essential for advancement in developed nations (Fuchs & Horak, 2006).

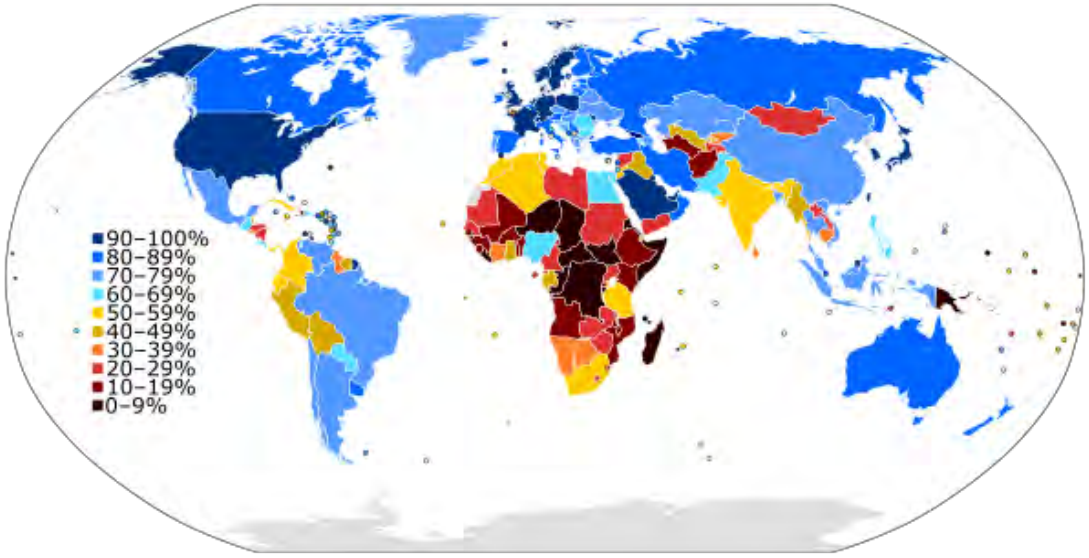

Figure 2: Internet users in 2015 as a percentage of a country's population

Source: International Telecommunication Union.

Table 2: Internet users by region

Region	**2005**	**2010**	**2017**	**2023**
Africa	2%	10%	21.8%	37%
America	36%	49%	65.9%	87%
Arab States	8%	26%	43.7%	69%
Asia and the Pacific	9%	23%	43.9%	66%
Commonwealth of Independent States	10%	34%	67.7%	89%

Europe	46%	67%	79.6%	91%

***Source**: Telecommunication Development Bureau, International Telecommunication Union (ITU)*

2.3 Global and African Perspectives on the Digital Divide

Global inequality is key to understanding the digital divide, as technology is a form of material and productive wealth. Consequently, the global digital divide significantly hinders economic growth, particularly in low- and middle-income nations. This divide highlights cross-national disparities in digital technology resources and capabilities, reflecting a broader gap in international social and economic relations. A 2019 study found that 72% of households in urban areas worldwide had internet access, compared to 36% of households in rural areas (International Telecommunication Union [ITU], 2020). This stark contrast underscores the concentration of digital technology resources, primarily in the global north, leaving many regions behind. Bleha (2005) cautioned that delays in bridging the digital divide could hinder innovation, economic progress, and overall quality of life.

The Organisation for Economic Co-operation and Development (OECD) defines the digital divide as the gap in accessibility and use of digital technologies among individuals, businesses, and geographic areas at different socioeconomic levels. It reflects variations in the general levels of socioeconomic development between and within countries (OECD, 2021, p. 5). Theoretically, it is possible to widen the dividing gap in environments where inequalities are characterised by unequal education, gender, and wealth (Lindsay, 2005). This phenomenon is called the "Matthew effect," where those with access expand their reach in opportunities, while those without continue to be increasingly marginalised and excluded (Tewathia et al., 2021).

> In 1999, the late UN Secretary-General Kofi Annan said, "The world population will surpass the six billion mark in three days. Five out of six billion people live in developing countries. For many of them, our era's great scientific and technical achievements might as well be taking place on another planet. The capacity to receive, download, and share information through electronic networks and the freedom to communicate freely across national boundaries must become a reality for all people. These people lack many things: jobs, shelter, food, healthcare, and drinkable water. Today, being cut off from telecommunication services is a hardship almost as

> acute as these other deprivations and may reduce their chances of finding remedies" (Annan, 1999).

This quote remains relevant in this century, given how wide and deep the digital divide is taking root among poor, rural, and marginalised communities. Economic disparities, gaps in infrastructure, cultural differences, and issues with digital literacy and education all contribute to the digital divide. Economic disparity is seen as the main factor in this issue. According to a 2022 ITU report, around 87% of children from high-income families have internet access at home, contrasted with just 6% of those in low-income households (ITU, 2022). High costs associated with digital technologies make affordability a significant obstacle for poorer communities (World Bank, 2021). Infrastructure issues, such as unreliable internet, frequent power outages, and lack of broadband, further worsen this divide. A 2021 ITU report highlighted that 2.9 billion people in rural and remote regions remain offline due to inadequate technological infrastructure and insufficient investment (ITU, 2021).

Additionally, cultural factors significantly impact the adoption of digital technologies, with varying attitudes, gender roles, and community structures playing a critical role (Gefen & Straub, 1997; Mumtaz, 2000). Restrictive gender norms keep women and girls from accessing and using technology. Furthermore, the absence of digital literacy programs and educational resources in local languages hampers the practical use of digital technologies, especially for marginalised populations in low-income countries (UNESCO, 2022; Chohan & Hu, 2022; Nawathe, 2018; Nogomasha & Shuumbili, 2022).

Researchers continue to argue that digital inequalities related to knowledge and economic and social resources significantly impact technology in areas such as performance, reliability, and utility realisation (DiMaggio et al., 2004; Van Dijk, 2006; Van Deursen & Helsper, 2015). Others argue that the digital divide gap is gradually closing due to economic and technological advancements; however, existing inequalities still affect individuals' ability to effectively use digital resources (Lameijer et al., 2017; Hsieh et al., 2011; Bucea et al., 2020). Even though the increasing digitisation in work and everyday life is evident, it also raises concerns about the continued inequalities within societies at the digital forefront, where low-resourced settings still face access

issues. For example, ITU (2019) stated that only 19% of individuals online were from developing countries, compared to 81% in the developed world. This glaring difference is a worrying trend.

A 2021 ITU report estimated that around 37% of the global population approximately 2.9 billion people remains offline, having never accessed the internet. Most of these individuals reside in developing nations. The report also highlights that among the 4.7 billion people identified as internet users, many rely on shared devices for limited online access, with connectivity speeds that hinder their online experience. The disparity in internet access is growing, with 84% of the population in high-income nations already utilising 5G networks, while only 4% in low-income countries have similar access. Additionally, 20% of individuals in low-income areas remain entirely offline, and 28% rely on 3G networks, which limit their online capabilities (ITU, 2023). By 2024, 5.5 billion people will be online, leaving 2.6 billion individuals approximately one-third of the global population disconnected (ITU, 2024). In developed nations, internet usage ranges from 87% to 92%, in contrast to Africa, where the average is only 38%.

It can be argued that disparities in access and limited resources are influenced by political, economic, and social conditions (Venkatesh et al., 2014; Srivastava & Shainesh, 2015; Luo & Chea, 2018). Additionally, digital inequality often reflects the socioeconomic status, knowledge, and physical resources available to individuals and nations. Consequently, even in areas with well-developed infrastructure and economic resources, a significant gap persists between access and actual usage (Bucea et al., 2020). Despite evidence indicating that the access gap is slowly narrowing in economically advanced areas, David et al. (2020) note that those lacking access remain neglected. Therefore, attention is still needed to address the digital divide's first level, access.

A study by David et al. (2020) examined how income, education levels, and ethnicity affect internet access in the United States. It found that individuals with lower education and incomes below the poverty line, approximately $1 a day, are more likely to lack internet access. Moreover, even with internet access, skill variations can create digital inequalities (Burtch & Chan, 2019). The digital divide is influenced by demographic, ethnic, and geographical factors, as noted by the OECD (2001). Several research studies indicate that income and education are the strongest indicators of

digital technologies usage and non-use (Lenhart, 2000; Jung et al., 2001; Sarikakis & Thussu, 2006). For a digital economy that predominantly relies on access to Internet services, social structures tend to be fragmented into classes based on ownership of the means of production and the ownership of essential skills and qualifications (Fuchs & Horak, 2008). These classes include people with high levels of education and income and nearly full access to digital information and communication tech; individuals with moderate access to digital technologies, especially from the middle-income bracket, possess fewer digital and strategic skills compared to the upper class; and a substantial portion of the population lacks internet access, which limits their full participation in society.

In context, language serves as a barrier and contributes to social exclusion. It is seen as obstructing the process of learning and adopting digital technology. Alam and Imran (2015) identified language barriers and inadequate skills within marginalised groups as key factors preventing many from fully understanding new technologies.

In Africa, high poverty rates, low educational levels, and inadequate infrastructure create significant barriers to digital technology access. As the continent most affected by poverty and global issues, along with unequal globalisation, many Africans are excluded from the digital inclusion agenda. This situation limits the population's ability to engage fully in economic, political, cultural, and technological discussions on a global scale. For example, restricted financial resources, limited influence on global political decisions, and a lack of representation in shaping technology standards and applications, which are predominantly controlled by Western countries, leave Africa, the continent with the fewest connections. Consequently, many individuals face reduced employment opportunities, fewer educational prospects, and diminished ways to engage in global politics (Van Dijk, 2020). As the second-largest continent in terms of population, Africa ranks lowest in social, health, and economic indicators. The continent, heavily impacted by poverty and often marginalised globally, struggles to achieve universal access to technology.

Van Dijk (2020) notes that disconnection and exclusion strip people with low incomes of their economic, political, and cultural capital, preventing them from benefiting from material access and the capabilities necessary to engage in accumulation processes within global network capitalism

(Fuchs, 2006). Despite a high penetration of mobile technology, particularly in the financial sector, the region has yet to realise its full economic potential due to barriers to access and literacy (Evans, 2018; Isukul & Tantua, 2021). The World Bank has reported that, as one of the least connected regions, only one-third of Africa's population has access to this technology. Additionally, 45% of the population lives more than 10 km from the nearest fibre network infrastructure, representing the highest percentage among regions.

In the sub-Saharan region (SSA), the digital divide is shaped by various factors. Countries in this area face challenges related to unique digital technologies (Kweku, 2012). Despite efforts to emulate developed nations in technology adoption, a significant digital divide persists, particularly regarding internet and broadband access (Mutsvairo & Ragnedda, 2019; Oyeyinka & Lal, 2005). Consequently, many individuals in the region cannot use digital technologies. According to ITU (2018), about half of the global population is online, while approximately 3.8 billion remain unconnected. For instance, only 23.5% of the SSA population uses the Internet, compared to 80.6% in Europe.

Aker and Mbiti (2010) note that mobile and internet technologies are increasingly expanding across Sub-Saharan Africa (SSA). Nonetheless, the development of these technologies continues to inspire innovations throughout the region, highlighting a significant internet divide among the population (Joel, 2021). As of 2015, no African country had achieved an internet penetration rate of more than 55%. Specifically, Niger, Sierra Leone, and Guinea-Bissau reported the lowest penetration rates, with only 5% of their populations online (ITU, 2019). Despite the rollout of submarine cables in 2019, which allowed 20% of SSA's population to access the internet in eight countries on the West Coast, five on the East Coast, and five in the Gulf, SSA remains digitally isolated from the rest of the world (Joel, 2021). This increasing connectivity, however, conceals significant disparities among different populations and sub-groups, including disparities based on wealth, location (urban vs. rural), gender, and education levels (Joel, 2021). The SSA is classified as a low-income or lower-income area (World Bank, 2012). It is also considered a region at the lower end of the African continent's United Nations Human Development Index.

In Kenya, the Internet was available by 1993. This was first introduced through the African Regional Centre for Computing, the country's first internet provider. Subsequently, the Communications Commission of Kenya (CCK) liberalised the telecommunications market, contributing to the increase in the country's internet use. As stated by ITU (2010, p. 18), Kenya was ranked the 10th African economy with the most considerable improvement in access to digital technologies. The proliferative growth poses far-reaching implications for many Kenyans, including escalating land pressure, high unemployment, and rising demand for social protection services (Odongo & Rono, 2016).

Nationally, 70% of households lack internet access, with disconnections reaching 83% in rural areas and 53% in urban settings. This issue largely stems from a lack of knowledge and skills related to internet usage. A key factor contributing to the digital divide in the country is the limited availability of technological resources and equipment throughout all educational levels (Karar, 2019). According to Odongo and Rono (2016), there is approximately one computer for every 150 students, unlike in developed nations, where there is one computer for every 15 students. This disparity significantly hampers educational equality. Like many other countries, Kenya has pursued the privatisation of its telecommunications sector. While this has increased the number of internet users, it has failed to effectively close the digital divide, especially between urban and rural areas (Karar, 2019).

2.4 Children and the Digital Divide

In the 1990s, as awareness of the digital divide grew, nearly one billion children were born. By the early 21st century, at the turn of the millennium, the United Nations Development Programme (UNDP) reported that around 100 million children were working on the streets, facing economic, social, and geographical challenges that severely restricted many young people from realising their full potential. Problems like childhood poverty, illness, and hopelessness still prevail, striking a deep chord with the children of widows. Although research indicates that technological progress could open new educational and job opportunities for children, the enduring digital divide affecting poor and rural youth remains a significant obstacle to their development (Kass, 2001).

Scientists argue that children between 8 and 18 begin consolidating their learning and developing work habits. Therefore, it is reasonable to contend that this is an ideal time to introduce technology into a child's life. A 2020 report by UNICEF and ITU reveals that roughly two-thirds (1.3 billion) of school-aged children lack internet access at home. The report also notes that 760 million young people aged 15 to 24 do not have internet access at home. It further explains that 58% of school-aged children from the wealthiest households have internet connections, compared to 16% from poorer families. This gap persists across various income levels as well. For instance, fewer than 1 in 20 school-aged children in low-income countries have internet at home, while 9 in 10 in high-income nations have access. According to ITU (2020), nearly 1.3 billion school-aged children in low-income, rural areas risk educational setbacks due to a lack of internet access. The same report estimates that about three-quarters of school-aged children in rural households lack internet access, compared to 60% globally.

It is estimated that globally, 87% of children from high-income families have internet access at home, compared to only 6% of those from low-income families. ITU (2020) reports that 768 million children and young people under 25 lack internet access in South Asia. In regions such as East Asia and the Pacific, West and Central Africa, and Eastern and Southern Africa, more than 300 million children and young people lack access to home internet, highlighting a significant disparity in digital connectivity. Additionally, only 25% of rural children and young people aged 25 and under have internet access, compared to 41% of their urban counterparts. Although 33% of children have home internet access, a substantial digital divide persists between high-income and low-income countries (UNICEF & ITU, 2020).

A study by ITU and UNICEF titled How Many Children and Youth Have Internet Access at Home? reveals significant inequalities across countries and regions based on a household survey conducted in 81 countries. It found that only 5% of children and young people in West and Central Africa have internet access, compared to a global average of 33%. This stark gap primarily affects children and young people from impoverished and rural backgrounds. It is important to note that having internet access and technology does not necessarily equate to the value children can derive from them. The second level of the digital divide underscores the importance of digital skills in navigating the risks and opportunities presented by digital technologies for children. Recent ITU data show that

insufficient digital skills hinder meaningful participation in today's digitally driven environment. Although mobile technology and internet access can be expensive, many developing nations possess limited purchasing power. Daugherty et al. (2014) discuss that knowledge and competence in utilising digital technologies to access information, connect with friends and family, and explore ideas are crucial components of digital literacy, significantly impacting children's academic success and future opportunities.

When children face digital and social exclusion, the adverse effects intensify (Cooley et al., 2016; Davis, 2007; Killen et al., 2009; Wesselmann et al., 2018). In their study on "Children, digital technologies, and the everyday nature of social exclusion," Valentine et al. (2002) emphasised the significance of using computers and internet kiosks in schools and at home as foundational points for understanding the impacts of digital technologies. Research on the digital divide during the COVID-19 pandemic revealed structural inequalities in children's experiences due to school closures and the shift to online learning (Blundell et al., 2020). This divide indicates that economically disadvantaged children have fewer opportunities to learn, explore, and communicate digitally. As a result, they struggle to achieve their educational goals and develop the necessary skills for their future (Berson et al., 2021). This study aims to closely examine the potential and risks of the digital divide on the education of widowed children.

In a world increasingly focused on tech-based learning, we must recognise its significant long-term consequences for children's education (Bose, 2017; Coffey, 2017; Ersoy & Bozkurt, 2017; Huda et al., 2017). Research has established a link between digital exclusion and social exclusion, indicating that while access to technology has enhanced many children's lives (Selwyn & Facer, 2007), it has also widened the gap for disadvantaged youth (Livingstone & Haddon, 2009). The digital divide considerably impacts children's social and educational experiences. Even after the COVID-19 pandemic, the repercussions of this divide continue to affect children profoundly.

The digital divide among children in Africa is a significant concern, as disparities in internet access and digital resources affect educational and developmental opportunities. Nearly 2.2 billion children lack access to essential technology (UNICEF, 2020). The growth of the internet and technology has been uneven (ITU, 2023). Despite increasing technology penetration in sub-Saharan Africa (Gina et

al., 2012), young people in low-income countries and communities still encounter significant barriers to access (Giri et al., 2023). Access and usage vary widely, with children from impoverished communities being the most disadvantaged (Subedi, 2020; Reich, 2021). Almost nine out of ten children in sub-Saharan Africa and South Asia lack internet access (ITU, 2020). Low affordability, safety concerns, and insufficient digital skills worsen this alarming statistic. Notably, UNICEF (2020) states that among young people aged 15 to 24 in the sub-Saharan region, 20% of households lack internet access, primarily due to infrastructure challenges in rural areas.

The digital divide that emerged in the 1990s describes the gap between those with access to computers and the internet and those without (Hoffman et al., 2001). The divide affects individuals' capacity and opportunities with technology across various domains, including social, educational, political, and economic discourse. The digital divide significantly challenges educational development and economic growth (Mossberger, 2003). As outlined in the UN 2030 Sustainable Development Goals Agenda (United Nations, 2022), bridging this gap is crucial for providing universal internet access, fostering innovation, and improving living standards, particularly in impoverished regions (Hagen, 2007). Access to technology is pivotal for addressing socio-economic inequalities and enhancing children's innovation and educational outcomes, making this study both timely and necessary.

Most research on the digital divide is concentrated on developed nations (Scheerder et al., 2017; Van Deursen, 2017; Van Deursen & Van Dijk, 2019). Africa remains unexplored (Kalmus, 2013; Ragnedda, 2013; Scheerder et al., 2017). According to the International Energy Agency (2021), approximately 600 million people (43%) in Africa lack access to electricity, with the majority in sub-Saharan Africa. ITU (2013b) states that Africa faces challenges with internet penetration, household connectivity, and broadband infrastructure. The 2018 Afrobarometer survey showed a noticeable surge in mobile phone accessibility in Africa. However, the study also revealed a stark contrast in internet usage, with only 11.4% reporting daily usage and 61.8% indicating they never use it. Despite widespread access to the internet and mobile phones, universal access has not yet been achieved.

Different studies argue that young people aged 15–24 years in Africa and the Asia-Pacific are more connected to the internet (ITU, 2021). However, children and young people in developing countries face significant barriers to access. The UN Children's Fund and ITU (2020) report that two-thirds of children aged 3–17 do not have internet access at home. Many connect to the internet through shared digital technology resources with other household members (ITU, 2021). In Eastern and Southern Africa, only 13% of children and young people have internet access at home (UNICEF, 2020). Only 3% of those aged 25 and below from the poorest families have access, compared to 40% from wealthy families (UNICEF & ITU, 2021). According to the Ibrahim Forum report (2021), 89% of learners in sub-Saharan Africa do not have access to a household computer, and 82% lack internet access. Most of these learners reside in areas not covered by the internet.

A study by Livingstone (2005) indicates that middle-class children have greater internet access than low-income children. The study further highlights that limited access among these children is due to a lack of internet availability, low literacy skills, and a traditional household culture. For many children, access to technology is non-existent, limited, sporadic, or problematic, varying by age, gender, socioeconomic status, caste, and other forms of inequality (Banaji, 2015, 2017). Wamuyu (2017) notes that marginalised communities face challenges accessing and adopting the internet due to high costs. The role of digital technologies in reducing poverty is hindered by the substantial expenses involved in purchasing and maintaining those (Weama & Miriro, 2014). Teens' limited access to and use of technology is attributed to insufficient digital education and skills, strict regulations, high costs, inconsistent electricity supply, and a lack of government support (Uzuegbunam, 2024). Children encounter significant barriers to accessing and using technology due to limited digital literacy (Third et al., 2017).

In education, many children find it challenging to interact with online learning, access digital resources, and fully participate in online platforms due to a lack of internet access, devices, and digital tools (Vitalis et al., 2025). Furthermore, despite the promising technological possibilities, the digital divide hinders many children (Vitalis et al., 2025).

The divide's impact on children in low-income households is more acute if they are left behind academically. In terms of school performance, because they do not have access to the internet,

which has become essential for teaching and learning in today's world (Wong et al., 2010), many of them remain outpaced by those with access, limiting their ability to select and process information (Mason & Hacker, 2003, p. 46).

The digital divide affects children's life chances, well-being, and survival prospects in the new knowledge economy (Wong et al., 2025). Those who are digitally excluded suffer various adverse effects, especially those of school-going age. Another study found that students without digital technology devices at home experienced slowed development and reduced self-efficacy with information technology (Jaksom et al., 2006; Zhau et al., 2010).

Digital technologies' self-efficacy is crucial in developing children's confidence and competence (Li & Ranier, 2013). Equally, the divide affects children's perception and attitude toward the internet and technology. Findings from a study by Kehens, Graft, and Mayer (2009) showed that digitally excluded children viewed digital technologies as a ladder to career advancement and social standing and as a valuable tool for meeting their educational needs.

2.5 Kenya and Widow-Led Households

Kenya is experiencing a three-level digital divide. According to the International Telecommunication Union's (ITU) Facts and Figures 2023, 81% of urban dwellers use the internet, 1.6 times higher than in rural areas. Before the COVID-19 pandemic, only 17.9% of Kenyan households had internet access (Kenya National Bureau of Statistics [KNBS], 2019). Despite increasing mobile internet subscribers (Communications Authority of Kenya, 2019), rural areas still struggle with limited electricity and internet connectivity. Kenya has 24.4 million children under 18 (UNICEF, 2023). According to UNICEF (2022), 90% of children surveyed in Kenya and neighbouring countries face barriers to internet access, such as infrastructure constraints, resource limitations, parental permission, or high costs. Wealth disparities further impact access.

Most research on children and digital technologies focuses on the dangers, portraying internet access as problematic, which limits access for many (Ngaji, 2023). This homogenised approach restricts effective interrogation of access and usage among children (Ngaji, 2023). Childhood is not

homogeneous but is gendered, racialised, classed, and ethnicised (Alanen, 2016). It is influenced by social, economic, political, and cultural factors. In addressing these disparities, my study focuses on the children of widows aged 13 to 18 in Kisumu, Kenya. Widowhood poses significant social challenges, resulting in economic disadvantages for widows and their children (The Loomba Foundation, 2015; Ngugi, 2012). Around 180 million children globally are raised by widows (Djuikom & van de Walle, 2018; The Loomba Foundation, 2015). Widow-led households are particularly impoverished (The Loomba Foundation, 2015). Children of widows face child labour, hunger, malnutrition, hazardous employment, mental health issues, substance abuse, and sexual exploitation (Kenya Ministry of Health [KMOH], 2020; Ngugi, 2012). They encounter barriers to education and economic opportunities, including limited access to learning technologies and digital illiteracy (KMOH, 2020; Ngugi, 2012). Thus, widows' children are disadvantaged by both structural and cultural divides, hindering their access to and positive impact from technology.

This study examines technology access and usage among children of widows aged 13–18 in rural Kenya. The research findings will catalyse advocacy for technological access for vulnerable young people, shedding light on the digital divide faced by widows' children and informing programming priorities for local organisations. Moreover, I will create an open-source fact sheet highlighting the digital disparities among rural and impoverished children, aiming to support initiatives that improve technology access for marginalised populations. Leveraging the study outcomes, I will advocate for enhancing digital rights protection policies, ensuring sensitivity to the experiences of widows' children.

2.6 Theoretical Framework

The digital divide is a complex and dynamic phenomenon (Van Dijk & Hacker, 2003), exhibited in unequal access to and use of technology and the internet. As claimed by Mossberger et al. (2003), sociological inequalities also drive the digital divide. This means that the national and cultural context can be a barrier to accessing, using, and benefiting from technology among populations. In the study context, children are directly affected by national, social, and cultural contexts, which could deny them the opportunity to access and enjoy technology.

To thoroughly examine the extent to which these inequalities were prevalent among widows' children, this study utilised Van Dijk's (2005) theory of Resource and Appropriation. The choice of the theory was informed by its relevance to the role of inadequate resources as a significant hindrance to the majority of digitally disadvantaged regions and persons and its perceived impact of digital setbacks on the economic problems of digitally disadvantaged countries (Inegbedion, 2021). The theory argues that the digital divide is a personal, positional, and background inequality. It claims that these inequalities lead to unequal access to resources for individuals, resulting in limited use of digital technologies. When there is unequal access, disparities arise in individual social participation (Van Dijk, 2008). When lacking participation, it directly feeds into positional characteristics, forming a complete feedback loop on the digital divide. In addition, inequality in resources at the government level is an added constraint to a country's capacity to acquire digital technologies, thereby limiting access to technological devices, services, and resources even further.

Further, the theory postulates that technology adoption is a behavioural process where individuals must be motivated and develop an interest in using technology and the internet. Its core argument is that personal (age, gender, ethnicity, intelligence, personality, health) and positional (labour, education, national, and household composition) differences can create inequalities in access to technology (Van Dijk, 2005). This theory allowed the study to analyse the existing structural and social inequalities among the children raised by widows that might hinder them from accessing and using technology.

The resource theory categorises access into four dimensions: personal, positional, social, and cultural. Each dimension influences an individual's access to and use of technology. This theory argues that access to and use of technology are not merely about the availability of devices or the internet, but are highly influenced by the interconnectedness of individuals' skills, social positioning, and cultural capital.

The appropriation theory explains that individuals adopt and use technology in three stages: access, adoption, and appropriation. The theory highlights that digital engagement is dynamic and influenced by personal, social, and contextual factors. Therefore, this theory provides a robust understanding of the availability of digital resources and their use among children. It also

comprehensively analyses factors influencing access, usage, and outcomes. It supports the development of effective strategies that promote digital inclusion and equity among children.

Van Dijk's (2006) theory posits that existing personal and positional inequalities drive disparities in resource availability, which in turn create access inequalities, ultimately leading to differences in individuals' participation in the digital world. According to Van Dijk, resource inequality is the fundamental cause of the digital divide. The theory outlines four successive stages of technology appropriation: (1) attitude, (2) material access and ownership, (3) skills, and (4) usage.

The central argument is that individual differences in personal and positional factors influence inequality across these four stages. A person's attitude towards technology determines their likelihood of owning a device or using a service (Venkatesh, Morris, Davis, & Davis, 2003). Material access refers to the physical availability of technology, encompassing both the opportunity to acquire devices and variations in their technical characteristics (Van Dijk, 2005). While physical access to technology continues to expand, rapid technological advancements create new disparities in accessibility.

Beyond ownership, individuals require skills to use technology effectively, including identifying their needs and navigating security concerns. The final stage, usage, pertains to the frequency and nature of an individual's technological activities. This phased approach highlights how structural inequalities shape digital access and engagement.

2.6.1 Resource, Personal, and Positional Inequalities

Studies on digital access and inequality often emphasise the role of income and social support (Scheerder, Van Deursen, & Van Dijk, 2017). Within the digital divide framework, income is the most significant economic resource as it directly determines the affordability of material access (Chinn & Fairlie, 2006; Goldfarb & Prince, 2008; Martin & Robinson, 2007; Ono & Zavodny, 2007). Research consistently demonstrates that lower income correlates with negative attitudes towards technology (Barzilai-Nahon, 2006), reduced internet usage, lower productivity, and greater economic disadvantage (DiMaggio, Hargittai, Celeste, & Shafer, 2004). Conversely, higher-income

individuals are more likely to engage with technology, enhancing their skills and opportunities (Van Deursen, Van Der Zeeuw, & Jansen, 2019). Additionally, Van Dijk (2005) highlights the importance of social relationships in technology adoption, as individuals with strong social networks are better positioned to acquire digital tools and receive assistance with their maintenance and use.

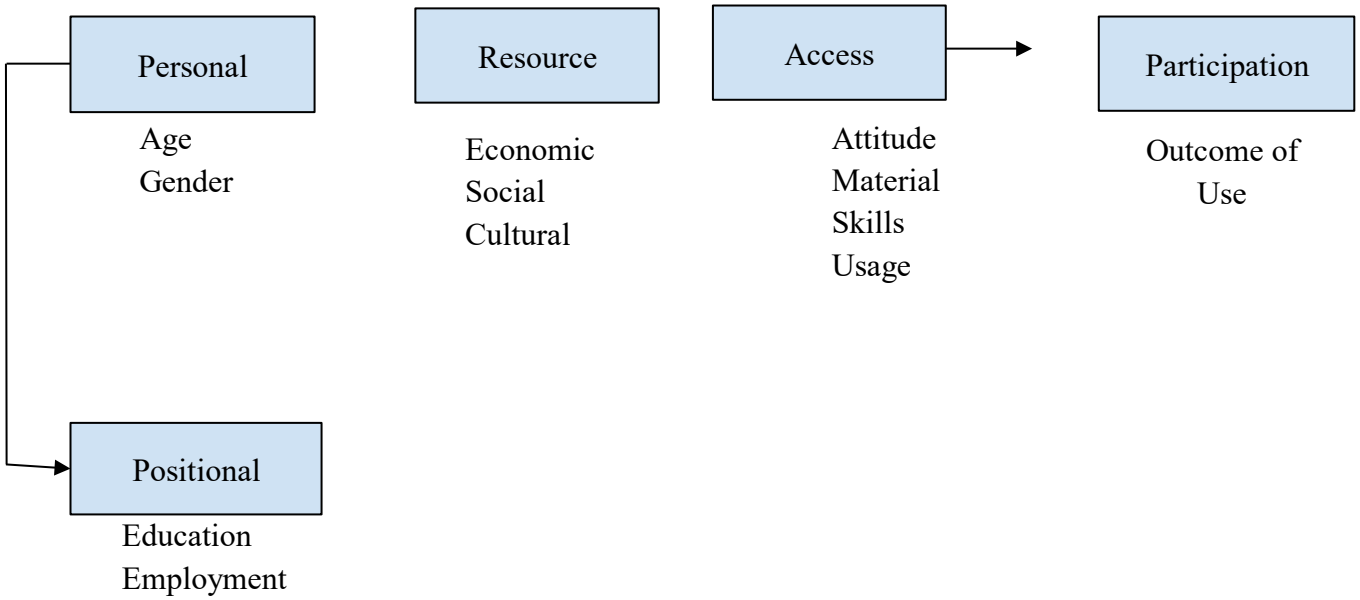

Figure 3: Adapted illustration of the resource and appropriation theory

2.6.2 Material access in resource appropriation theory

Physical access to technology devices and the Internet is considered the second phase of access, which precedes material access. The different types of access to technology are at the core of the resource and appropriation theory. To understand the digital divide, we must understand how and by whom different materials are used. Material access includes various online devices such as computers, laptops, and smartphones.

When examining material access, we must consider three crucial material access inequalities: first, the difference in device availability; second, the diversity of devices, and finally, the difference in device maintenance costs. These three depend on the technical characteristics, where the difference in capacity is studied chiefly in the use of computers and desktops. Economic status plays a crucial

role in determining material access. The income required to acquire, and maintain/sustain devices and internet use, is often expensive (Van Dijk et al., 2018).

For instance, this study found that the highest barrier to access was the cost of device purchase and maintenance (Odhiambo-Evelyn, 2025). People with high incomes are more likely to own first-class devices than those with low incomes, who are likelier to opt for lower, second-hand devices. These devices often experience hardware and software malfunctions, resulting in high maintenance costs. According to Gonzales (2016), although many individuals from low-income backgrounds now use the internet on their smartphones, access remains unstable, characterised by frequent periods of disconnection.

2.6.3 Access as a process of appropriation of technology

The concept of access is both narrow and broad. Its most common definition is "physical access." However, a broader meaning is more appropriate for describing and explaining all kinds of divides, including the second-level divide (such as usage) (Van Dijk, 2005). Physical access includes motivation, attitudes, and expectations about getting physical access, encompassing the whole meaning of appropriation. Furthermore, a single decision to adopt and purchase is a continuous process of accessing new software and hardware versions.

Skills and competence are equally crucial for access. When an individual has learnt how to operate and understand a technology, the purpose of access and the final goal of appropriation often lead to actual usage.

2.6.4 Phases of access

In the 1980s and 1990s, people argued that they never needed computers for internet connections due to fear (Van Dijk, 2005). However, the motivation to obtain digital media spiked during the diffusion period. Even older people and those with limited education were motivated to gain access and often feared being excluded. These access phases include motivational, physical, skills, and usage access.

2.6.5 Motivational Access

This is the social, cultural, and mental nature of individual access. Some of the early social explanations argued that "the Internet does not have an appeal to low-income and low-educated people" (Katz & Rice, 2002, p. 93). During the mid-2010s, working-class and educated people caught up with other groups and spent more time online (Van Deursen & Van Dijk, 2013). Tech acceptance, motivations, and attitudes relate to perceived usefulness, ease of use, and subjective norms—the importance one would get from having used digital media. With this background, this study also explored technology's effectiveness, helpfulness, and significance to the study population to determine acceptance.

In addition, social norms and support play a significant role in one's motivation and intention to accept and use new media (Stewart, 2007). Similarly, this access phase influences (1) physical access, (2) skills access, and (3) usage access.

2.6.6 Physical Access

Overwhelmingly, digital divide research has continued highlighting the physical access divide to personal computers and the internet among demographic categories, including income, education, age, gender, and ethnicity. In 2000–2002, physical access divides in East Asia, North America, and Northern European developed countries began to decline as categories of high income and education levels reached partial saturation. This causes lower-income and less-educated individuals to strive to catch up (Eurostat, 2005–2010). However, developing countries still have a widening gap in physical access.

Physical access has evolved, despite being a topic contested in digital divide research (Van Dijk, 2020). The contestation arises because, theoretically, the physical access divide was proposed as a manifestation of having more or less economic, social, and cultural capital (Rojas et al., 2004). Others defend the resource-based, network approach, which focuses on social positions, resources, and relations in labour markets, education, and households (Van Dijk, 2005).

2.6.7 Skills Access

Once physical access is obtained, individuals need skills to command and use digital devices and services. This access is divided into two. These include operational or instrumental skills (medium-related), such as command of digital technologies—one's ability to operate a device from opening to shutting it down. Substantial skills are geared towards individuals' ability to find information, communicate, act, and create content using digital technologies.

Although popular opinions in many scholarly concepts suggest that medium-related skills are predominant, it's dangerous to assume that the ability to operate a medium and navigate the internet is simply a matter of access. Medium skills are a prerequisite, whereas information retrieval, communication, and content generation skills are crucial. Further, it's not easy to determine people's digital skills. This is because people's actual skill levels result from observation and learning through practice, thanks to a course (Van Dijk & Deursen, 2014). The different studies conducted to measure digital skill levels surveyed respondents with questions that asked them to estimate their skill level. This kind of measurement poses a validity problem (Hargittai, 2002; Van Deursen, 2010). However, performing skills tests is labour-intensive (Van Deursen, 2010).

Similarly, research on digital skills shows significant differences in performance between people of different ages and educational levels, with education being the most critical factor (Hargittai, 2002; Van Deursen, 2010).

2.6.8 Usage access

This is the last stage of access. The goal is to use digital technologies. It's measured using time and frequency as well as the diversity of usage applications, internet usage, and online activeness. The usage gap is broader, as it concerns different uses and activities in all daily life spheres, not just the perception and cognition of digital technologies. Several studies have shown the usage gap in the diversity of applications, individual ages, education levels, and gender. A striking observation is

that people with higher education are using advanced digital technologies for business, work, and education, while those with lower education simply use them for entertainment, commerce, and messaging (Bonfadelli, 2002; Cho et al., 2003; Van Deursen & Van Dijk, 2013; Van Dijk, 2005; Zillien & Hargittai, 2009). However, we can hold both complexities and acknowledge that there's no greater use than the other.

2.6.9 Personal and positional inequalities as a cause for differences in material access

The digital divide suggests that this category is mainly influenced by personal factors, such as age, gender, and ethnicity (Scheerder et al., 2017). Primarily in education, employment, and home life. Research by DiMaggio et al. (2004) and Scheerder et al. (2017) suggests that education level is a key factor in studies on the digital divide. It has been observed that education correlates positively with technology usage, leading to better awareness, enhanced training, and improved content evaluation skills (Rice, McCreadie, & Chang, 2001).

A 2005 study by Van Dijk found that men and women continued to increase their use of digital technology at work, school, and home in the developed world. According to Van Dijk (2005), individuals with lower educational attainment face limited material access, reduced skills (Correa, 2016; Hargittai, 2010; Scheerder et al., 2017), and fewer technological advantages (Hargittai & Hinnant, 2008; Scheerder et al., 2017). Conversely, higher-education students reap more benefits from technology (Clayton & Macdonald, 2013; Scheerder et al., 2017).

Even though Van Dijk's (2005) study showed that the digital divide gap between men and women in the developed world was closing, the existing gender-based stereotypes suggest that women and girls are less tech-savvy (Dholakia & Chiang, 2003). Additionally, it is argued that women and girls are naturally disadvantaged because they lack tech skills and are technophobic, and that tech doesn't meet their needs (Hilbert, 2011). Nonetheless, gender remains a significant factor in accessing and using digital technologies (Helsper & Reisdorf, 2017). In a household context, the digital divide often reveals independent effects of marital status (Scheerder et al., 2017). This

context is critical to consider, even though this study did not specifically assess the gender angle when examining access, use, and outcomes among the study population.

2.6.10 Internet attitudes as a course for inequalities in material access

The first phase of the theory is motivational access (Van Dijk, 2005). Motivational access is shaped by an individual's attitudes towards the technology, which is crucial for use (Venkatesh et al., 2003). Negative attitudes decrease an individual's likelihood of accessing and using the internet (Dutton & Reisdorf, 2019; Reisdorf & Groselj, 2017; Van Dijk, 2005).

2.6.11 Material access as a cause for the difference in skills, use and outcome

According to Van Dijk (2005), material access (having access to devices and the internet) is crucial for understanding how people use technology, shape their digital skills, and the benefits they receive from digital technology. According to the theory of resource and appropriation, unequal access to technology is not just limited to device ownership; it is also about how that access can either enable or limit skills development, actual usage, and beneficial outcomes, including education, employment, and participation in the development agenda. Thus, technology appropriation is a process with four main successive phases: (1) adopting a favourable attitude, the desire and need to use digital technologies, (2) acquiring physical access, owning a device or having access through shared devices, (3) material access, owning and using the device appropriately, and (4) possessing the needed skills having essential skills to navigate digital technologies (Van Dijk, 2005).

2.7 Conclusion

This theoretical framework and literature review chapter illuminates the complex factors that affect the digital divide, focusing on different access forms, including material, physical, motivational, skill-based, and usage access. Drawing on Van Dijk's (2005) theory of Resource and Appropriation, this chapter emphasises how different factors significantly influence the access, use, and outcome of technology. By addressing these significant gaps, children can access, adapt, and create new

knowledge using new information and communication technology, which is crucial for social inclusion in today's digital world (Warschauer, 2003, p. 9).

This framework highlights the need to examine the digital divide holistically and critically. Recognising the existing inequalities driven by resource power and privilege, while understanding the interconnectedness of individuals' skills, social positioning, and cultural capital, can promote more inclusive, accessible, and equitable digital access for children globally.

CHAPTER 3: METHODOLOGY

3.1 Introduction

Chapter 2 established the status of the digital divide from global, regional, and local perspectives, particularly focusing on children, while highlighting the risks posed by this divide to their lives and future opportunities. This chapter outlines the methodology employed to assess access to and use of technology among children of widows in the Lake Victoria Region, Kisumu, Kenya. It details the research design, data collection procedures, study population, sampling strategy, data analysis methods, and ethical considerations.

The chapter is structured into key sections: it first discusses the quantitative methodology applied in the study, highlighting its suitability for understanding the digital divide; then outlines the research design, objectives, and population; describes the sampling strategy used to select participants; explains the data collection methods; details the systematic approach for data analysis; and finally discusses ethical considerations underpinning this study.

3.2 Quantitative methodology

This study employed a quantitative methodology, using survey questionnaires and a case study design to explore technology access among children of widows in rural Kenya. I selected a quantitative method, not a qualitative one, as it allows for the collection of quantifiable data that showcases frequencies and relationships among variables, effectively answering my research objectives. I wanted to demonstrate the statistical significance of the digital divide among the study population and generalise the findings to other populations of children with similar social, cultural, and geographical characteristics, making quantitative methods applicable. Qualitative methods are used to understand people's experiences and attitudes towards specific issues, answering the questions of what, how, and why. This study, however, seeks to answer the question of how much and how much, making the quantitative method a more suitable methodology (Baruch, 1999; van Deursen & Helsper, 2015).

Data was collected through semi-structured questionnaire surveys, facilitating statistical sampling techniques to enhance generalizability (Nardi, 2015) and offering insights extending beyond the specific region under study. This approach ensures a comprehensive understanding of the digital divide while allowing for broader applications (Foster, 2018; Hurst, 2015).

Surveys are commonly used tools in different fields, from collecting information on environmental issues (Friberg, 2018) to studying the economic performance of enterprises (Foster, 2018), researching health-related issues (Kalton, 2012), and even conducting various socio-economic phenomenon studies (Hurst, 2015; Kim et al., 2014). In studies of the educational and social sciences, survey research involves collecting information from a sample of individuals through their responses to questions (Check & Schutt, 2012).

As a quantitative design, surveys measure causality between dependent and independent variables (Creswell, 2014). They involve examining and describing particular issues, subjects, or objects. Researchers using this methodology apply it in studies that result in some statistical inferences. For this study, the researcher used the survey questionnaire approach, which allows for data generalisation, is cost-effective and efficient, and is widely known as the most popular data collection method for academic and marketing research (Regmi et al., 2016; van Deursen et al., 2015).

Additionally, the study incorporated an intersectional lens to examine how multiple forms of oppression faced by widows' children, such as child labour, inadequate housing, food insecurity, sexual violence, child marriage, and societal exclusion, affect technology access for their children. This reason is heavily borrowed from the scholarly work of Blay (2008) on feminism, which emphasises the need to study the interconnectedness of social categories that can influence how individuals experience privilege and oppression. By addressing these intersecting forms of oppression, the study provides a more comprehensive understanding of the barriers to technology access and informs strategies to improve accessibility for this marginalised group. This was achieved through the intersectional section of the survey questions, which cover key questions

about the parent or guardian's economic status. These factors hindered access and open-ended questions about participants' concerns regarding technology access, use, and outcomes.

Consequently, this approach was adopted due to its proven ability to support societal decision making, influence policies, shape public discourse and affect product development (Slatter et al., 2011; van Deursen & Helsper, 2015). The method equally presents opportunities for analysing problems and developing practical actions (Slatter et al., 2012).

3.3 Population

The study population refers to a defined, limited, and accessible group of individuals from which the sample is drawn. This group must meet specific characteristics and eligibility criteria (AriasGómez et al., 2016; van Deursen & Helsper, 2015). In the current study, the target population comprised 800 children of widows registered under Nyanam International at the time of the study.

A simple inclusion and exclusion framework was applied, initially based on the participants' prior involvement in Nyanam International's technology education programmes. The initial exclusion criteria included children who had been exposed to advanced technology through robotics training, while the inclusion criteria focused on those who had participated in Nyanam International's programmes for up to three years and were resident in Kisumu West Sub-County. This was intended to ensure that only children of widows supported by Nyanam International within Kisumu County took part in the study (Nardi, 2015; van Deursen & Helsper, 2015).

However, after careful consideration of the research objectives and the context of the study population, it was determined, following consultation with Nyanam International, that prior exposure to technology would not significantly affect the study outcomes. As such, it was decided not to exclude participants on this basis, in order to preserve inclusivity and relevance to the research questions. The inclusion criteria included: 1) must be a child of a widow served by Nyanam International, 2) must be aged 13–18 years, and 3) must be in Nyanam International's youth program.

To ensure geographical alignment with the study objectives, a list of 63 widows' groups served by Nyanam International for over three years was reviewed (a widows' group comprises widows of different ages who have come together to support one another and are served under the umbrella of Nyanam International). Of these, only 19 groups were located within the study area and thus included in the study (Blay, 2008; van Deursen & Helsper, 2015).

3.6 Sampling Procedure and sample size

In any research undertaking, it is essential to determine the appropriate units of analysis, which may include individuals, departments, officers, firms, or organizations (van Deursen & Helsper, 2015). The selection of a sample is typically influenced by the nature of the study, the data collection instruments, and the anticipated outcomes (Nardi, 2015). Another critical consideration is the method used to select units from the population and the appropriate sample size to ensure both generalizability and representativeness.

This study employed a two-stage sampling procedure, combining cluster sampling and simple random sampling. In the first stage, 17 clusters, referred to as widows' groups, were randomly selected from a total of 63 widows' groups using a study criterion. In the second stage, individual children within the selected clusters were volunteered by their mothers based on random selection according to availability, after meeting the study criteria to join the study (van Deursen & Helsper, 2015; Blay, 2008).

The sample size was arrived at using Cochran's sample size formula. Cochran's formula was developed by William G. Cochran to help researchers calculate an ideal sample size when estimating proportions in a population, particularly in survey research. For this study, Cochran's formula for a finite population was applied as follows:

$$n = \frac{z^2 \hat{p}(1-\hat{p})}{\varepsilon_2}$$

Where z is the z score, ε is the margin of error, N is the population size, p̂ is the population proportion. The N in the formulae was set at 800, margin error of 5% (0.05), and p̂ was set at 0.5.
Replacing these parameters in the above formula resulted into a total of 260 children.

$$\frac{^2\widehat{0.5}(1-\widehat{0.5})}{0.05^2}\ 1.96 = 260\ participants$$

The initial sample size was adjusted upward by 15% to account for potential nonresponses. As a result, the target sample size was set at 300 children from widow-headed households participating in the Nyanam International programme. This sample was then equally distributed across 17 clusters, with each cluster allocated 18 slots.

During data collection, it became evident that the clusters were not homogeneous in terms of the number of widows with eligible children. To maintain the overall sample size, some clusters were oversampled while others yielded fewer respondents. This led to variations between the initially allocated and actual number of children interviewed per cluster, as detailed in Table 3.

It is important to note that some clusters contributed a higher number of child respondents. This variation was solely dependent on the number of children within each widow group who met the study's inclusion criteria. Such differences are common in cluster-based sampling, where participant numbers within clusters may vary depending on demographic composition and eligibility (van Deursen & Helsper, 2015; Nardi, 2015).

Table 3: Nyanam International widows' groups and total respondents per group

Clusters (Widow groups)	Initial Sample size	Total number of children interviewed
Chakwuoth	18	19
Ongayo	18	15
Geno	18	18
Monday Ruoth Moyie Wuoth	18	13
Law Kendi	18	14
Lwala	18	11
Pillars of Hope	18	15
Kemri	18	16
Yaw Pachi Olando Silk	18	25
Blessed	18	12
Chi Ruoth Majahera	18	15
Karwamati	18	19
Nyahera Humble	18	21
Lao Bang Dwar	18	39
Kisian Railways	18	24
Nyolwanda Central	18	10
Koyiengo	18	14

3.7 Study Instruments

This study focused on closed-ended questions consisting of yes/no and multiple-choice options, alongside 2–3 open-ended questions. This made it easy to interview participants and allowed the researcher to efficiently score and compare results from the questionnaire (van Deursen & Helsper, 2015). Survey questionnaires are effective in facilitating ease of administration and analysis, specifically for community-based studies such as this study setting. The choice of closed-ended questions was efficient in generating quantifiable data while reducing respondents' burden, whereas

open-ended questions provided qualitative depth, allowing respondents to articulate views not anticipated by the researcher (Blay, 2008; van Deursen & Helsper, 2015). Importantly, the researcher developed the tool after a thorough review of existing scholarly survey instruments used in assessing children's experiences of the digital divide and digital technology awareness (Livingstone & Helsper, 2007; UNICEF, 2017).

Furthermore, the researcher noted that closed-ended questions may not capture all participant responses. To address this, some closed-ended questions included an "other" option for additional responses beyond the multiple choices, facilitating a broader range of feedback while minimising responses that might appear forced (van Deursen & Helsper, 2015)

As such, this survey design gathers, describes, and explains information from a sample, thereby constructing a quantitative description of a particular population (van Deursen & Helsper, 2015).

3.7.1 Outline of survey questions about the research questions

For research question 1:

What types of technology are widows' children aware of and have access to?

The researcher carefully crafted fifteen questions which addressed key aspects of technology engagement, including awareness; individual, household, and community access; ownership; availability; and permission to access technology devices, services, and the internet. These questions were close-ended with an "other" option where deemed appropriate, capturing a holistic understanding of factors influencing technology access and usage (van Deursen & Helsper, 2015).

For research question 2:

How do they access and use technology?

The researcher crafted nine in-depth questions which examined critical aspects of technology usage, including frequency of use, types of activities performed, users' perceptions, skills in using

technology, and benefits of its use. These questions were close-ended with an “other” option where appropriate (van Deursen & Helsper, 2015).

For research question 3:

What are the outcomes of using technology?

The researcher developed nine questions that thoroughly assessed the benefits respondents gain from using technology, its potential positive and negative impacts on children, its advantages to their lives, areas where technology needs improvement, its potential to enhance children's education, and their desired features and design for technology. These questions were designed to capture a nuanced understanding of technology's role in the study respondents' lives and their aspirations for its development. These questions were close-ended with an inclusion of “other” where the researcher deemed appropriate (Blay 2008).

For research question 4:

What are the barriers that hinder widows' children from accessing and using technology?

The researcher developed six probing questions that explored the intersecting factors influencing technology access and usage among the study respondents. These questions addressed key positional factors, such as household income, obstacles to access, challenges encountered when using technology, and the potential of technology to improve their education (van Deursen & Helsper, 2015).

However, it is vital to note that survey data collection has limitations, including response bias and incomplete questions or questionnaires. To mitigate these limitations, such as response biases and inadequate data collection (Glasow, 2005; Nardi, 2015), the questionnaire instrument was made available in three languages the respondents spoke: Dholuo, Swahili, and English. This ensured that respondents fully engaged with the study in the language they were most comfortable with (Blay, 2008). As noted by Creswell (2014), quantitative research involves testing theories and variable

relationships. Therefore, there is a need for consistent and comparable data, which necessitated translation in the context of this study to prevent measurement bias. In addition, translation helped the researcher ensure the inclusion of all the respondents' diversity, ensuring generalisability. Without translation, the study would have limited respondents to one language, creating bias and compromising representation. All translations were aligned with standard practices aimed at producing rigorous and ethical research.

Further, the research adopted a one-on-one survey administration approach facilitated by five trained and seasoned research assistants, including the researcher, who conducted constant spot-checks, which helped enhance comprehension, reduce bias, and improve the reliability of the collected data (Felix et al., 2024). For this study, the use of a research assistant was specifically crucial as it helped create a supportive environment for respondents, as there were faces they were familiar with, thus vital for building rapport while ensuring the respondents felt comfortable and offered honest responses. Also, the assistants were crucial in managing logistical challenges in data collection, enabling the administration of the survey with the 300 respondents promptly. Lastly, the RAs ensured consistency and reliability of data, as their direct involvement facilitated immediate clarification of questions, thereby minimising misunderstanding.

As the researcher, the selection of the five RAs was a strategic decision. Working closely with Nyanam International, the five were selected from their pool of youth leaders. These five had demonstrated leadership growth and foundational understanding of community engagement through their work at Nyanam International. Also, the pre-existing relationship and proven leadership made them the ideal candidates for the study. After selection, the researcher extended a formal invitation to each of the RAs, ensuring voluntary participation. Once they agreed, a comprehensive three–day training was organised in collaboration with Nyanam International, which offered the researcher a training venue. The training curriculum was designed directly from the study proposal and delivered through a PowerPoint presentation. This was complemented by other online resources providing RAs with the necessary skills to administer the questionnaires consistently, ethically, and effectively. This section included a mix of open-ended and closed-ended questions.

3.8 Fieldwork and data collection procedures

This study engaged widows' children in the Lake Victoria region under Nyanam International. Before data collection, the researcher and Nyanam International agreed on the study location based on the study objectives. Groups served by Nyanam International widows for over three years and located within the study area were included. The sampling included an intensive five-day engagement with the 17 selected widow-led groups in Kisumu West Sub-County that had been part of Nyanam International for over three years and whose children and grandchildren had benefitted from the organisation's programmes. This criterion ensured that those who benefitted from Nyanam International programmes were better placed to share the technology access, use and outcome gap (Knighton, 1998).

Before inviting the participants, the researcher developed a participant package to assist with the invitation process. These included a participant selection form in which parents were asked to write volunteer respondents' demographic details after consent; a respondents' invitation letter; a parent consent form; ethics letters from Rhodes University and the Kenya National Commission for Science, Technology, and Innovation; a signed agreement letter; and a one-page study brief, which was given to all the 17 groups to keep as a record. This ensured the study was both methodologically and ethically sound (Creswell, 2014; NEMA, 2009). The consent and documentation process was designed to ensure cultural sensitivity and relevance while still meeting Nyanam International institutional guidelines. Respondents' selection form adopted Nyanam International's community engagement forms as a deliberate choice to ensure collaboration (Bartley et al., 2008).

Through this approach, it was easy to build trust and align with what the widows were familiar with. The translation of the parent/guardian consent form established informed consent by providing vital information for parents and guardians in the native language, addressing the core of ethical requirements within vulnerable populations (Creswell, 2014; Action Aid, 2006).

Concurrently, the study maintained all formal documents, especially the ethics and gatekeeper letters in English, in compliance with institutional academic standards. However, the letters were

explained in the native language of the parents/guardians during all the information sessions. This demonstrated transparency, accountability and strengthened the relationship and trust between the researcher and the study community (Baishya, 2013).

From November 4th to 8th, 2024, the researcher conducted a comprehensive group-based information session over five days, visiting all the selected widow groups on regular meeting days and times. During the group visit session, the researcher shared the study's purpose, goals, objectives, rationale, benefits of participation, procedures for parental consent, procedures for participant assent, and the study's plans. The study exit for respondents was also clearly explained.

After each group information session and once the group members understood the study, they were allowed to ask clarifying questions, all of which were answered. Parents who agreed to have their children participate were invited to sign the parent/guardian consent form and provide relevant details, including the child's name, gender, age, and contact information.

The study specifically included children from the selected groups who had been involved with Nyanam International for at least three to four years. All respondents were between 13 and 18 years old. Only those children whose parents were willing and confirmed their availability to participate were recruited and included in the study.

The researcher targeted 18 children per group to ensure equal distribution and meet the study's target of 300 respondents. During the cluster group visits, the researcher noted that some groups had at least four children in total in the age (13–18 years) category during recruitment stage. Although the study had an earlier need, the group clustering aimed to achieve 18 respondents per group. However, it was clear that strict adherence to this fixed number would have compromised the study's sample size (Wolman, 1958).

Therefore, to ensure the study's viability and statistical power, the researcher made a pragmatic decision to increase the number of respondents in groups that had many respondents, were more reliable and willing to participate. This adaptive approach, even though not academically

appreciated, was necessary and effective in this specific study context. It helped maximise the opportunity to gather sufficient data (Knighton, 1998; NEMA, 2009).

To address this, we increased the number by five in the following groups and welcomed additional groups with 30 or more children within the age bracket to ensure an adequate sample size.

3.8.1 Training of Research Assistants for Data Collection

Data collection is crucial to research outcomes (Mugenda, 2003; Creswell, 2014). This study used face-to-face survey interviews as the primary data collection method. Before data collection, the researcher organised and conducted an intensive three-day training for five youth mentors from Nyanam International, aged 18 and older, who were selected and approved by the researcher and Nyanam International to serve as research assistants (RAs) for this study. This comprehensive training covered all study aspects, including an overview of the global digital divide, interview techniques, and practical instruction on using the Kobo-collect data collection tool (Blay, 2008; Nardi, 2015). Additionally, the training included role-plays and hands-on practice sessions to ensure that the RAs gained proficiency in data collection before fieldwork began (Glasow, 2005). This thorough preparation ensured the research assistants were fully equipped to conduct the study effectively, maintaining accuracy and consistency in the data collected (Felix et al., 2024).

Figure 4: A photo of the researcher while training the research assistants. Taken and used with consent from research assistants. Kisumu, Kenya. Copyright: the researcher.

3.8.2 Pilot test

Study piloting helps discover flaws within the instrument and allows for examining the reliability and validity of the survey questionnaires (Slatter, 2011; Mugenda & Mugenda, 2003). While ensuring the effectiveness of data collection, the study's survey questionnaire was tested on six children aged 13 to 18 in the pilot phase. During the research assistant training, one of the requirements was for each research assistant (RA) to test their interviewing skills and the tool with children close to them, such as their siblings or neighbours' children. The RAs noted personal interview challenges which included challenges in effectively understanding and relaying the question and technical issues during these tests where some questions in the survey tool missed some aspects. The researcher also tested the tool with her 17-year-old nephew. While conducting the pilot, all feedback was captured in notes and later gathered through structured one-on-one

feedback sessions during the final RAs training session. Based on this feedback, revisions were made to address issues related to the wording of intersecting questions, precisely question 29 on household income, which was adjusted to improve clarity and relevance. The survey questionnaire tool was updated to include a skip option for respondents who responded 'no' to a question that required further explanation. Piloting, therefore, played a crucial role in improving validity and ensuring reliability before the main study (Creswell, 2014; Orodho, 2009).

3.8.3 Actual Data Collection

After verifying that the recruited respondents met the study criteria, the researcher collaborated with Nyanam International's Monitoring and Evaluation team to develop a comprehensive data collection plan created in conjunction with the study research assistants. This collaboration ensured that widows were well-informed about the data collection schedule, including the time and venue, so that they could notify their children accordingly. A detailed data collection timetable was created (see Appendix). Nyanam International Widow Liaison personnel were contacted to communicate with the widows, which aligned with the Nyanam International established protocol for engaging with the community (NEMA, 2009).

The data collection process included four daily groups, with each interviewer responsible for conducting 12 interviews. On each data collection day, the researcher and assistants arrived 30 minutes early to ensure the venue (these were multiple venues where Nyanam International conduct their activities with the youth) was prepared and conducive to the interview process. Upon the respondents' arrival, the researcher conducted a one-hour information session, during which the study's goals, objectives, and participant roles were explained. Respondents were also informed about the voluntary nature of their involvement and were provided with consent forms. They were allowed to ask clarifying questions and were assured that participation would not result in tangible benefits and that they could exit at any stage (Cohen, Manion, & Morrison, 2011).

After obtaining informed consent, respondents received a unique study code pre-encrypted within the data collection tool. This confirmed whether respondents were registered, as 24 additional

respondents gathered at Nyanam International's annual youth event had not been entered into the system. A distinct list of codes was generated beforehand (Baishya, 2013).

With a code assigned, each participant was invited for a one-on-one interview, which lasted between 30 and 50 minutes, depending on how much time the participant needed to understand the questions. The questionnaire consisted of 43 questions, including two open-ended questions; the rest were closed-ended. Interviewers listened to the respondents' responses and selected the appropriate options based on their answers. The questionnaire was available in three languages to ensure clarity and understanding, allowing interviewers to switch languages as needed (Creswell, 2014).

Upon completing the interview, respondents were given a bottle of soda, biscuits, and a bar of soap as tokens of appreciation for their participation. Respondents who incurred transportation costs to attend the study exercise were also reimbursed and released to return home.

3.9 Data Processing and Analysis

Effective data management following collection is crucial for ensuring the success of a study and maximising the utility of survey responses. In this study, data were collected using both offline and online methods, with Kobo Collect serving as the primary tool. Kobo Collect facilitated the seamless gathering of electronic responses and data entry into the system. Prior to fieldwork, the researcher uploaded the survey questionnaires into the Kobo Collect platform and conducted pilot testing to confirm their accuracy and reliability. During fieldwork, all responses were recorded offline on tablets, and at the end of each day, the devices were synchronised with Kobo’s secure central server once internet connectivity was available. This method was especially vital in the remote study area, where internet access was often unreliable, ensuring both the efficiency of data collection and the integrity of data transfer to a central repository.

Kobo Collect also supported the initial stages of data analysis by simplifying data export and enabling graphical representations. All quantitative data were downloaded as Excel files and subsequently transferred to SPSS for cleaning and analysis, in line with the study objectives. The

dataset was carefully reviewed to remove incomplete responses and extraneous entries, and to verify the accuracy and completeness of information (Aday, 2006; Fink, 2009).

Quantitative data collected through structured questionnaires were analysed using both descriptive and inferential statistics (Kothari, 2004). Descriptive statistics included measures of central tendency, variability, and position, which were used to calculate frequencies, percentages, means, and standard deviations. These analyses were applied to capture demographic characteristics of respondents as well as their awareness of, access to, and ownership of technology, patterns of use, perceived benefits, and the barriers encountered. The results were presented using tables, bar graphs, and charts, which enhanced clarity and accessibility of findings.

In addition, qualitative data obtained from three open-ended survey questions were analysed thematically following Braun and Clarke's (2021) framework. This involved identifying, analysing, and reporting patterns (themes) within the data. The process began with familiarisation, where the researcher read and re-read the responses to develop an in-depth understanding of context. Next, initial codes were generated by systematically labelling relevant sections of text. These codes were then grouped into broader themes, which were reviewed, refined, and clearly defined to capture recurring narratives and meaning in the data. This approach ensured that the analysis was both comprehensive and credible.

Furthermore, a multivariate analysis was conducted to examine relationships between data sets, particularly to identify barriers related to technology access, usage, and outcomes. This approach followed the guidelines of Tabachnick et al. (2007) and enhanced the depth of interpretation. The integration of statistical and thematic analyses improved the robustness of findings and supported better data visualisation, thereby aiding comprehension and reader retention (Reuben, 2021).

The study findings were ultimately organised and presented thematically in line with the research questions. The flow of the survey results was expressed in prose and guided by the following core questions:

1. What are the demographic characteristics of the respondents?
2. What types of technology are widows' children aware of and have access to?
3. How do they access and use technology?
4. What are the outcomes of using technology?

5. What barriers hinder widows' children from accessing and using technology?

3.10 Research ethics

The researcher secured ethical approval from the Rhodes University Ethics Committee and the National Commission for Science, Technology, and Innovation (NACOSTI) in Kenya, as well as through a signed collaboration agreement with Nyanam International. The gatekeeper agreement was established following extensive email correspondence with the Founder and Executive Director of Nyanam International. Prior to data collection, Nyanam International reviewed all relevant study documents, including Rhodes University's ethics approval, and stated two key requirements: (1) mandatory acquisition of ethics approval from NACOSTI, and (2) a commitment to share the study results with both Nyanam International and the respondents upon completion of the study. The researcher met these conditions, and upon finalisation of the study results, the report will be shared with Nyanam International. In addition, a respondents' feedback meeting will be conducted.

In the field, informed assent and consent were obtained from all study participants. Parental consent was secured for children aged 13–17 years, while respondents aged 18 years and above provided direct consent. The study prioritised participant autonomy, privacy, and confidentiality while minimising associated risks (Creswell, 2014). On the day of data collection, participants were assured of confidentiality and informed that their responses would be recorded on a tablet, after which they were asked to provide consent. Confidentiality was emphasised at the beginning and end of each interview. Consent forms were available in both English and Luo, and each participant signed before the start of the interviews.

The consent form was translated only into Luo to ensure participants fully understood the study's purpose, their rights, and conditions of participation, in line with ethical standards of informed consent (Mugenda & Mugenda, 2003). Since the respondents were native Dholuo speakers, this translation removed language barriers and promoted ethical treatment of the study population. By contrast, the survey tool was translated into both Swahili and Dholuo to enhance methodological rigour and ensure flexibility. This allowed research assistants (RAs) to use whichever version

respondents were most comfortable with, switching between languages when necessary to provide clarity. This pragmatic decision ensured accurate and inclusive data collection.

3.11 Key lessons learnt

During the entire data collection period, the researcher gained key lessons that were instrumental in achieving sample reach and collecting reliable data. First was the importance of adopting a proactive and adaptive mobilisation strategy during fieldwork. Such strategies encouraged the participation and motivation of respondents, reduced dropout rates, and enhanced overall data quality.

Second was the centrality of collaboration with community partners in ensuring the success of the study. Conducting the study with a population the researcher had prior experience working with created an enabling environment for trust and mutual engagement. However, the process also highlighted the broader importance of collaboration in research, particularly for scholars entering communities where they have no prior relationships or experience (Cohen, Manion, & Morrison, 2018). Establishing a foundation of mutuality and trust is essential, as it reassures participants and facilitates their willingness to engage in the research process.

3.12 Credibility of research methodology

Quantitative research approach has four principles that ensure its credibility. They include validity which confirms if the study is measuring what it claims precisely; reliability-which ensures that the results are consistent and can be reproduced if the survey is conducted again; replicability-the researcher's ability to repeat the study and get similar results independently; and finally generalisability-which determines the extent to which the drawn conclusions can confidently be applied to another larger population (Shadish, Cook, & Campbell, 2002; Creswell & Plano Clark, 2011). For this study, this methodological approach was essential in realising the four mentioned principles.

3.13 Reflexivity

Even though reflexivity is majorly considered as the hallmark of qualitative study, this study employed reflexivity as a crucial part of demonstrating rigor and ethical practices. The researcher recognized that even in a quantitative study, a researcher's presence and decision-making does influence the research process and therefore it is vital for the researcher to actively consider how their own positionality and assumptions shaped the research (Finlay, 2002; Berger, 2015). Reflexivity is not just about avoiding bias but also about acknowledging it, thereby enhancing the study's transparency and trustworthiness.

In this study, reflexivity included documenting the researcher's self-reflection and that of the study research assistants, thereby providing a more honest account of the research process and a nuanced interpretation of the findings (Creswell & Creswell, 2018).

In this section the researcher reflects on the experiences of individuals involved in data collection for this study. As mentioned in the methodology chapter, I engaged five Nyanam International youth mentors trained for three days before starting the study. For most of them, this was their first-ever research engagement. The researcher held daily debrief sessions throughout the entire period to capture the research assistants' voices and experiences. This was a learning opportunity to provide support in data collection, to understand what they observed, and to reflect on what they learnt.

Further, I am glad to mention that the researcher and the research assistants' engagement did not end at data collection. The researcher and the study RAs are still in contact, and once the study is finalised, submitted to the university, and approved, together we will explore collaborative ways to collectively give feedback to our study respondents.

3.13.1 The Research Assistants

Research assistant 1

"Being part of this study has opened my eyes. From the training to interviewing the children, I realised we make many assumptions, like "Children are digital." However, through this study, I

have learnt that although I am aware of technology, it has limited resources, especially in rural communities and schools. Further, most of the respondents aged 13 -15 raise a complaint that their parents don't give or allow them to use phones, claiming that they will be prompted to pornographic movies. In addition to the parents' fear, most of the respondents I interviewed lacked the skills and access to trained teachers at school to provide them with the basics of technology and the internet. Those aged 16 to 18 had more access to the internet, and most of the respondents I interviewed could post online, use apps such as TikTok and Facebook, and use the internet for school programmes such as studying and searching for past papers."

***Research* assistant 2**

"Generally, most of the children I surveyed did not have access to technology due to high cost or poverty. Others also said it was because they were in school, while others attributed it to parental restrictions as a hindrance. This makes children think technology is bad. For instance, one of the children I interviewed shared that he only uses his brother's phone at night. This begs the question: What could the child do with a phone at night? However, the response is that's the only time the phone is accessible to him. Equally, for respondents aged 18, most had access to mobile phones or smartphones, possibly because they had completed secondary school. Most of them come from an average background; mostly, their mothers are casual workers.

Furthermore, I observed that some youth do not know how to study online; most only use it for communication. Those attending school are often not allowed to use mobile phones because their parents are strict. I believe public awareness of technology should be raised about the benefits and challenges of technology among children."

Research assistant 3

"I am glad to have been part of this team. One section of the survey, where we asked respondents about their family's socio-economic status, revealed many stereotypes among the children. When handling this question, most respondents were hesitant to share what their mothers or guardians did for a living. This is because their socialisation for income-generating activity only focused on

formal jobs as the best. Many gardeners have informal jobs like farming, washing clothes for others and house help."

Research assistant 4

"In every stage of these children's lives, there was parental involvement, which can be positive or negative, especially concerning children's access to and use of technology. Those I interviewed were wary of how their parents allowed or restricted the use of technology, and most of them requested that their parents be trained on technology so they could help them access and use it effectively. Equally, I had a range of respondents who were familiar with technology and those who were not. From my observation, those interviewed use technology and the internet for studying or entertainment and are only allowed to have phones once they complete secondary school."

Research assistant 5

"Most respondents I interviewed believed they should not have access to technology while still attending school. Further, many mentioned that age and family background were the main factors that hindered them from accessing technology. It was equally interesting to see that the most common and well-known technologies included television, radio and mobile phones. They shared one request: if they can be offered more technology training and equally be accorded access."

3.13.2 The Researcher

For me, 2024 was when I stepped out of my comfort zone to seek knowledge and advance my career. Grateful to be among the selected young African leaders for the Mandela Rhodes Foundation scholarship, and the desire to learn was piqued. I applied to Rhodes University and contacted four lecturers at the Department of Journalism and Media Studies to take me on as their supervisee. The amazing and highly accomplished Dr. Chikezie Uzuegbunam accepted me. This was great because, after reading his profile, we shared a common interest: an interest in children. This assured me of the incredible journey my two-year master's would be and what it has indeed been.

Returning to the academic world after three years in the industry wasn't easy. Throughout my existence, I have experienced pockets of anxiety with the thought of having to live in a different

country, far from my family, for two years. However, I braced myself because I needed to expand my sphere. Coming into Rhodes University, I wanted my research to focus solely on children's human rights. Why? Because to me, this was a pressing issue within the population of widows' children that I am serving. And as a human rights advocate, what better way is there than to let our hearts guide our academics? However, the universe had a different view. I remember talking to my supervisor, Dr. Uzuegbunam, during the initial proposal writing phases, trying to understand what issues were pertinent at this time, and technology was at the top of my list.

So, I leapt and had the faith to assess how my population (widows' children) at Nyanam International access, use, and enjoy the benefits of technology. My desire to ensure that while embarking on this critical work, the voices of these children are centred was so loud. So, I took the Afrofeminist research methodology course and was equipped with essential knowledge and skills to ensure that the community being researched is dignified and that knowledge is collectively generated. Truthfully, this course shaped my approach, and while my study population is exposed to a world of academics, I constantly reminded myself that I am here to learn and that they are the experts.

To show my intent, I translated my study tool, a survey questionnaire, into two languages widely spoken by the study respondents: Dholuo and Swahili. I also had an English version for respondents who were fluent in English. Fast forward to November 11th-14th, after ethics approval, gatekeeper acceptance, participant recruitment, and data collection. The five days of data collection were very enlightening. I remember being very anxious about respondents aged 13-18 years showing up and explaining to them, especially those aged 13-15 years, what I was doing, why I was with them, and the benefits that followed. These were huge questions.

I started all the sessions by recognising their willingness to be part of the study and simply explaining my research, why it is essential, and how they fit into it. All this was done in Dholuo, their native language, to ensure that no one was left behind or lost in the somewhat academic language research that it can pose. Over the days, the influx of respondents was different, and at some point, I struggled with low attendance, which had me going back to the drawing board on mobilisation. Doing studies with children requires intense mobilisation because 1) parents might forget the date, including letting their children go to the study location, or 2) children might be sent

to come and fail to do so. To ensure that children came, I coordinated more frequently with the Nyanam International widows' liaison officer, who called the group chairs to remind the widows in her group about the meeting and encouraged them to bring their children. I also called the next-day group every evening, reminding them of the data collection venue and time while encouraging them to send their children. Through this, I saw a positive turnout on the final data collection date, with the children coming in large numbers.

During the invitation, I was overwhelmed by the warm welcome the widows at Nyanam International accorded me. I was particularly motivated by their questions about the study and their desire to understand before committing to it. Their enthusiasm for supporting the research was evident in their willingness to let their children participate. One of the most heart-warming observations I made was their recognition of their children's independent decision-making throughout this process. Some mentioned, *"I'll have to talk to my kids before I make a decision."* Even though this was raised from both angles of respect for the child and fear that the child might refuse, for me as a researcher, it was a beautiful expression to witness, understanding how research with children is a delicate project.

During data collection, I observed some things, including how widows' children were significantly aware of information and communication technology. I also noticed how the digital divide was evident, as despite most respondents having awareness, their access to these devices and services was limited or restricted, mainly due to household sharing and parental permission. Many shared that their parents did not allow them to use technology. Equally astonishing was how most children were quick to share about the negative side of the internet and had limited positive experiences. This emphasised the existing stereotype in communities not vastly exposed to the world of technology and the internet.

As a researcher, I learnt much from mobilisation, data collection, and effective power balance throughout this study. For mobilisations, it was refreshing to appreciate the power of ongoing mobilisation throughout a study period. As one of the main activities, mobilisation continued to be essential and an ongoing activity throughout the data collection phase. I was pleased to realise that mobilisation doesn't stop at first contact, as it continuously ensures the target population is met and engaged in the study. This study population is considered among the most vulnerable within the

research arena. Often, engaging children requires keenness, as they are a sensitive and time-consuming population. I appreciated the patience this offered me because, with children, I had to ensure that every child responded to the questionnaires at a different pace, taking the time to bake for them. Therefore, researchers must provide quality time for child study respondents to be seen, heard, and feel safe. Reaffirming to a child their position and power in the study was a powerful way of getting them to open up and share more. This allowed them to own the power and feel centred in the study. I constantly re-emphasised to the study respondents that they were the experts, thus ensuring the balance in power dynamics, which is vital for their openness and allows them to feel valued and appreciated.

3.14 Chapter Summary

This chapter outlines the essential procedures for ensuring adequate data collection. It captures the holistic approach to exploring the study subject: access to and use of technology among widows' children in the Lake Victoria Region in Kisumu, Kenya (Shadish et al., 2002). A quantitative method was used to examine the level of access to opportunities and the challenges of accessing technology among widows' children, and to create a foundation that local organisations can use to promote and improve the educational outcomes of widows' children (Shadish et al., 2002). The analysis section is grounded in providing insightful descriptive evidence while highlighting the interconnectedness of access, use, and outcomes of technology (Shadish et al., 2002).

As Finlay (2002) notes, participants' engagement is critical in validating the need and importance of a study. Respondents showed up at the beginning of the data collection process, and their engagement was good (Finlay, 2002). However, in the days that followed, there was a slight decline in the number of respondents who showed up. This was attributed to the fact that some were still in school taking their final year national examinations, while others had not received communications effectively and on time (Finlay, 2002). To mediate, a different communication and mobilisation strategy was adapted, which included daily evening and early morning calls for the groups to be met on the day of data collection. This was reinforced through close collaboration with the Nyanam International widows' liaison, who made quick reminder calls to all groups yet to be visited, urging them to send their children to the venue on the designated day (Finlay, 2002). This experience

underscored the importance of deploying a robust mobilisation approach to ensure participant turnout, especially in resource-constrained settings and studies (Finlay, 2002).

Similarly, Shadish et al. (2002) emphasise the importance of contextual awareness in quantitative research. During the study, it was observed that most respondents were highly aware of various technologies, including communication (television, radio, mobile phones, and smartphones), domestic appliances (washing machines and microwaves), and transportation (cars, motorbikes, and aeroplanes) (Shadish et al., 2002). This observation provided valuable insight into the importance of contextualising technology interventions and building upon participants' existing knowledge about digital technologies and their perceived benefits (Shadish et al., 2002).

Finally, Finlay (2002) reminds us that reflexivity extends beyond qualitative research. In this chapter, I reflect on my positionality and experience as a researcher, as well as the experiences of the study research assistants (Finlay, 2002). Their voices and reflections were central to this study, offering valuable insights into the process and enhancing the credibility and trustworthiness of the findings (Finlay, 2002).

CHAPTER 4: ANALYSES AND FINDINGS

4.1 Introduction

This study, conducted in Kisumu West Sub-County, Kenya, covered five wards within the constituency: Osiri, Kisian, Airport, Sabako, and Nyahera. The primary focus was to assess access to and use of technology among children of widows in the Lake Victoria region of Kisumu, Kenya. The research aimed to evaluate the level of access to technology, opportunities, and challenges that widows' children face in using these technologies. Additionally, it sought to establish a foundation on which local organisations can base strategies to improve the educational outcomes of widows' children, thereby enhancing their access to opportunities for growth and development.

This chapter presents the study findings demonstrating the diverse levels of access, usage, and technology outcomes among widows' children in the Lake Victoria region. Through a mixed method approach, the combination of descriptive, inferential and thematic analysis, the chapter presents four main themes: (1) technology awareness, access, and availability; (2) skills and usage; (3) perceived benefits of technology and its usefulness; (4) barriers to accessing technology.

In addition, this analysis explores the intersection of the digital divide and social factors, specifically widowhood status and stigma, to understand their potential impact on widows' children's access to and use of technology. By providing a holistic and contextualised understanding of the digital divide among widows' children, this chapter illuminates the challenges and opportunities that directly impact access to and use of technology, including access to quality education. This contributes valuable insights in addressing the digital divide among vulnerable child populations. The findings are presented in the order of the study's research questions, exploring the different aspects of each research question. I introduced the demographic findings, followed by research questions 1, 2, 3, and 4. Finally, I included an intersecting section addressing the four study hypotheses and presented the tested correlations.

4.2 Demographic characteristics

This study sampled and interviewed 300 children of widows. Of the total number of study respondents (widows' children) 156 (52%) were girls and 144 were boys (48%), as illustrated in the figure 4 below.

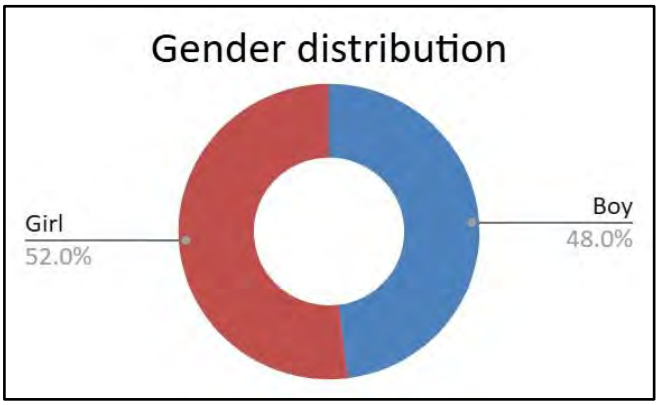

Figure 5: Gender distribution

4.2.1 Age distribution

The youngest respondent was 13 years old, while the oldest was 18 years old. Most children interviewed were between 17 and 18 years old, as shown in the table 4 below.

Table 4: Age distribution of widows' children

Ages	N	Percent
13 Years	46	15%
14 Years	50	17%
15 Years	35	12%
16 Years	50	17%
17 Years	64	21%
18 Years	55	18%

Total	300	100%

The children's ages ranged between 13 and 18 years. The average age is estimated to be 16 years, with a standard deviation of 1.8, indicating that most children's age values fall about 2 years below the mean age.

Table 5: Age Descriptive summary

Variable	**Mean age**	**Standard Error**	**Median age**	**Standard Deviation**	**Minimum age**	**Maximum age**
Age (years)	16	0.106	16	1.831	13	18

4.2.2 Youth Mentorship Groups

Most widows' children (15%) were engaged in the Lao Bang Dwar youth mentorship group. The Kisian railways mentorship group had the second-highest number of children, at 9%. In comparison, the Koyiengo youth mentorship group had the fewest children engaged (2%), despite having many volunteers, as shown in the figure below.

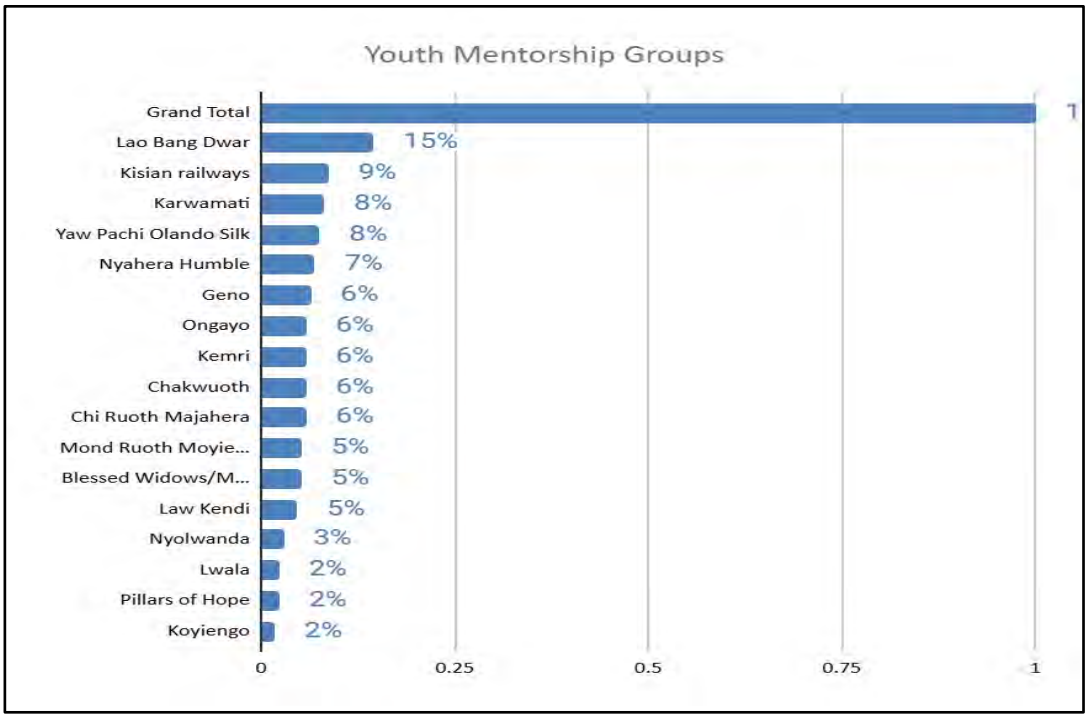

Figure 6: Youth mentorship Groups' Representation

4.2.3 Academic Qualifications

Of the 300 total respondents, 198 children had attained the secondary school academic qualification, which accounted for 66% of the total children. Respondents who indicated that their highest educational qualification was primary were 79, accounting for 26% of the children. Only three children, who accounted for 1% of the children, had attained a university-level education. Two had college academic qualifications, and one indicated that he had never attended school. In contrast, about 5.7% of the children had either completed school or were in junior secondary level.

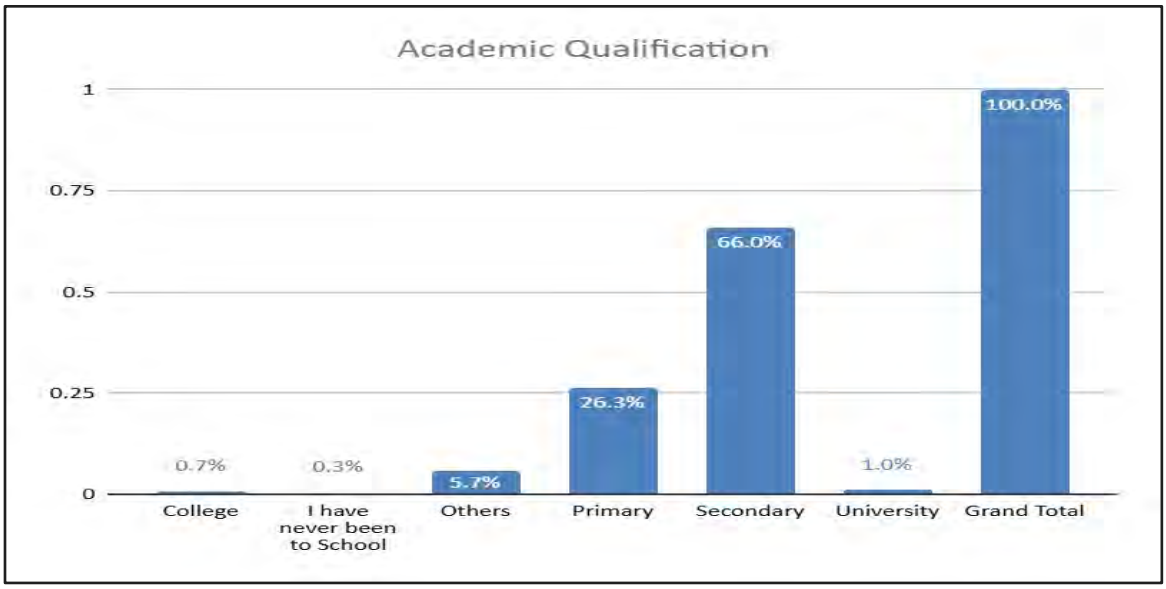

Figure 7: Highest academic qualification

The table 6 below presents the summary statistics for the widows' children's academic qualifications, which are tracked across three key subcategories: completed, junior secondary, and ongoing. Among the primary school children, only two had completed the primary level of education, while 77 were still finishing their primary studies. This accounts for 3% and 97% of the total. Among the secondary school children, 30 (15%) had completed their secondary studies, while 168 (85%) were still undergoing secondary education. There were only two, both of whom were still pursuing their college education. The analysis also shows challenges in accessing tertiary education for the widows' children since they are poorly represented in numbers. College education, for instance, had two children, all of whom were still pursuing their college studies. In contrast, university education had three children – one had completed university education, and two were still pursuing it.

Table 6: Academic qualification levels

Academic Qualification	**Completed**		**Junior secondary**		**ngoing**		**Grand Total**
	n	**%**	**n**	**%**	**n**	**%**	
Primary	2	3%	0	0%	77	97%	**79**
Secondary	30	15%	0	0%	168	85%	**198**

College	0	0%	0	0%	2	100%	**2**
University	1	33%	0	0%	2	67%	**3**
Others	2	12%	15	88%	0	0%	**17**
Total	**35**	**12%**	**15**	**5%**	**249**	**83%**	**299**

4.2.4 Family Financial Situation

The figure below indicates that most widows' children's families (57%) had an average financial situation, suggesting that more than half of the families could maintain a moderate financial standing. Thirty-seven per cent (37%) of the families were financially disadvantaged, which would imply that more than a third of the widows' families undergo significant economic hardships and challenges. Only three per cent (3%) of the widows' families are financially disadvantaged, and the other three per cent (3%) are very disadvantaged financially.

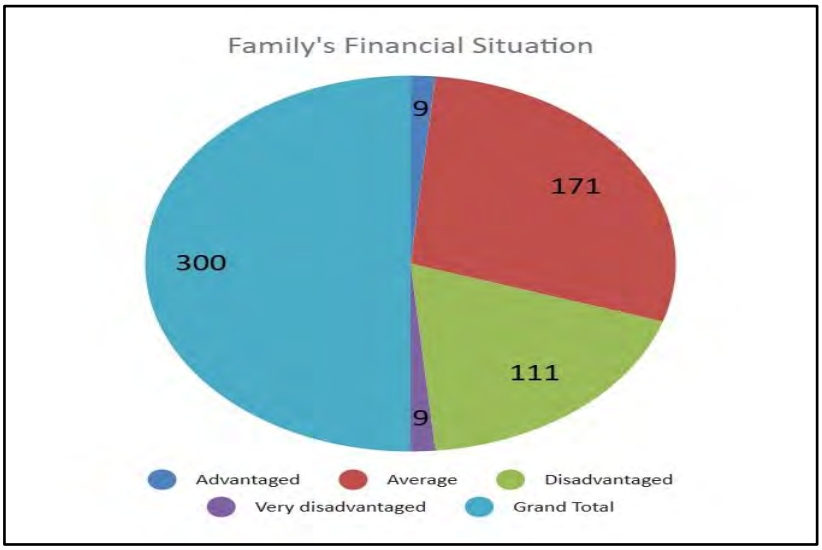

Figure 8: Family's financial situation

Generally, 40% of the widows' families, including 37% for disadvantaged families and 3% for very underprivileged families, need financial aid from support groups and programs that would help their children have easier access to technology.

4.3 Research question/objective one: What types of technology are widows' children aware of and have access to?

In this section, the study describes the respondents' level of access to technology based on five multiple-choice questions that assess awareness, availability, ownership, and access to tech devices.

4.3.1 Do you know what technology is?

Among the widows' children interviewed, there seems to be a significant understanding of technology. This is illustrated in the table below, where 94% of the children indicate that they know what technology is, while 6% indicate that they are unaware of it.

Table 7: Knowledge of technology

Do you know what technology is?	N	%
No	17	6%
Yes	283	94%
Grand Total	300	100%

4.3.2 What type of technology do you know/are you aware of?

Television are the most well-known type of technology among the widows' children, with 207 children out of 283 (73%) aware of them. Mobile phones, smartphones, computers, and radios are also the most well-known types of technologies, with more than half of the children who know what technology is being aware of them. Tape recorders, film projectors, games, and digital cameras are the least known types of technology among the widows' children, and less than 5% of them were aware of them. Forty-nine per cent (49%) of the children indicated they were aware of other technologies, including aeroplanes, calculators, cars, laptops, and cooking technology.

Table 8: Technologies that children are aware of

Type of technology	N	N	Percent
Tape recorder	6	283	2%

Film projector	6	283	2%
Games	10	283	4%
Digital camera	12	283	4%
Tablets	95	283	34%
Other	139	283	49%
Radio	155	283	55%
Computers	179	283	63%
Smartphones	180	283	64%
Mobile phones	182	283	64%
Television	207	283	73%

4.3.3 Which of these technologies is available in your home?

The figure below shows the availability of technology among the widows' families. More families own mobile phones, smartphones, televisions, and radios than do not. On the other hand, most families also lack computers and tablets at home. Technologies like games, digital cameras, tape recorders, and film projectors also show limited availability. Despite the substantial availability of mobile phones in these households, the disparity in mobile phone and computer technology could have significant implications for access and digital literacy among these households.

Table 9: Technology availability

Technology	Available at home/yes	Available at home/no	Total
Mobile phones	96%	4%	100%
Smartphones	77%	23%	100%
Television	62%	38%	100%
Radio	82%	18%	100%
Computers	4%	96%	100%
Games	10%	90%	100%
Digital camera	0%	100%	100%
Tablets	7%	93%	100%

Tape recorder	0%	100%	100%
Film projector	0%	100%	100%

4.3.4 Who in your family owns this technology?

The table below shows that the most commonly owned technological device is a mobile phone, with 106 children reporting that it is their mother's. Mothers own the most available devices, such as mobile phones, smartphones, Televisions, and radios, respectively, followed by grandmothers and siblings.

Table 10: Technology Ownership

Devices	Mother	Brother	Sister	Grand mother	Relatives	Other	None
Mobile phones	106	32	22	54	16	11	0
Smartphones	64	53	35	17	25	9	2
Television	86	6	3	32	12	3	1
Radio	84	10	1	42	5	3	1
Computers	1	5	0	0	0	1	0
Games	0	1	0	0	0	0	0
Digital camera	0	0	0	0	0	0	0
Tablets	2	2	0	0	2	1	0
Tape recorder	0	0	0	0	0	0	0
Film projector	0	0	0	0	0	0	0

4.3.5 Which technology do you personally own?

Of 283 widows' children who are aware of and have access to technological devices at home, only 32 (11%) owned mobile phones, followed by 33 (12%) owning smartphones. Devices like televisions and radios had ownership rates of less than 5%.

Table 11: Personal ownership of tech devices

Technology ownership	Yes	Total	Per cent
Mobile phone	32	283	11%
Smartphones	33	283	12%
Television	1	283	0%
Radio	10	283	4%
Computers	1	283	0%
Tablets	4	283	1%
Others	5	283	2%

4. 4 Research question/objective 2: How do they access and use technology?

In this section, the study describes how the study population accesses and uses technology.

4.4.1 How do you access the technologies at home? Through whom do you have access?

The following figure shows the descriptive analysis of widows' children's access to technology. For each medium of technology access, the percentages are computed column-wise out of 283 children who knew what technology was for. As shown in the figure below, more than half of the children who knew what technology is (67%) accessed technology through their mothers. Siblings also play a crucial role in accessing technology, with 23% of children doing so through their siblings. In comparison, less than 5% of children access technology through their friends, neighbours, and at school. Twenty-four per cent (24%) of the children indicated that they access technologies at home using other people's devices, such as their grandmother's, uncle's, aunt's, or their own.

Table 12: Various technologies widow's children access

Technology access through	Yes	Per cent	N
Mother	190	67%	283
Siblings	67	24%	283
Friends	12	4%	283

Neighbour	15	5%	283
School	11	4%	283
Other	67	24%	283

4.4.2 What do you use the technology for?

The study population use technologies in various ways, as shown in the figure below. For most people, communication technologies mainly include mobile phones and smartphones, which are used for communication as well as for studying, playing video games, entertainment, and completing homework. Televisions and radios are mainly used for entertainment by children in these households. A few children use televisions to learn new skills, play video games, study, and network, among other uses, such as watching the news. Children from these households rarely use different technologies, such as computers, video games, tablets, tape recorders, film projectors, and digital cameras, probably because they are unavailable or difficult to access.

Table 13: Usage of technology

Technology	**Used For**								
Technology	**Communication**	**Meeting/ networking**	**Do Homework**	**Studying**	**Play Video Games**	**Entertainment**	**Learn New Skills**	**Promote Business**	**Other**
Mobile phones	107	7	9	32	41	43	5	0	32
Smartphones	65	14	28	67	61	78	17	0	10
Television	4	2	1	14	9	122	9	0	20
Radio	3	0	0	10	2	108	8	2	30
Computers	1	2	1	3	0	3	1	0	0
Games	0	0	0	0	1	0	0	0	0
Tablets	1	1	1	4	3	4	2	0	1

Tape recorder	0	0	0	0	0	0	0	0	0
Film projector	0	0	0	0	0	0	0	0	0
Digital camera	0	0	0	0	0	0	0	0	0

4.4.3 How frequently do you use the technology you mentioned having access to?

The table 14 indicates the frequency of technology among widows' children. For respondents who mentioned having access to mobile phones, 33% use them daily, 27% use them twice a week, and 23% use them only once a week. A tiny proportion (1%) of the children indicated that they use them once a year, while those who use them once a month were only 6%.

Table 14: Frequency of technology use

Frequency	Mobile phones	Smartphones	Television	Radio	Computer
Daily	33%	39%	82%	77%	13%
Never	11%	12%	1%	4%	50%
Once a month	6%	4%	3%	3%	
Once a week	23%	17%	5%	9%	
Once a year	1%				
Two times a week	27%	27%	9%	7%	38%

Most children with access to smartphones (39%) use them daily. This is followed by 27% of the children who use them only two times a week. Only 4% of the children use smartphones once a month. The table also shows that most children with access to television and radio technology use them daily. This accounts for 82% and 77% of the children for television and radio, respectively. Further, it's essential to note that among those with access to computers, only 13% of children use them daily, 38% use them weekly, and 50% never use them.

4.4.4 How confident do you feel using the technology you have?

As shown in the figure below, most children are confident using the technology they can access. A smaller percentage of children lack confidence in using these technologies and are neither very confident nor completely confident.

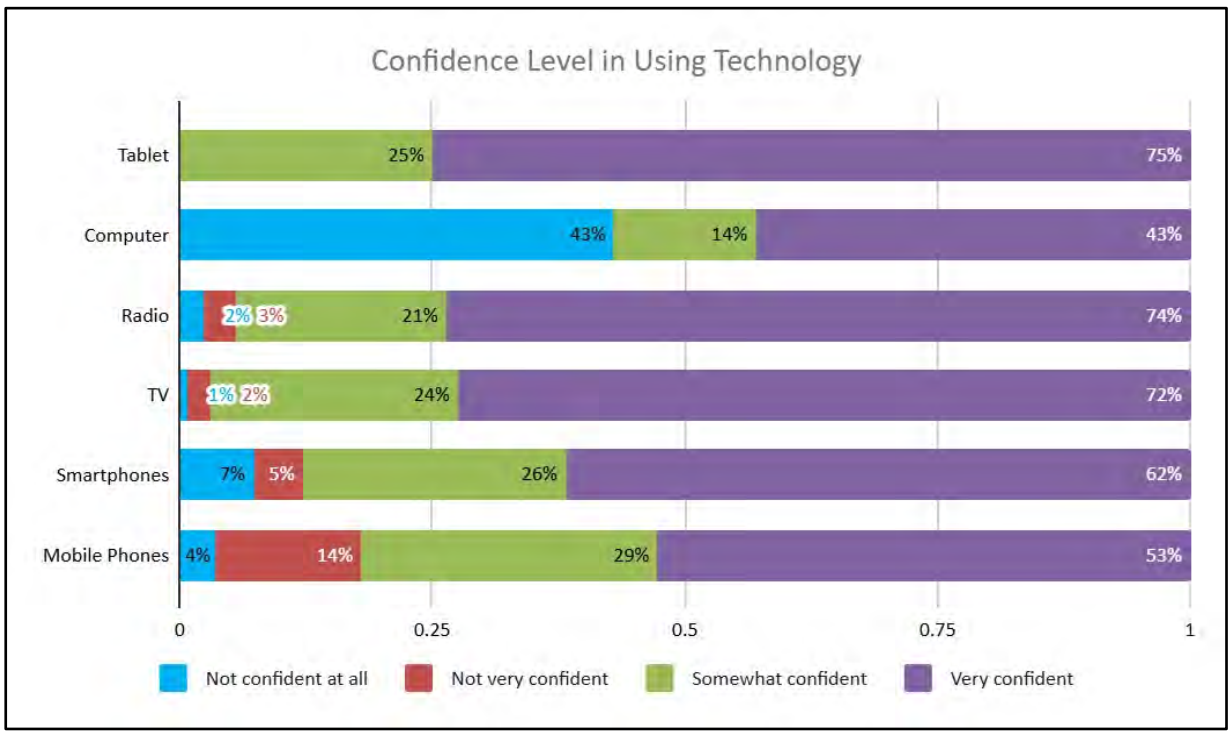

Figure 9: Confidence level in using technology

The data representation above shows that 75% of the children had high levels of tablet use despite only 7% having access to tablets at home. In this context, tablets are easily accessible outside the home, which increases their use since they are often found in their neighbours' spaces.

4.4.5 Do you have the needed skills to use the technology properly?

The analysis indicates that over half of the children have the necessary skills to use technology appropriately. Twenty-eight per cent (28%) of children do not have the essential skills, while only 4% are unsure whether they do.

Table 15: Needed skills to use technology properly

Have the Skills Needed?	N	Percent
I don't know	12	4%
No	85	28%
Yes	203	68%
Grand Total	300	100%

4.4.6 What skills do you have?

For the children with the skills needed to use the technology properly, 72% know how to operate the devices (operating being able to open and close the device safely), 70% know how to handle the devices (handle meaning know how to navigate through the device) , and 14% have other skills, such as the ability to recharge scratch cards, codes, change television channels, connect Bluetooth, and perform MPESA transactions, among others.

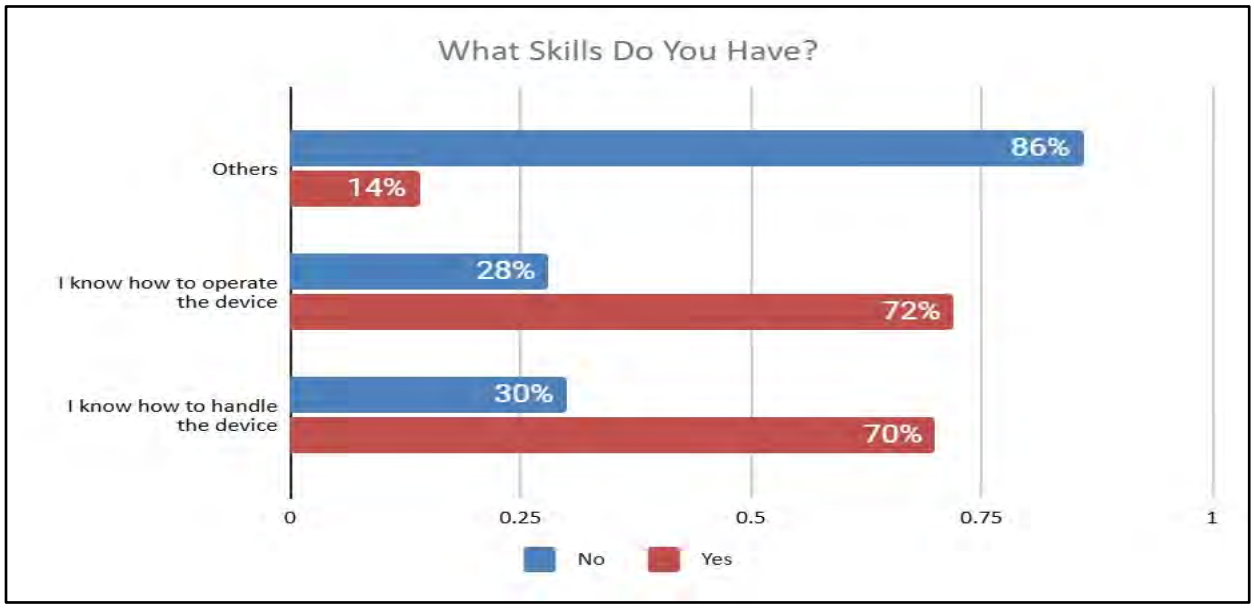

Figure 10: Skills possessed by children

It is essential to underscore that the study tested basic skills for operating technological devices. However, technological skills require various skills, from operation to safety mechanisms, which this study did not examine.

4.4.7 Do you have internet access?

As shown in the table below, more than half of the children (56%) have internet access, while the remaining 44% do not.

Table 16: Do you have access to the internet

Do you have internet access?	N	Percent
No	132	44%
Yes	168	56%
Grand Total	300	100%

4.4.8 How do you access the internet?

Of the 56% of children with internet access, 78% access it through broadband connectivity, 5% use home Wi-Fi, and 16% use other means, such as using a company's, neighbour's, or someone else's Wi-Fi system or buying data bundles. Only one child, 1%, accesses the internet using a cybercafé, as shown in the figure below.

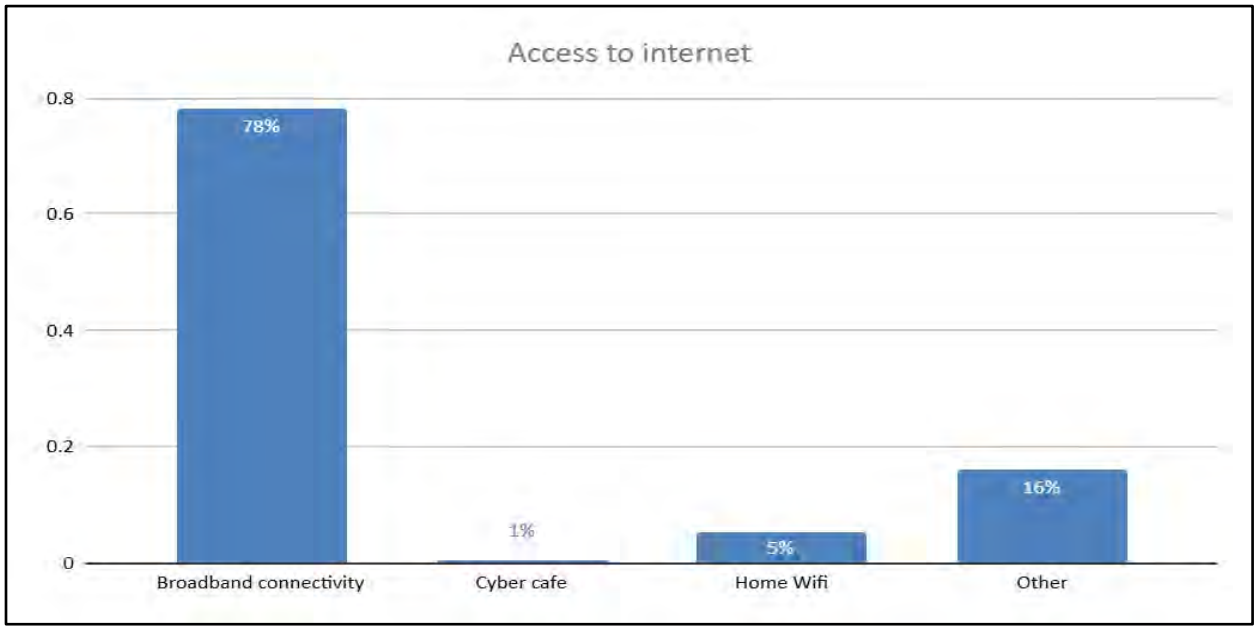

Figure 11: Access to the internet

4.4.9 At what age did you first access the internet?

The figure below shows the age distribution of the children who first accessed the Internet. The 10-14 age group had the highest number of children who first accessed the Internet, followed by the 15-18 age group. The analysis indicates that children rarely access the Internet until they are 10 years old.

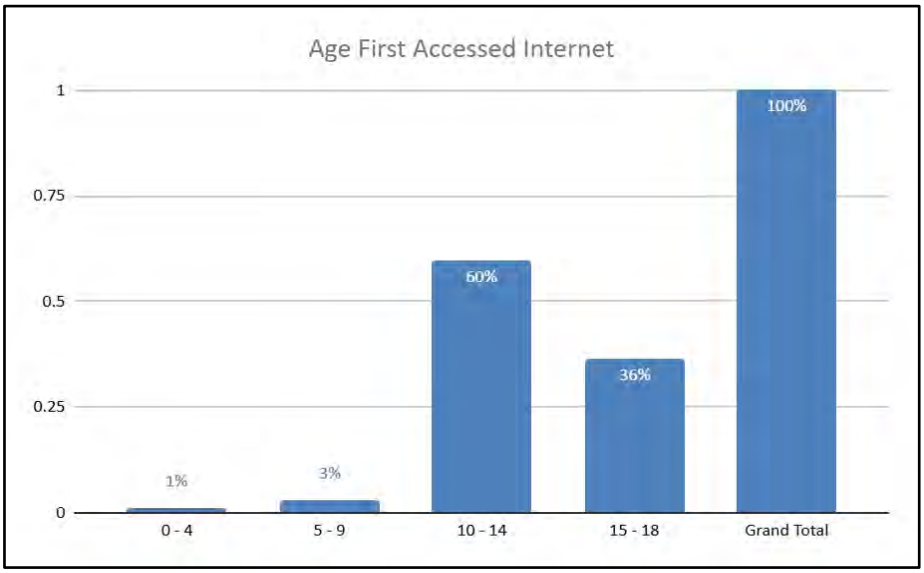

Figure 12: Age at which first accessed the internet

4.4.10 Do you need permission to use the internet or technology?

The analysis shows that 76% of children need permission from their parents or guardians to use the Internet or technology, while only 24% do not.

Table 17: Permission to use the internet

Do you need permission to use the internet or technology?	Percent
No	24%
Yes	76%
Grand Total	100%

4.4.11 Technology and Internet Usage

In this section, the study describes how widows' children use technology and the Internet in varied ways. The devices and services are deployed in issues ranging from communications to education.

4.4.12 How frequently do you use the internet?

The figure below shows the frequency of internet use among widows' children. The analysis shows that 39% of the children use the internet daily, with % using it once a week being the second most common, at 21%. Nineteen per cent (19%) of the children use the internet only two times a week, while less than 10% use it once a month or less than once a year.

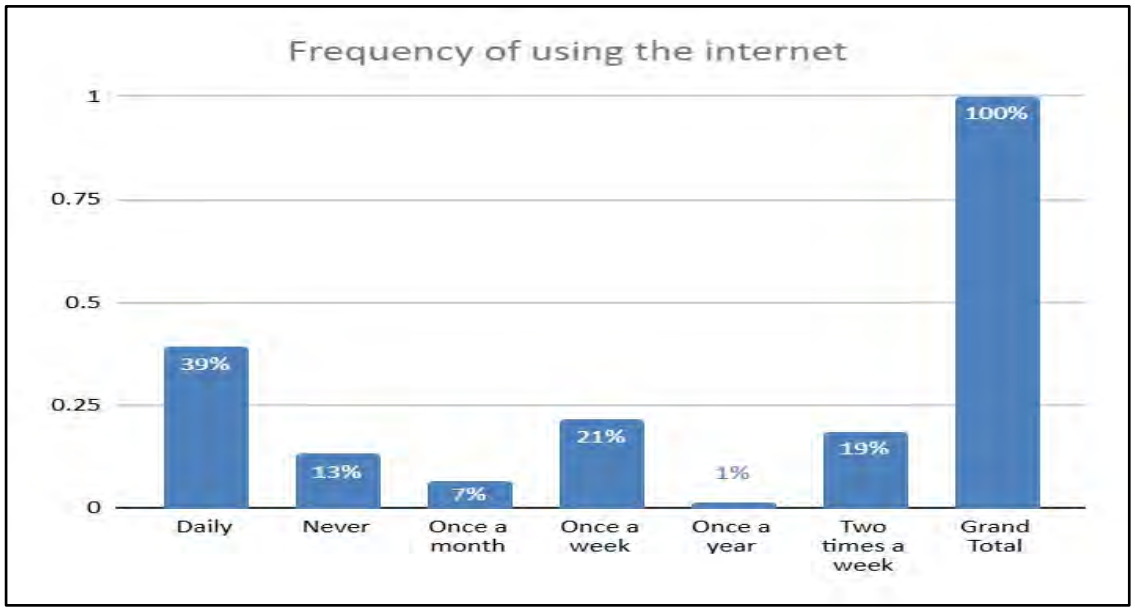

Figure 13: Frequency of using the internet

4.4.13 Can you use the internet or technology whenever you want?

While a significant proportion of children (35%) can sometimes use the Internet wherever they want, 32% cannot, as shown in the figure below. Often, 15% of children use the Internet wherever they want.

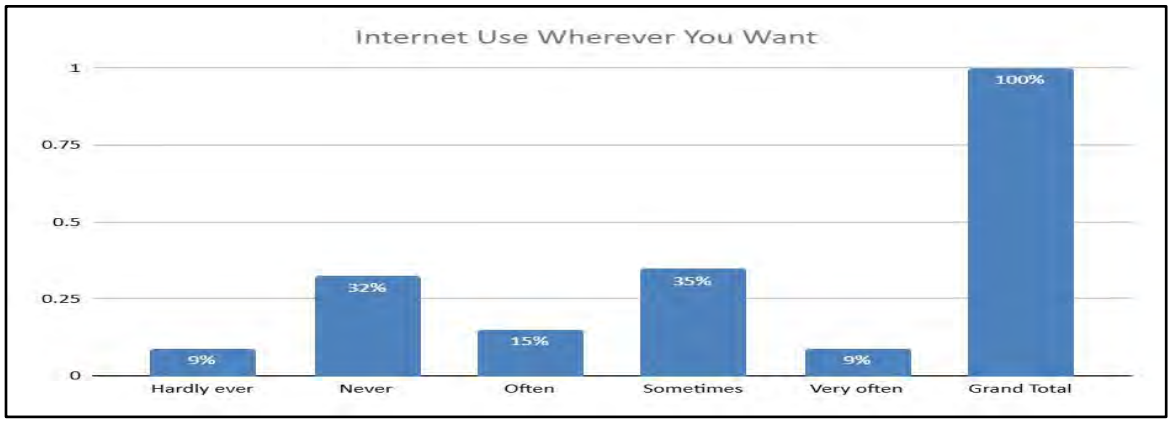

Figure 14: Internet use wherever you want

4.4.14 How confident are you in using the internet?

The analysis shows that 36% of the children are very confident when using the internet, 23% are somewhat confident, and 17% are not very confident. As the figure above shows, ten per cent (10%) of the children are unsatisfied with internet use.

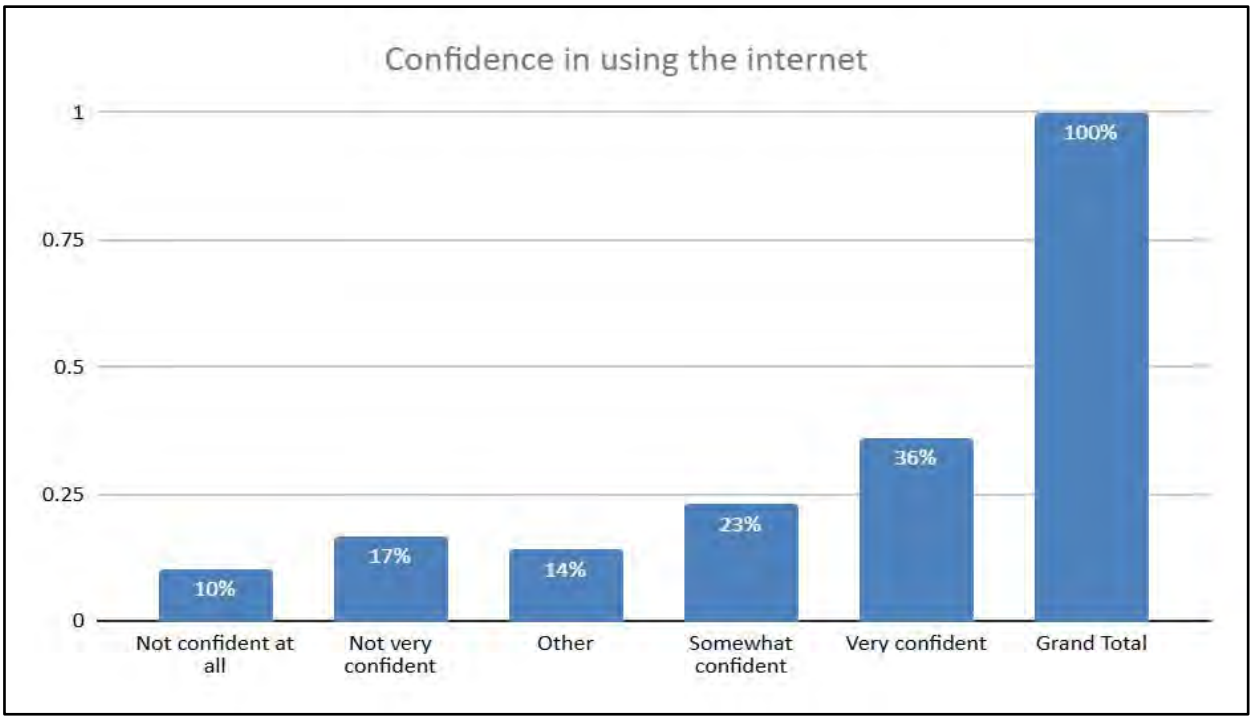

Figure 15: Confidence in using the internet

4.4.15 Do you have the needed skills to use the internet?

More than half of children (54%) have the necessary Internet skills, while 37% do not. Only 9% of the children have no idea whether they have the skills to use the internet properly.

Table 18: Do you have the skills needed to use the internet?

Do you have the skills required to use the Internet?	N	%
I don't know	26	9%
No	111	37%
Yes	163	54%
Grand Total	300	100%

4.3.16: Which skills do you have?

The figure above clearly indicates that the children possess a variety of skills. These include searching for things online using browsers (23% of children), opening downloaded files (20%), making new friends online (13%), and using social media apps (12%), among other activities.

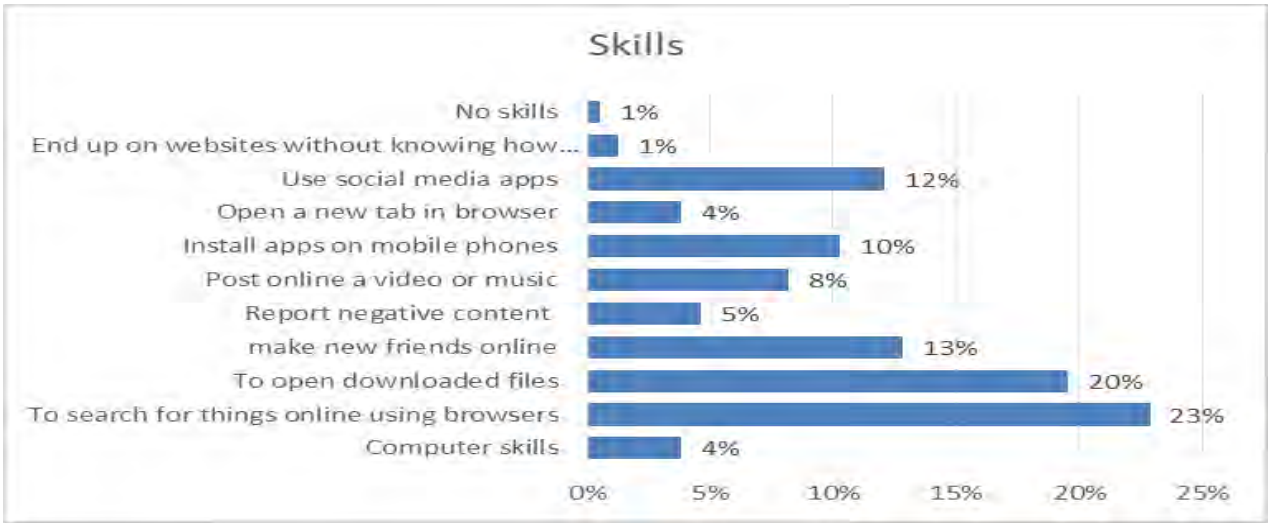

Figure 16: Skills that children have

4.4.17 How did you acquire these skills?

Of the 163 respondents who mentioned having skills in using technology, 120 reported that they had acquired these skills from various sources. 25% had been taught/learned from their siblings (brother or sister); 21% from their friends; 18% self-taught, primarily through observation; and 14%, 13% and 9% from their parents (mother, father or grandmother), school, and relatives (aunts, uncles and cousins), respectively.

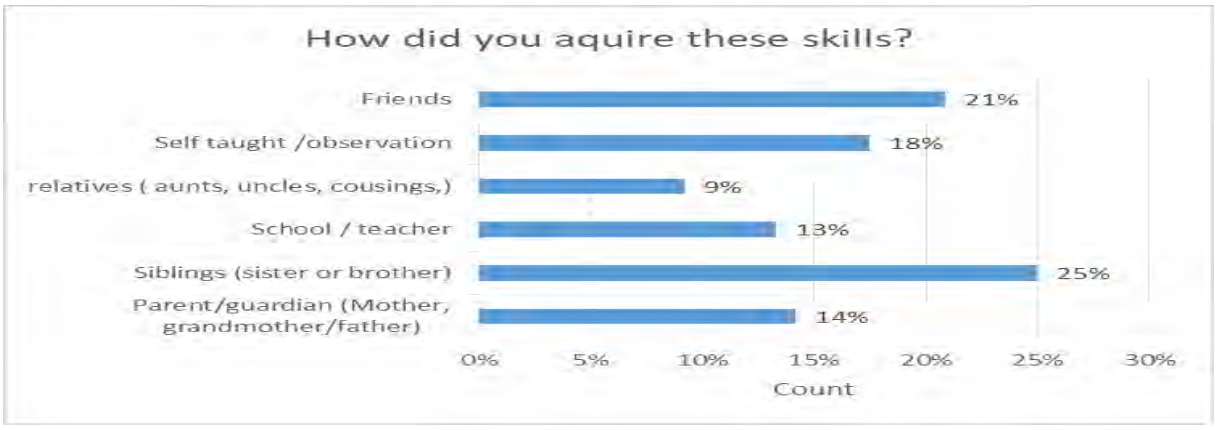

Figure 17: Acquired skills through

4.4.18 Benefits of using technology

As seen in the figure below, technology has benefited widows' children in communicating with friends. 48% of the children use it for this purpose. 47% of the children also use it for studying, while 44% use it for entertainment. Other benefits of using technology that the widows' children experience include learning new skills, connecting with family, doing homework, and playing video games.

Table 19: Benefits of using technology

Technology Benefits	n	Percent
Promoting business	8	3%
Networking with new people	35	12%
Playing games	54	18%
Doing homework	55	18%
Connecting with family	89	30%
Other	109	36%

Learning new skills	115	38%
Entertainment	131	44%
Studying	140	47%
Communicating with friends	145	48%

4.4.19: Do you have a good time using the internet?

Not all children have a good time using the internet. 36% (30% never and 6% hardly ever) of the children indicate this. Some children have a good time when they go online. 34% of the children (19% often and 15% very usually) support this, while 29% sometimes have a good time when they go online, as summarised in the figure below.

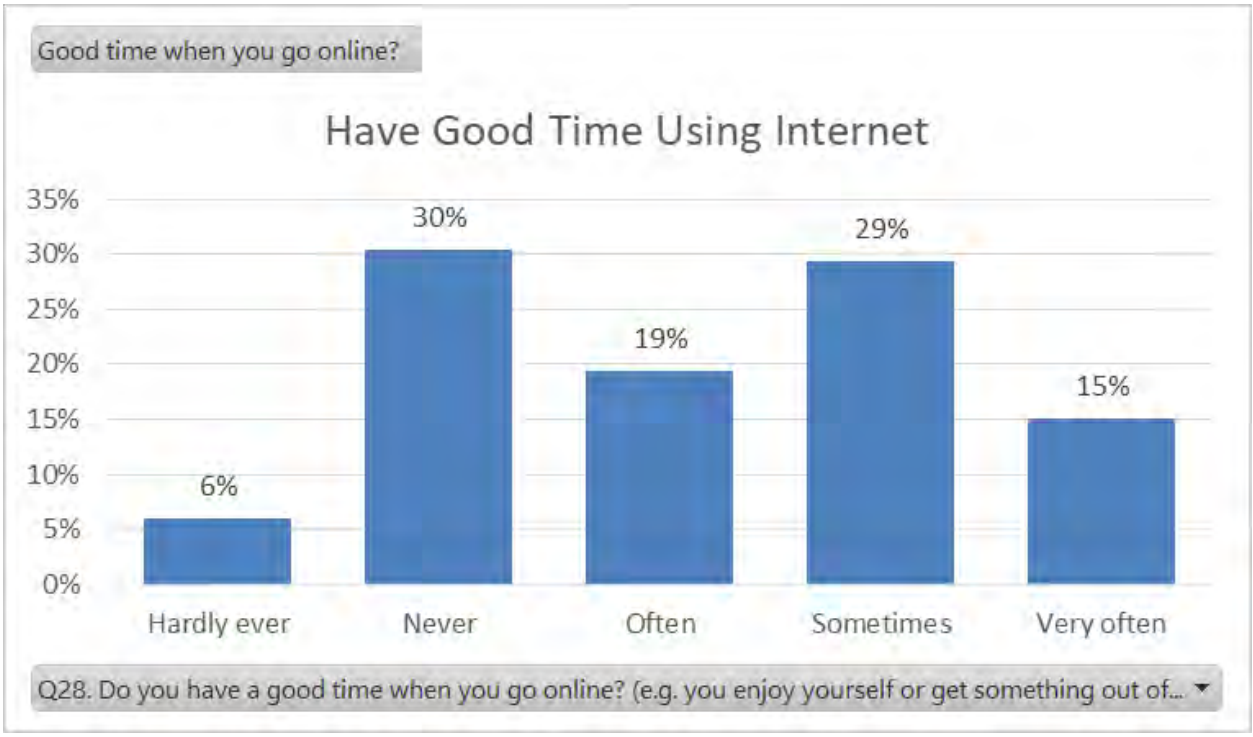

Figure 18: Have a good time using the internet?

4.5 Research question/objective three: What are the outcomes of using technology?

This section demonstrates the output that widows' children receive and experience using the internet and technology. It describes what they perceive as the most substantial outcome of use.

4.5.1 Are there good things on the internet for children?

80% of children believe that there are bad things on the internet that could negatively affect them. Meanwhile, 14% of the children are not confident about whether there are bad things on the internet for kids. Only 6% do not think there are bad things on the internet that could negatively affect children.

Table 20: Good things on the internet

Are Bad things on the internet that can negatively affect children?	n	%
I am not sure	43	14%
No	17	6%
Yes	240	80%
Grand Total	**300**	**100%**

4.5.2 What are some of the good things on the internet for children?

More than 60% indicated that the internet helped improve their education and learning. Approximately 35% indicated that the internet helped them relax and have fun with their children, while 30% said it helped them communicate and strengthen family relationships.

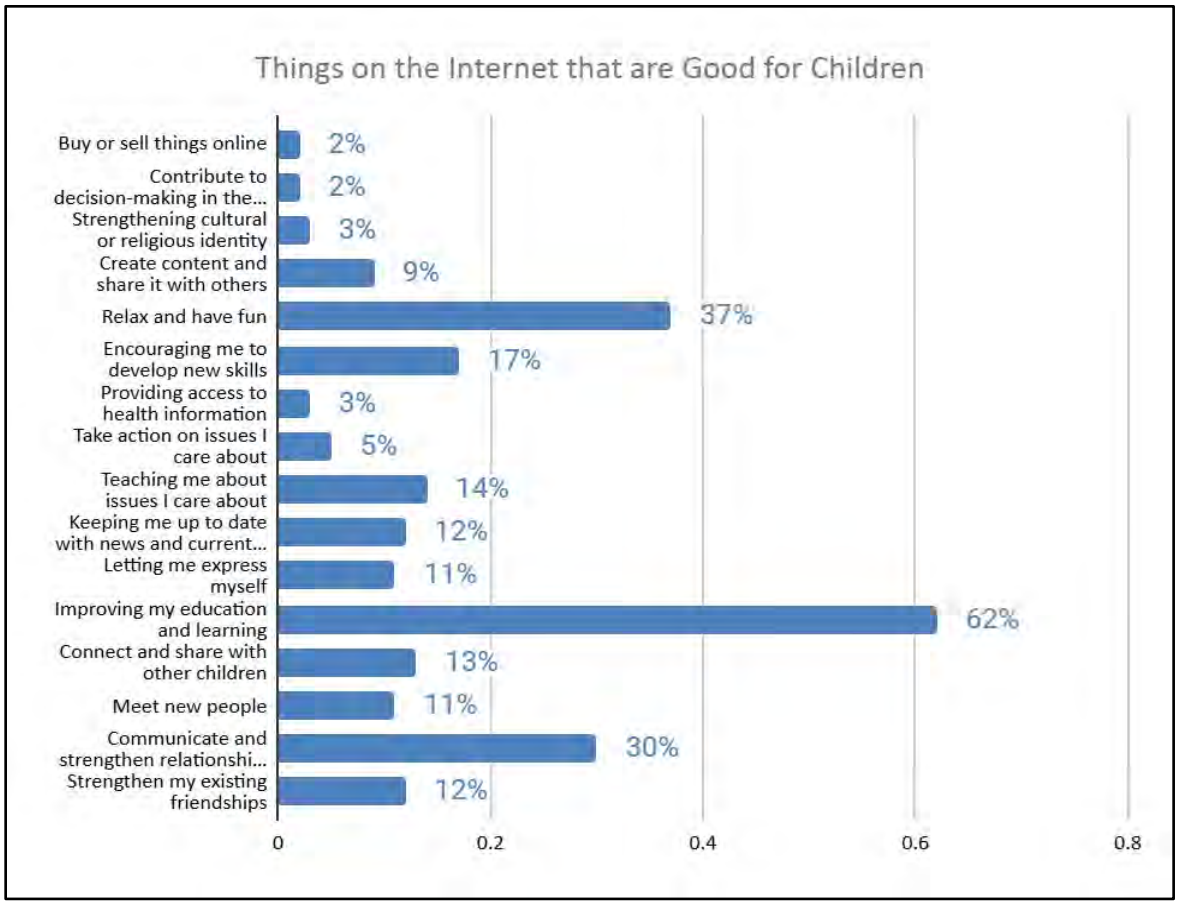

Figure 19: Good things on the internet for children

4.5.3 Do you think there are bad things on the internet that can negatively affect children?

Although technology use can be beneficial in improving children's education, there are several risks and drawbacks associated with it that can have a negative impact on children. Access to pornographic content was a key voice on the internet, which was supported by more than 80% of the children as a vice that could negatively affect children. Child sexual abuse and child predators, although supported by a few numbers of children as bad things on the internet that could negatively affect children, are also some of the vices on the internet. Other bad stuff on the internet includes addiction, nasty videos, and explicit content, among others.

Table 21: Bad things on the internet

Bad things on the internet that can negatively affect children	Percent
Access to pornographic content	86%
Child predators	5%
Child sexual abuse	12%
Others	36%

4.5.4 How has technology helped your life?

The figure below shows the perceived helpfulness of technology in children's lives. This perception is measured by the children who responded 'yes' and 'no'; the results are summarised in a stacked bar chart below. While only 23% of the children found the technology valuable for connecting with friends and family, the remaining 77% did not see it as applicable. Similarly, a smaller proportion of the children (28%) believe that technology helps relieve stress through entertainment, whereas most (72%) disagreed. Improving academic performance was supported by 59% of the children, while meeting new friends was supported by only 19% of the children.

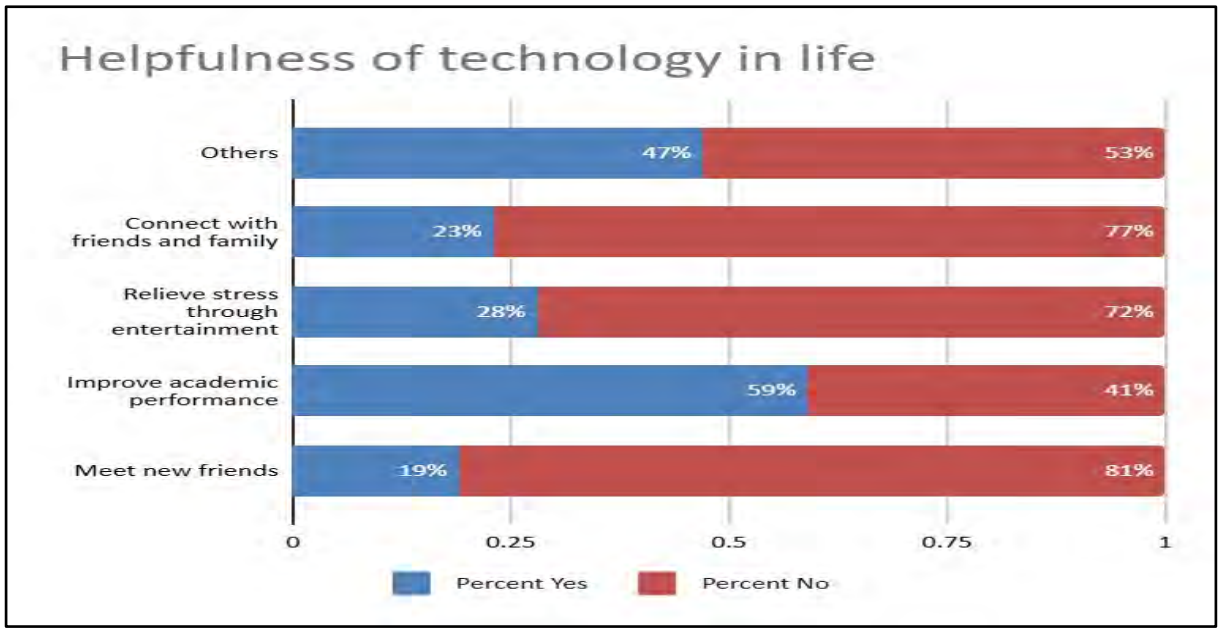

Figure 20: Technology helpfulness

4.5.5 How can technology be improved to meet your needs?

From the analysis below, 52% of the children believe that technology should be improved to meet their needs by being made easier to use and more accessible or affordable for all children. Twenty-two per cent of the children believed it should be made more age-appropriate, while 15% felt that better internet access would help meet their needs. Better modification to accommodate all children was only supported by 9% of the children.

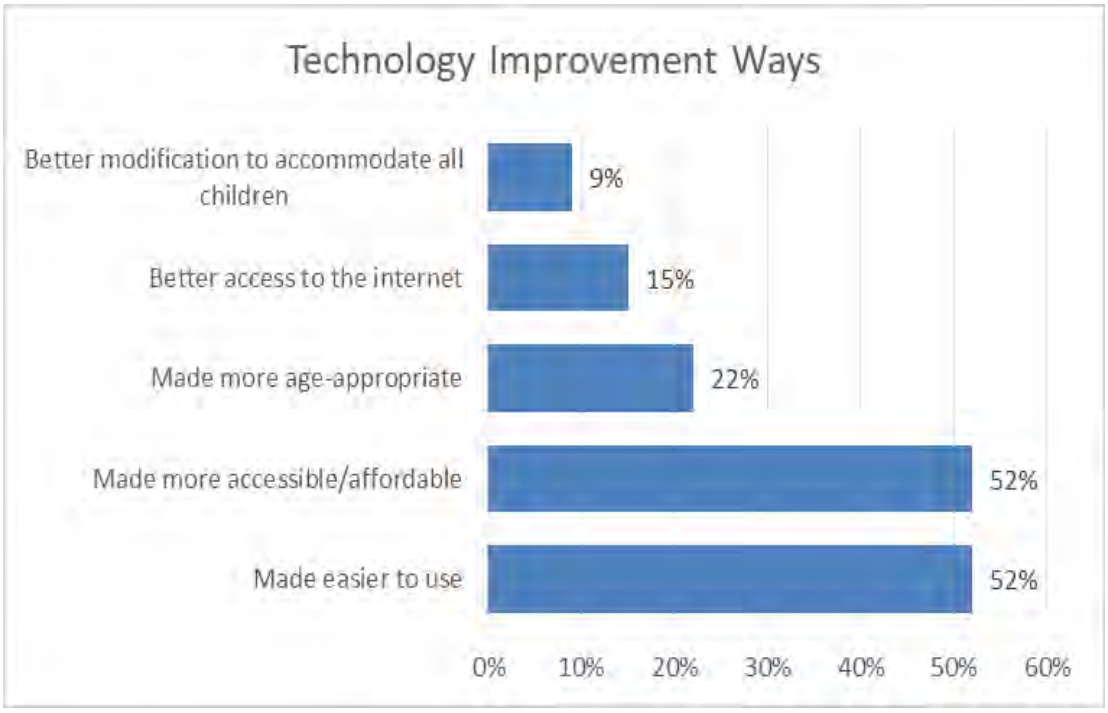

Figure 21: Technology Improvement

4.5.6 What do you think is the usefulness of technology in children's education?

Concerning the usefulness of technology in children's education, 60% of the children indicated that it helped them research new issues. In comparison, 56% stated that it was helpful since it supported them in their homework. A small percentage (25%) indicated that it helped support peer learning among the children, as shown in the figure below.

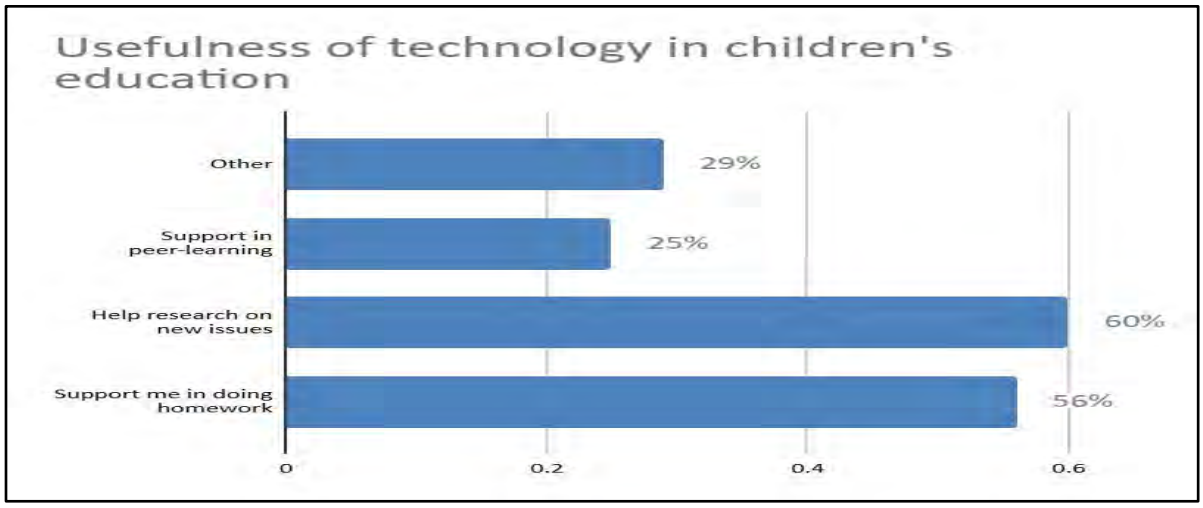

Figure 22: Tech usefulness in their education

4.5.7 How have technology and the internet helped improve your education?

Several children indicated that technology and internet use had helped improve their education in various ways, as shown in the figure below. More than 35% of the children agreed that using technology helped them get extra lessons from their teachers, learn about additional things in class, and study for their exams.

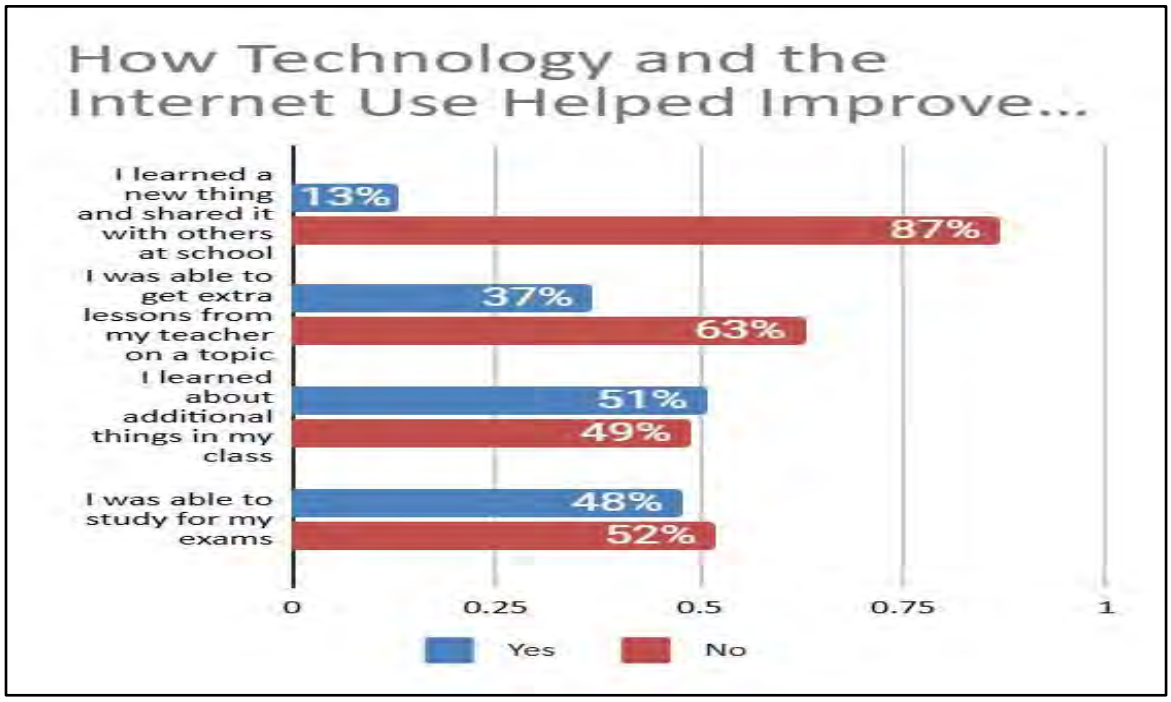

Figure 23: Use of tech to improve education

4.5.8 Please describe how your desired technology would look and feel (feel free to include a colour preference)

Device preferences

Respondents expressed a diverse range of preferences regarding technological devices. The most commonly desired devices included smartphones from brands like Samsung, Techno, Oppo, iPhone, and Infinix. Laptops, primarily from HP and Dell, were also in high demand, alongside computers, desktops, tablets, and televisions - Smart televisions and flat screens. Other preferred devices included radios, cameras, and vehicles such as Mercedes-Benz, Subaru, Nissan, and Range Rover. Additionally, respondents showed interest in smartwatches, drones, gaming laptops, and educational technologies that provide learning programmes, internet access, and free resources.

Colour preferences

Colour preferences varied among respondents, with black, blue, grey, and white emerging as the most commonly favoured shades. Less standard but still mentioned colours included red, pink,

green, neon blue, yellow, and orange. A few responses highlighted the appeal of multi-colour combinations, such as black screens and brown bodies, while some respondents preferred bright colours or even transparent phones.

Size and form factor preferences

Respondents had specific preferences regarding the size and form factor of devices. Many preferred medium-sized devices, such as phones, tablets, laptops, cameras, and radios, which balance portability and usability. Others leaned toward larger devices, including big televisions, laptops, and computers. A smaller subset of respondents favoured compact, portable devices, tiny smartphones and lightweight laptops. Some respondents even specified exact dimensions.

Functional preferences

Functionality played a crucial role in respondents' technological choices. Many prioritised educational uses, emphasising the need for devices that support learning through educational apps, free internet access, and school-friendly programmes. Ease of use was another primary consideration, with respondents expressing a preference for user-friendly and accessible devices. Affordability was frequently mentioned, with several respondents seeking budget-friendly options. On the other end, some desired high-performance and premium models. Durability and security were also critical, with calls for waterproof designs, strong screens, and secured, self-powered phones. Innovative features such as fast internet, high-quality sound for radios, and long-lasting batteries were also highly valued. Furthermore, entertainment and connectivity features were necessary, with respondents wanting devices that provide access to games, music, Nigerian movies, and social media platforms.

Special technology requests

The analysis further identified special technology requests that went beyond conventional devices. Some respondents were interested in robotics for tasks like cleaning the environment and offloading goods. Others envisioned futuristic innovations such as gravitational technology and self-controlled cars. There was also a strong demand for solar-powered devices and universal access to free

technology. Additional requests included phones with free internet and built-in screen protectors, fast cars, energy-efficient cookers, and technology designed to enhance marketing.

Community and policy requests

Findings also highlighted community- and policy-related concerns regarding access to and distribution of technology. Many respondents believed the government should ensure all households access to essential technology. Calls for free data and internet services were widespread, alongside suggestions to ban unnecessary television channels. Some respondents advocated establishing technology resource centres to enhance digital literacy. There was also a strong push for policies ensuring that all adults aged 18 and above have access to technology.

4.6 Research question/objective four: What barriers hinder widows' children from accessing and using technology?

In this section, the study shows how socioeconomic and cultural status can impact access, use, and technology outcomes among widows' children. It further demonstrates the relationship between intersecting factors that affect access and technology usage among the populations.

4.6.1 Which one of the following best describes the position of the sole breadwinner in your family?

Most breadwinners are casual workers, implying that 82% of the sole breadwinners are farmers, vegetable vendors, or small shop operators. A small portion of the breadwinners are domestic workers (house helpers are commonly known as maids in Kenya, and washing clothes for others, widely known as "mama fua" in Kenya), which accounted for 6% of the breadwinners. Six % are employed as teachers, nurses, or school cooks, while another 6% are unemployed.

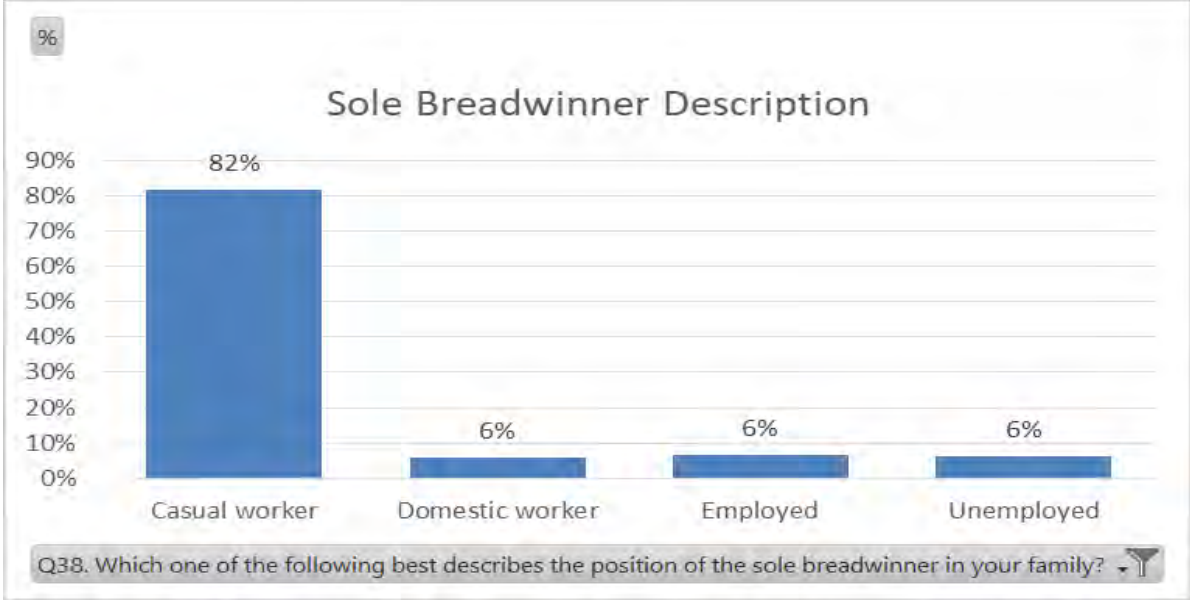

Figure 24: Sole breadwinner description

4.6.2 What factors hinder you from accessing technology and the internet?

The widows' children have perceived several factors as barriers to accessing technology and the internet. Poverty is perceived as the most significant barrier to accessing the internet and technology by 64% of the children. In comparison, 47% of the children believed that the high cost of technology and the internet is also a barrier to accessing them. A smaller proportion of the children indicated that lack of electricity at home, the cost of data, lack of signal at their residence, and stigma were also barriers that hindered their access to the internet and technology. Some children (36%) indicated that other barriers to accessing the internet and technology included their age, being too young, parental strictness, a lack of relevant knowledge on how to use them, fear of damage or theft, and still attending school, among other reasons.

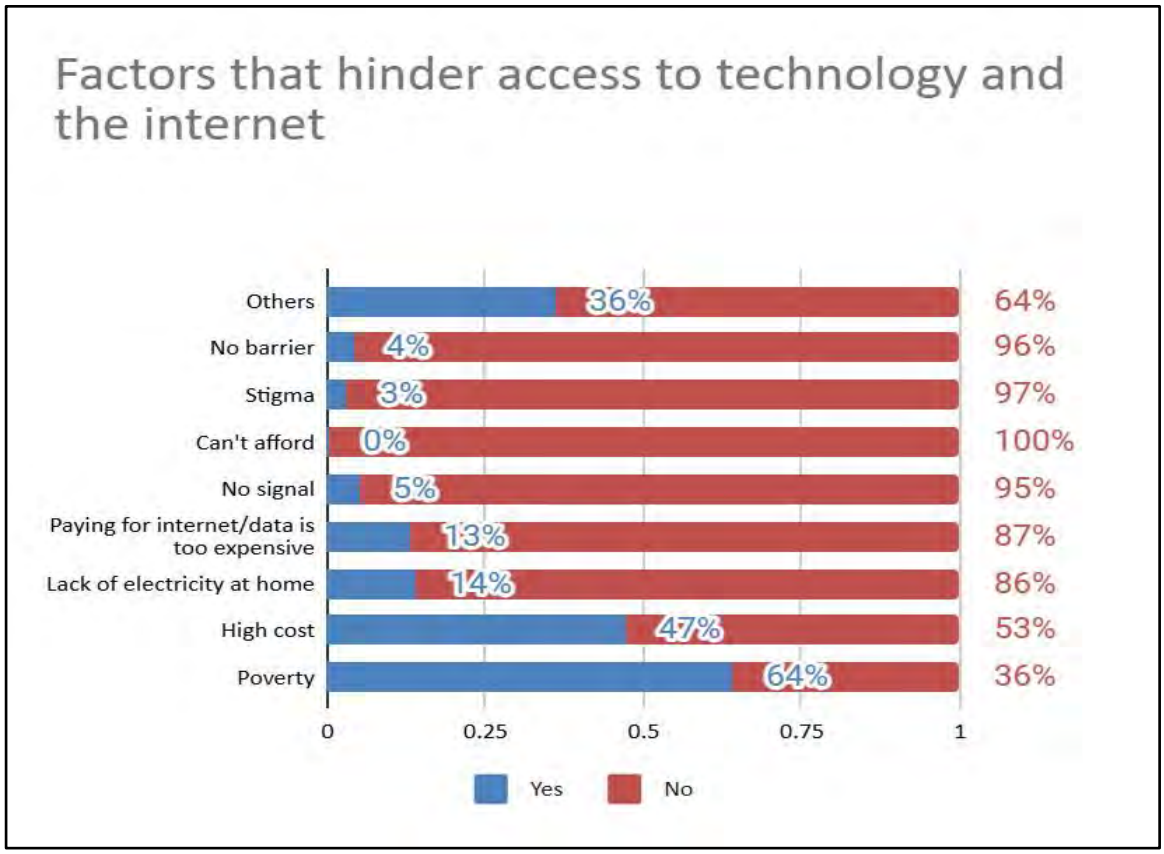

Figure 25: Factors hindering access to technology

Other barriers to using technology included age – where some children felt they were still too young to indulge in digital technologies; school – they argued that being in school was essential and technology would make other children not concentrate in their academics; fear – they were scared of getting or using technology, mentioning technology devices being damaged or stolen as the reason for their fear; and finally, limited knowledge of use arguing that most of them thought that they lacked the necessary and needed knowledge to use technology efficiently.

4.6.3 What challenges do you face in using and accessing technology and the internet?

While not common, some children also reported facing challenges in accessing and using technology and the internet. Approximately 30% of the children found technology and the internet too tricky to use, while about 24% did not have enough time to go online. Another challenge was that technology, and the internet, were time-consuming, as 17% of the children indicated. A small percentage also believed that technology was unsuitable for people their age and were concerned

about their privacy. Other challenges, as indicated by 54% of the children, include poor network connectivity, addiction, lack of data bundles, eye problems, and cyberbullying, among others.

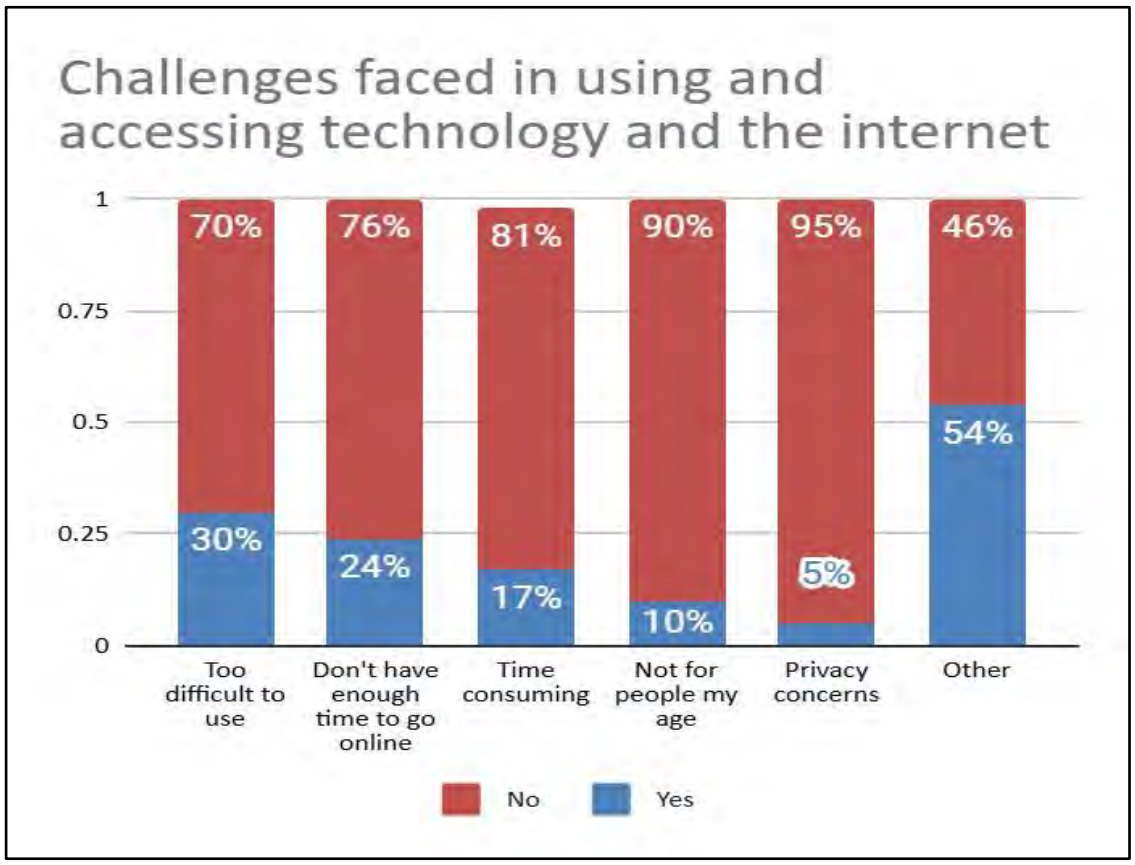

Figure 26: Challenges faced in using tech and the internet

4.6.4 Would access to technology and the internet help improve your education?

92% of the respondents stated that access to technology and the internet would improve their education.

Table 22: Access to tech and internet to improve education

Would access to technology and the internet improve your education?	**n (%)**
No	25 (8%)
Yes	275 (92%)
Grand Total	**300 (100%)**

4.6.5 Is there anything else you want to say about technology access, usage, and outcomes?

General perception of technology

A significant percentage of the respondents acknowledged that technology has significantly improved their daily activities, provided convenience and enhanced their ability to perform tasks effectively. These findings highlight the potential of technology in children's lives, showing that the widely perceived benefits of technology in various aspects of life depend on individuals' attitudes and needs for specific tools or services. Many respondents said technology dramatically impacts their lives, enabling them to stay informed and work more efficiently.

Technology and education

Through the study findings, I noted that technology has significantly influenced the study respondents' education by making learning more accessible and practical. Many students highlighted that technology aids them in research, provides revision materials, especially for homework and studying for exams, and allows teachers to conduct and share new lessons via mobile phones. Additionally, it was noted that technology has facilitated studying by offering better learning tools and resources, making education more interactive and efficient.

Technology and communication

The findings also indicated that technology has transformed and made communication easier. Most respondents appreciated that technology makes it easy for them to connect with different people. Respondents observed that technology has simplified communication, improving accessibility and interaction among people. The ability to instantly reach others through digital platforms has significantly enhanced social and professional communication. A great example was offered when one respondent shared that with their home mobile phones, they easily reach their parents seeking direction on what meals to prepare, especially when they aren’t home.

Technology and economic opportunities

Only a tiny percentage of this population have engaged with technology on the economic level, as evidenced by using different social media platforms to market and sell products. However, it's essential to note that technology is crucial in creating economic opportunities. Many respondents recognised technology as a tool for job creation and improved living standards. Some expressed a desire to learn online marketing skills to support family businesses, while others emphasised the importance of access to technology for financial empowerment.

Challenges in accessing technology

Access to technology for this population has been challenging. Some of the challenges identified included high costs, poverty, and limited skills. For most study respondents, restricted access to technological resources hindered their ability to benefit from its advantages. The lack of devices and skills was among the most significant barriers to access and use. Poor network coverage, financial constraints, and a lack of resources were also cited as substantial barriers. Most respondents desired for technology to be free or relatively affordable. They argued that with low-cost and possibly free resources, there would be increased levels of accessibility and inclusivity for many children and young people.

Concerns about technology use

Being a population not widely exposed to different technologies, younger populations felt a sense of fear about technology use. The study respondents raised concerns about the use of technology, particularly regarding its impact on young users. They mentioned that without proper knowledge of how to use it, children could end up on sites that are not age-appropriate or friendly. A few of the respondents shared that without understanding, there's the possibility of one acquiring a bad behaviour like drug abuse and becoming addicted. Some respondents felt that technology should not be introduced to children under the age of ten due to the risks associated with internet exposure, addiction, and laziness. Equally, there were concerns that technology could encourage bad habits and even threaten human life. Respondents emphasised

the need for responsible use and proper guidance on technology usage to mitigate these risks, particularly for children.

Recommendations and wishes

The findings highlighted various recommendations and wishes related to technology. Many respondents expressed a desire for community-based initiatives that support needy students in accessing technology, such as school-based programs, community tech lab centres, and simple training sessions to enhance digital literacy. Others suggested that parents should also be educated on technology to help guide their children effectively. This was because many felt that, since their parents lacked knowledge on proper use, they also lacked guidance and support on navigating digital platforms safely. Some respondents also wished for more opportunities to learn how to search for information online and improve their technological skills.

4.6.6 Testing of Study Hypothesis

In my quest to present an in-depth analysis, after collecting, entering, and conducting initial descriptive analysis, I sought expert consultation on applying the chi-square test to assess the correlations between sociocultural factors and tech access and usage, including interpreting the hypothesis output presented below.

This study had four central hypotheses:

H1: Sociocultural factors, including widowhood, can restrict further widows' children's access to and effective use of technology

H2: Economic challenges, such as the high cost of devices and internet connectivity, are the most significant barriers to widows' children's access to and use of technology.

H3: Using technology can positively contribute to widows' children's educational achievements, which may be associated with improved academic performance and self-efficacy among widows' children.

H4: Children of widows' access to technology is primarily limited to shared resources at home or within the community, such as school facilities or cybercafés, rather than individual ownership.

H1: Association between Sociocultural Factors and Access and Effective Use of Technology

A chi-square test was conducted to determine if youth mentorship groups, gender, academic qualification, and family financial situation were associated with accessing and effectively using technology, using a 5% significance level. The null hypothesis for the test was that there is no association between sociocultural factors and access to and effective use of technology.

Table 23: Chi-Square test of association between socio-cultural factors and technology access

		Youth mentorship group		Gender		Academic Qualification		Family Financial Situation	
		value	p-value	Value	p-value	value	p-value	value	p-value
Access through	Mother	9.279	0.901	2.549	0.11	5.723	0.334	2.302	0.512
	Siblings	20.608	0.194	0.86	0.354	2.978	0.703	3.251	0.354
	Friends	15.798	0.467	0.535	0.465	2.514	0.774	3.667	0.3
	Neighbour	9.023	0.912	1.361	0.243	1.505	0.912	1.264	0.738
	School	21.944	0.145	0.196	0.658	6.49	0.261	1.473	0.689
	Other	19.845	0.227	3.993	0.046	7.968	0.158	2.335	0.506

Based on the results of the analysis, there was insufficient evidence to conclude that an association exists between access to technology and youth mentorship groups, gender, academic qualifications, and family financial situation, since the associated p-values are significantly greater than the significance level. For gender, however, there is a significant association between gender and access to technology through another method, which includes access through their grandmothers and

uncles. This implies that only widows' children can access technology through other means, such as grandmothers or relatives.

There is insufficient evidence to conclude that youth mentorship groups are associated with effective use of technology. There is, however, enough evidence to conclude that there exists an association between the following: gender and using smartphone technology for doing homework, television technology for studying, and radio for entertainment; academic qualification and using mobile phones for networking, smartphones for communication, and television for communication and networking; and family financial situation and using mobile phones for networking and smartphones for entertainment, thus implying that social-cultural factors can restrict widows' children's effective use of technology.

Table 24: Chi-Square test of association between socio-cultural factors and technology use

		Youth mentorship group		Gender		Academic Qualification		Family Financial Situation	
		value	p-value	Value	p-value	Value	p-value	value	p-value
Mobile phones	Communication	10.810	0.821	0.001	0.981	9.182	0.057	0.798	0.850
	Networking	12.706	0.694	0.046	0.831	10.358	0.035	13.141	0.004
	Do Homework	8.878	0.918	4.885	0.027	0.676	0.954	1.716	0.633
	Studying	14.280	0.578	0.150	0.699	2.667	0.615	6.953	0.073
	Entertainment	21.605	0.156	0.581	0.446	7.852	0.097	1.276	0.735
	Other	13.901	0.606	2.559	0.110	6.488	0.166	1.465	0.690
Smartphones	Communication	14.648	0.551	0.579	0.447	13.720	0.017	6.683	0.083
	Networking	15.504	0.488	0.000	0.992	4.263	0.512	1.229	0.746
	Do Homework	14.105	0.591	0.202	0.653	3.128	0.680	6.006	0.111

	Studying	16.739	0.403	1.065	0.302	4.579	0.469	0.496	0.920
	Entertainment	22.262	0.135	0.034	0.854	10.795	0.056	7.848	0.049
	Other	14.524	0.560	2.348	0.125	2.592	0.763	23.568	0.000
Television	Communication	.	.	0.006	0.937	15.022	0.005	0.589	0.899
	Networking	.	.	0.003	0.956	31.479	0.000	0.266	0.966
	Do Homework	.	.	0.933	0.334	0.487	0.975	1.818	0.611
	Studying	13.860	0.536	4.463	0.035	5.055	0.282	1.076	0.783
	Entertainment	11.304	0.731	0.245	0.621	1.235	0.872	2.646	0.449
	Other	11.477	0.718	0.089	0.766	1.610	0.807	1.032	0.974
Radio	Communication	12.544	0.637	2.442	0.118	1.391	0.846	0.210	0.976
	Studying	17.682	0.280	2.599	0.107	2.337	0.674	1.448	0.694
	Entertainment	11.372	0.726	5.760	0.016	2.291	0.682	0.983	0.805
	Other	16.622	0.342	0.014	0.906	2.075	0.722	2.718	0.437

Note: Significant associations are highlighted in green.

H2: Most Significant Barriers to Widows' Children's Access to and Use of Technology

The most significant barrier for children accessing technology through their mothers is the high cost of acquiring the devices, as indicated by a substantial p-value ($p = 0.006$). This implies that having a barrier of high cost versus not having this barrier decreases the odds of accessing technology by 0.712, which is reduced by approximately 51% (1-exp(B)) for children who identify high cost as a barrier compared to those who do not. The most significant barrier for children accessing technology through friends is the lack of a signal where they live. This implies that children who do not have network signals where they live have a 2.245 times reduced chance of accessing technology compared to those who do. This further means that their odds of accessing technology are reduced by 89% (1-exp(B)) compared to those with signals where they live.

Table 25: Logistic regression analysis for significant barriers

		Model 1		Model 2		Model 3		Model 4		Model 5	
		B	Sig.	B	Sig.	B	Sig.	B	Sig.	B	Sig.
Barriers	Poverty (1)	-0.023	0.930	0.38	0.201	-0.646	0.378	-0.45	0.492	0.024	0.972
	High cost (1)	-0.712	0.006	-0.179	0.537	-0.377	0.545	-0.2	0.721	-0.336	0.599
	Lack of electricity (1)	-0.368	0.345	0.46	0.314	-0.547	0.514	0.529	0.617	0.643	0.563
	Data is expensive (1)	0.085	0.836	-0.064	0.886	1.466	0.233	18.261	0.998	-0.122	0.897
	No signal (1)	-0.675	0.336	-0.954	0.112	-2.245	0.018	17.341	0.999	-1.602	0.087
	Can't afford (1)	21.872	1.000	20.764	1.000	20.549	1.000	-16.503	1.000	0.971	1.000
	Stigma (1)	0.572	0.439	-0.086	0.919	-2.089	0.085	-1.625	0.177	17.817	0.999

Note: **Model 1 – Access through mother, Model 2 – Access through siblings, Model 3: Access through friends, Model 4: Access through neighbour, Model 5: Access through school**

H3: Relationship between Technology Use and Widows' Children's Educational Achievements.

A significant positive linear association exists between technology use for homework and playing video games, which supports children's education and positively contributes to it. In helping children research new issues in their education, there is a significant positive linear association with using technology for networking with new people, completing homework, studying, and entertainment purposes, resulting in a positive contribution. Supporting peer learning among children as an educational achievement is significantly associated with using technology to communicate with family and friends, networking with new people, playing video games, and engaging in entertainment, all of which contribute positively.

Table 26: Correlation between technology use and educational achievement

Technology use	Support me in doing my homework.			Helped with research on new issues.			Support in peer learning		
	Pearson Correlation	Sig.	N	Pearson Correlation	Sig.	N	Pearson Correlation	Sig.	N
Communicating with family and friends	0.097	0.093	300	0.008	0.884	300	.130*	0.024	300
Meeting/networking with new people	0.097	0.094	300	.135*	0.019	300	.145*	0.012	300
To do homework	.208**	0.000	300	.187**	0.001	300	0.101	0.082	300
Studying	0.103	0.075	300	.127*	0.028	300	-0.018	0.754	300
Play video games	.122*	0.035	300	0.086	0.136	300	.126*	0.029	300
Entertainment	0.053	0.356	300	.159**	0.006	300	.155**	0.007	300
Learn new skills	-0.083	0.150	300	0.053	0.363	300	-0.091	0.115	300
Promote my business	-0.042	0.469	300	0.053	0.359	300	0.107	0.065	300

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

H4: Chi-Square Test of Independence of Technology Access Type and Technology Ownership

There is a significant association between personally owning a smartphone and accessing technology through friends, as shown by the considerable p-value of the chi-square test in the table below. A significant association exists between personally owning a tablet and accessing technology through school. This supports the hypothesis that shared resources, such as friends and school, play a crucial role in children's access to technology.

Table 27: Chi-Square test of independence between technology access type and ownership

		Personally Owns					
		Mobile Phones	Smartphones	Television	Radio	Computer	Tablet

		Chisq.	Sig.	Chisq.	Sig.	Chisq.	Sig.	Chisq.	Sig.	Chisq.	Sig.	Chisq.	Sig.
Technology Access Through	Mother	1.280	0.258	0.143	0.705	0.391	0.532	1.009	0.315	0.423	0.515	1.745	0.186
	Siblings	0.241	0.623	2.171	0.141	3.155	0.076	0.221	0.638	2.744	0.098	0.111	0.739
	Friends	0.318	0.573	5.756	0.016	0.051	0.821	0.659	0.417	0.066	0.797	0.232	0.630
	Neighbor	0.149	0.699	0.859	0.354	0.051	0.821	0.582	0.446	0.053	0.818	0.184	0.668
	School	1.783	0.182	0.010	0.922	0.030	0.863	0.211	0.646	0.035	0.852	4.475	0.034

4.7 Conclusion

This chapter presents the findings analysed from the face-to-face survey interviews with 300 Nyanam International widows' children, focusing on the study respondents' access, use, and outcomes of technologies. The finding revealed that, despite a great awareness of digital technologies, the population's access was limited mainly due to shared household devices, high cost, poverty and limited infrastructure including lack of internet and electricity limiting their skills development and leading to a digital divide in access, use, and benefits. The finding revealed a correlation between access to technology and homework, directly answering the research question of the ways in which technology improves children's educational outcomes. Further, there existed evidence which implied that socio-cultural factors (specifically the status of widowhood) could restrict widows' children's effective use of technology; however, no association was found with access. These insights address the research questions, laying the groundwork for the next chapter, which discusses the broader implications of the findings.

CHAPTER 5: KEY FINDINGS AND DISCUSSION OF FINDINGS

5.1 Introduction

In this chapter, the researcher explores the interpretations and implications of the findings presented in the previous chapter. As previously outlined, this study aimed to examine digital disparities among adolescents in rural Western Kenya: a Technology Access and Usage survey among Children of Widows. The goal was to assess access to and use of technology among children of widows in the Lake Victoria Region, Kisumu, Kenya. The research aimed to evaluate the level of access, opportunities, and challenges of technology among widows' children and create a foundation that local organisations can use to promote and improve the educational outcomes of widows' children (Helsper, 2012; Warschauer, 2004).

The study findings offer significant insights into children and digital technologies. Firstly, it was incredible to note that there was a great sense of awareness of digital technologies among the study respondents, with 94% reporting being aware of modern technologies; for example, television amounted to 73%, followed by mobile phones and smartphones at 64% and 65% respectively, and radio at 63%. However, this awareness is limited to perceiving digital technologies as artefacts (as tools/things that cannot be questioned on how and why they work the way they do while at the same time assuming digital tech are only meant for the elite and foreign) and the lack of digital technologies within their communities and homes (van Dijk, 2006; DiMaggio & Hargittai, 2001).

Secondly, the access rate to technology can be argued as being limited or restricted if interpreted through the lens of the availability of different digital technology resources, devices, and ownership. Nonetheless, it is crucial to highlight that access among the study population is more than half of the awareness percentage. 67% mentioned accessing technology mainly through their mothers, while 24% said they accessed it through other means, including grandmothers, uncles, aunts, or their own devices. Fairly, access through shared devices, as highlighted in previous studies (Souter et al., 2018), is predominant for this population (van Dijk, 2005; Norris, 2001).

Thirdly, the most commonly available and owned digital devices were mobile phones, smartphones, televisions, and radios; very few families owned computers or tablets. A significant 48% of the respondents reported using technology mainly to communicate with their friends and loved ones, 47% for studying, and 44% for entertainment. Similarly, internet use was reported to have been beneficial and improved learning and education for more than 60% of the population (Selwyn, 2004; Livingstone & Helsper, 2007). Evidence shows that the inaccessibility of technology and the internet is primarily linked to individual economic status. In this study, poverty was identified as one of the main barriers to access. Poverty was the most commonly perceived barrier to accessing technology, at 67%, followed by high cost of digital devices and data at 47%. Additionally, 36% indicated that obstacles such as age, parental restrictions, lack of essential knowledge, fear of damage and theft, and being in school hindered their access to and use of technology (Hargittai, 2002; van Deursen & Helsper, 2015).

The following sections discuss these findings, compare them with existing literature, address the study's potential limitations, and explore its broader implications for children's digital divide. Specifically, key findings are discussed following the research questions/objectives as listed below:

1. What types of technology are widows' children aware of and have access to?
2. How do they access and use technology
3. What are the outcomes of using technology?
4. What are the barriers that hinder widows' children from accessing and using technology?

Further in this discussion chapter, I highlight some of the respondents' voices gathered from the survey, focusing on their desires to improve technology to meet their needs as children (Buckingham, 2007; Livingstone, 2009).

5.2 Q1. What types of technology are widows' children aware of and have access to?

5.2.1 Technology awareness: what is and what is not

Globally, children are considered tech-savvy compared to the adult generation. Studies by international agencies such as the ITU (2021) and UNICEF (2020) have consistently shown that children are exposed to digital technologies at a very young age, even before they start school. Understanding technology is critical in becoming technologically literate and making informed use decisions (Van Dijk, 2005). However, other studies have shown that many students often have vague and/or limited conceptions of technology, referring to it primarily as artefacts (Mitcham, 1994; Ankiewicz, 2019). Often, children refer to technology as objects, such as devices. This can be attributed to their limited understanding of technology (ITU, 2021).

In this finding, 94% of the participants were aware of technological devices, specifically information and communications technologies. 73% showed significant knowledge of television, followed by mobile phones and smartphones at 64%, computers at 63%, and radio at 55%. For most of them, awareness meant having seen, touched, and experienced these types of technology. This finding aligns with earlier work showing that children's perceptions of technology are influenced by exposure and socio-economic context (Mitcham, 1994; Ankiewicz, 2019). Technology sense-making differs from one person to another. These perceptions are essentially influenced by the level of exposure to what technology is and isn't. Often, for children from vulnerable and low-income populations, the view of technology and understanding of information and communication technology are limited to mobile phones and smartphones, televisions, radios, and computers. This narrow awareness is a significant factor in the discussion around the digital divide (UNICEF, 2020).

Studies also show that access, exposure, and education can influence a child's technological awareness (ITU, 2021; UNICEF, 2020). With the generally high awareness in this digital world, one must not forget that technology education needs to incorporate a broader understanding of digital technologies and their potential for change. This suggests that children often have a limited understanding of technology, which creates a vivid awareness divide (Van Dijk, 2005).

Although the study population was highly aware of digital technologies, most were only exposed to commonly known devices such as televisions, radios, smartphones, and mobile phones. In contrast,

only 5% of the participants were aware of other digital technology devices, including tape recorders, film projects, digital games, and cameras. In comparison, 49% of the population were familiar with various technologies, including cars, aeroplanes, and cooking devices.

In conclusion, it is important to highlight that this study population still has a gap in technology awareness, considering the broader spectrum of current digital and communication technologies. The limited awareness of television, radio, computers, phones, and smartphones, among the most commonly known technologies, demonstrates the need to ensure a broader understanding of information and communication technologies among children, especially in the context of ongoing global technological development (ITU, 2021; UNICEF, 2020).

5.2.2 Does the availability of technology devices imply full access?

For years, there have been debates around what is/can be considered complete access to technology. Scholars have defined it differently, and one that links to this study is the definition by Gerster and Zimmermann (2003), who define access to digital technologies as the availability, affordability, and possession of the necessary skills. In addition, Kleine (2007, 2013) included aspects of social norms, which control the use of time and space, as key dimensions to consider when investigating access to and equity in technology.

Access to technology can take many forms. Van Dijk and Hacker (2003) argue that barriers to technology access take the forms of four different types of lack: 1) mental access - lack of elementary digital experience, 2) material access - no possession of computers or network connections, 3) skills access - having no digital skills, and 4) usage access - inability to effectively use technology and its opportunities meaningfully. Furthermore, Wilson (2006) discusses eight aspects: physical access, financial access, cognitive access, design access, content access, product access, institutional access, and political access.

The study's findings highlight that 96% of respondents have a mobile phone at home, 77% have a smartphone, 82% have a radio, and 62% have a television. Mothers owned the most available devices, such as mobile phones, smartphones, television, and radio, respectively, followed by

grandmothers and siblings. Regarding access to use, 67% of the 283 people who knew what technology was and that it was available at home had access through their mothers. 23% accessed through their siblings, 24% through immediate relatives (uncles, aunts, and grandmothers), and 5% through friends, neighbours, or at school. Notably, siblings play a significant role in technology access among the study population. However, does availability equal complete access?

For most respondents, access was primarily available through shared avenues at home. This type of access is restrictive and contributes to the digital divide, as adults can dictate how and when these devices are used, which can act as both a protective measure and a limiting factor. Without control, the study participants depended entirely on adults' willingness to let them use devices, even in dire situations.

Even though it is argued that access to technology devices, services, and resources is essential in bridging the digital divide, 2.2 billion children still lack access to necessary technology (UNICEF, 2020). The digital divide is a social problem resulting from inequalities in accessing and using digital technologies (Afzal et al., 2023). Access is a prerequisite for children's full participation in the digital world (Ayllón, 2022). Access inequality continues to be a vivid divide, being witnessed globally. Digital inequality in the emerging digital world continues to place those with the power to buy, use, and gain a better position than those who are disadvantaged (Souter, 2022). For this study finding, it was noted that high cost was among the access challenges, where 47% of the children believed that the high cost of technology and the internet was a barrier to them accessing technology.

The current development of new technologies can simultaneously empower and disempower, creating new divides that the disadvantaged have not previously experienced. Therefore, we must continuously examine the pre-existing social and economic inequalities and their relationship to the digital divide. According to Van Dijk's (2005) resource and appropriation theory, access to offline and online technology, including access to skills, materials, and usage, is a fundamental factor in bridging the digital divide. For Van Dijk, access can be measured in terms of access to high-quality technology devices; it can be categorised in different ways, including motivation, skills, usage, and physical access, as integral parts of closing the digital divide gap.

This supports the argument that within the African continent, especially in communities facing multiple access barriers such as marginalisation and poverty, television and radio are relatively the most easily accessible technologies. This is also because their access is tied to numerous factors, including access to electricity. The comparison between urban and rural communities shows unequal access to electricity, despite electricity being a public good (Tully, 2006). Furthermore, this study population is located in a rural area where technology often competes with necessities like food, shelter, clothing, and education. The intersecting social and structural barriers and limitations continue to push them further away from accessing essential devices and resources. With the growing use of digital technology, new technologies are being developed with prosperity in mind, but this continues to create access and usage gaps.

Although children are often considered to be digitally connected, their access to the internet remains a concerning issue. ITU (2022) indicated that only 28% of children in Africa had internet access at home compared to the rest of the world. In this study, 56% reported having access to the internet. While there's still a significant number of children unable to access the internet, we must understand that populations' access to online technologies is a necessary ingredient for ensuring equity in access to the information economy, allowing people and governments to be equal participants while capitalising on the existing economic opportunities offered in the digital age (Cronin, 2002).

Looking at the age factor, the study results showed that most of the study population started accessing internet technology between the ages of 10 and 14 (60%), followed by those aged 15–19 (36%). This indicates that children typically do not access the internet until around 10. Moreover, in the current digital economy, technology ownership is considered an essential aspect of access. Of the 283 participants who were aware of technology and had access at home, only 12% personally owned smartphones, followed by 11% mobile phones and 5% television, radio, and other devices. Most young people do not own their own devices, and when they need to use them, they often have to seek permission from others, especially household members. This can add another barrier to access, especially if those household members are not technologically equipped to understand the benefit of technology in a child's life.

Access to digital technologies is crucial not just in bridging the digital divide but also in realising the 2030 global Sustainable Development Goals (SDGs), which seek to build resilient infrastructures to promote sustainable industrialisation while striving to ensure increased access to information and communication technology for all (UNICEF, 2020; ITU, 2021). Critically, we need to note that children without access to technology will be quickly outpaced, and their ability to select and process information will be affected as those with access will surpass them (Mason & Hacker, 2003). Moreover, it is crucial to highlight that computer access is one of the key indicators when studying digital divide rates. Of the study population with access to computers, only 13% use them daily, 38% weekly, and 50% reported never using them. Due to limited computer access, study participants' opportunities to fully engage with the digital world are limited.

While this study focused on physical access to personal computers and the internet across various demographic categories, including income, education, age, gender, and ethnicity, despite the availability of the mentioned communication and entertainment technologies, the lack of computers at home has dire implications for the population's access to quality education and digital literacy, both of which are key factors in the current digital world (UNICEF, 2020; ITU, 2022).

5.3 Q2. How do they access and use technology?

5.3.1 Permission as a significant factor that may limit access and use

In rural and conservative communities and households, parental control over when, where, and how children use digital technologies can limit access (UNICEF, 2017; Helsper, 2012). Often, parents deny permission due to fear of misuse, dangers, or the perception that it will distract the child from fully concentrating on their education (ITU, 2021). This is especially true in the context of this study, as parents also have a limited understanding of the value of digital technologies and their potential importance to their children's education (van Dijk, 2005; van Deursen & Helsper, 2015).

For this study, 76% of widows' children reported needing permission to use technology, and only 15% stated that they could use the internet whenever they wanted. Widows' children's access to technology mainly depends on their mothers, siblings, or immediate relatives. Approximately 72% of devices are owned by households, compared to 28% personally owned. Mothers and siblings

played a significant role in access to resources. Most of them do not have the privilege of individual ownership, although they enjoy the availability of collective use. As already determined, ownership of technology tools is highly significant among the study respondents' mothers, followed by siblings and other immediate relatives (van Dijk, 2012). This means that to access any device, one must seek permission to use it. When using the internet, 78% accessed it through broadband connectivity (mobile internet), often using SIM scratch cards to purchase data bundles. 5% used home Wi-Fi, while 16% used their neighbour's (ITU, 2020).

Understanding that this population accesses technology devices from household members, it is pertinent to argue that their effective internet use is limited by access permission (Helsper, 2017). Their engagement with the internet is primarily directed by the individual, allowing them to access and use the internet as they see fit. Additionally, 76% reported that they must be granted permission to use technology and the internet. Their parents or caregivers primarily influence children's access to the internet (UNICEF, 2020). A 2016 study in South Africa titled Global Kids Online South Africa found that adults significantly determine when and how children access the internet (Phyfer, Burton, & Leoschut, 2016). This suggests that parents and adults play a significant role in deciding when their child can use the internet, how often they can use it, and for what purposes (van Deursen, van der Zeeuw, de Boer, Jansen, & van Dijk, 2014).

5.3.2 From their own lens, what benefits are children receiving from using technology?

Children worldwide derive multiple benefits from technology, including educational, social, and developmental advantages. Despite the perceived challenges, children must access technology as fashionably as possible. Findings from this study report that communication was identified as a critical use of technology; many use mobile phones and smartphones to interact. Forty-eight per cent used technology to communicate with friends, 30% connected with family, and 12% met new people. Through offline and online communication, 30% shared that communication helps strengthen their relationships.

Additionally, 60% indicated that the internet helped improve their education and learning. Approximately 35% indicated that the internet helped them relax and have fun, while 30% implied

that the internet helped strengthen family relationships highlighting some of the positive contributions technology can make in children's lives. Upon further probing, an interesting response emerged: 23% of the children shared that technology is valuable for connecting with friends and family, while 77% did not see technology as helpful. Similarly, 28% believed that technology helps relieve stress through entertainment, whereas 72% disagreed. Improving academic performance was supported by 59% of the children, while meeting new friends was supported by only 19%.

This showcases that technology's usefulness and helpfulness depend on an individual's motivation and attitudes towards using certain technologies. This affirms the argument that an individual's attitude towards technology determines their likelihood of owning a device or using a service (Venkatesh, Morris, Davis, & Davis, 2003). In addition to communication, some mentioned that mobile phones and smartphones are also used for studying, playing video games, entertainment, and completing homework. However, for many, television and radio are primarily used for entertainment; very few use them to learn new skills or study. For those with mobile phone access, 33% use it daily, 27% use it twice a week, and 23% use it once a week. A small proportion (1%) use it once a year, while 6% use it monthly. Meanwhile, 39% of smartphone users reported daily use, and only 4% reported monthly use. Home-based technology such as television and radio is used daily by 82% and 77% of children, respectively.

Numerous studies have shown a significant positive response regarding education, suggesting that technology is the bedrock of improved learning, creativity, and academic performance. Sixty per cent of the children indicated that technology has helped them research new issues, while 56% said it was helpful in supporting their homework. Additionally, 25% noted that it helped promote peer learning. More than 35% of the children agreed that using technology helped them receive extra lessons from teachers, learn additional concepts in class, and study for exams. In today's world, education is the foundation of wealth and development. With technology, people can increase their knowledge and acquire new and necessary skills to accomplish their goals.

Basic primary education is significantly trailing in Africa (United Nations Development Programme [UNDP], 2013). With limited access, many schools cannot teach courses related to digital technologies or access world-class research and resources available online (Hagen, 2007). Access to

technology for education is vital and has become a basic need. The continued divide will disadvantage talented, poor, and vulnerable children if access continues to favour the privileged, who can acquire new skills and knowledge through digital learning tools and platforms, including distance learning.

In Kenya, where education is categorised along urban–rural and public–private divides, those in metropolitan areas are more exposed and have better access to amenities often lacking in rural schools. For Kenya to realise its Agenda 2030 commitments on transforming education to meet the needs of its population and ensure quality, access, and relevance – guided by curriculum reforms, infrastructure development, and digitisation of education at all levels – widows' children and other vulnerable populations must be provided with access to technology at either school or community level. Technology can make a significant difference in how students learn and enhance the quality of education. Therefore, no child should be left behind.

5.3.3 Operational skills alone are not enough to ensure enjoyment of technology

Digital literacy goes beyond basic operational ability, requiring access, use, and effective application of technology to close digital gaps (ITU, 2021; UNICEF, 2017). To close the gap, one must have access to and use technology, possess the essential skills to navigate the digital world, and effectively use the tools to their benefit. When asked whether they had the essentials needed to use technology, 28% reported not having the necessary skills compared to 67% who had. Additionally, 54% reported having the required Internet skills, 37% did not, and 9% said they did not. Some of the notable abilities mentioned included browsing (23%), opening downloaded files (20%), making new friends online (13%), and using social media apps (12%) (UNICEF, 2017). Further, 48% reported being confident in using technology. However, confidence in use also varied depending on the specific device. 74% reported confidence in using radio, 72% television, 62% in smartphones, 53% in mobile phones and 43% in computers (ITU, 2021).

A significant proportion of the study population possessed more operational skills, such as turning the device on and off after use (van Deursen & Helsper, 2015). 72%, primarily the ability to open and close the devices during use. Followed by 70% being able to handle the devices, like knowing

how to navigate through the device operating systems. Even though this might indicate possession of a variety of skills, the limited computer skills, with only 4% possessing skills, suggest a skills gap among the population. In the increasingly digital world, knowledge and skills in online safety and mandatory education, including creating, posting, and sharing content, are crucial for children's lives (OECD, 2019). One notable gap was that only 5% of the population possessed the technical know-how to report harmful content online (Livingstone et al., 2017). Critically, it is essential to note that various skills are required to effectively use technology, ranging from operating to safety, which this study did not examine.

As many of these participants accessed technology through household shared devices, it was interesting that most had these skills from their siblings (brother or sister), with 18% learning through observation (Helsper & van Deursen, 2017). Acquiring knowledge and abilities related to technology usage is derived mainly from family exposure. By observing how other household members use and handle technology, one can learn and acquire the skill to use it. One of the most significant limitations of this study is that self-reported skills do not necessarily equal skills that one might have learnt through a weeks' or months' long course that focuses on equipping individuals with essential skills in using and navigating the digital world (van Dijk, 2020). Digital literacy is a fundamental skill in today's digital age, equally vital to children's future success (UNICEF, 2017).

5.4 Q3. What are the outcomes of using technology?

Children's engagement with technology has been documented across contexts, with some studies showing that pre-schoolers are exposed to technology earlier than books (Hopkins, Brookes, & Green, 2013; UNICEF, 2017). This is also true for this study population, where most participants were first exposed to technology and the internet between the ages of 10 and 14. The increased use of technology among children has led to expanded research around potential linkages between the emotional and mental outcomes of technology use (Livingstone et al., 2017). However, studies around how children generate and disseminate knowledge are still understudied. This study provides no evidence on the mental and emotional outcomes of technology use among widows' children; however, it highlights the potential of technology for this study population, with a specific focus on education (ITU, 2021). Some of the issues raised here have been widely discussed as key

benefits of why children use technology. These areas include communication, education, and entertainment. A significant proportion of the study population, 48%, regarded technology as necessary for communication, followed by 47% for education and 44% for entertainment.

What's more, the study observed an interesting aspect of whether the study participants had a good time online. Ninety-one per cent of the children mentioned never having a good time online, followed by 88% who sometimes had a good time and 58% who often had a good time. This data indicates a sense of danger among this population while they use the online space (OECD, 2019). The limitation is that there are no in-depth insights to prove why 91% of them never have a good time online.

5.4.1 Building, maintaining, and sustaining social connections through communication

Young people today seek/desire to "stay connected," with rapid digital growth creating a pressing need for visibility beyond traditional means (UNICEF, 2017). Among the benefits of technology for this study population was communication. Most people have used or continue to use mobile phones as their primary tool for connecting and interacting with friends and family. Forty-eight per cent have benefitted mainly from using digital technologies to interact and engage with family and friends. Communication allows them to strengthen their relationships while still sharing with their peers (Livingstone et al., 2017). Through the desire to stay connected, we derive a sense of belonging within a community of friends and family.

5.4.2 Knowledge seeking and development

Neurodevelopment is at its peak during childhood and adolescence, a stage in life when behaviours, attitudes, and understanding of the world are formed (van Dijk, 2020). Introducing technology during adolescence can help develop one's worldview and make different cultures more mainstream (OECD, 2019). For this study, 47% of the population mentioned using technology to study. This included learning new skills, doing homework, watching and listening to the news, and studying for their exams. In addition, it was impressive that more than 60% of the children indicated that the internet has helped them improve their educational and learning experiences.

Central to this study is that access to technology in education has the potential to significantly impact students' learning and academic performance (UNESCO, 2014). By understanding how technology is used or not, we can help identify strategies and practices most effective for improving educational outcomes for widows' children. Scholars argue that any country seeking to remain competitive and relevant on the global stage must ensure its citizens possess technological skills (Bolt & Crawford, 2000; ITU, 2021), which can be easily acquired through intentional access to and education on technology. One of the study respondents also argued that the internet and technology have the capability of improving individuals' thinking capacity and talent. This thereby illustrated the perceived importance of technology in education and development.

In previous discussions, the study has demonstrated how this population appreciates the power of technology and the internet for communication, learning, and entertainment. Fifty-six per cent of the students agree that technology has helped improve their academic performance. We can conclude that one's view and motivation towards technology are closely linked to the expected outcome (Venkatesh et al., 2003). This also justifies this study's proposed outcome: technology can potentially improve educational outcomes. This is after several children indicated that technology and internet use had helped them improve their education in various ways, including in getting: 1) extra lessons from their teachers, 2) learning about additional things in class, 3) researching, 4) doing homework, and 5) studying for their exams (UNICEF, 2017).

Even though there is evidence that access to technology can revolutionise the education sector, digital inequalities continue to be a problem in education, employment, race, and gender (van Deursen & Helsper, 2015). The educational gap between the affluent and the poor, between urban and rural areas, and between developed and developing countries continues to widen (Afzal et al., 2023; UNESCO, 2014).

5.4.3 Technology offers the opportunity to relax for children

Children also benefit from technology as a tool for relaxation and leisure (OECD, 2019). In this study, 44% of the children mentioned using technology as entertainment. These included playing video games, and watching music. As one respondent reported, *"I use technology and the internet*

to relax and have fun, as it allows me to express myself, connect and share with other children." There is also a perceived danger in the use of technology. More than 80% of the children mentioned that access to pornographic content was a significant vice that could negatively affect them (Livingstone et al., 2017). This highlights the limited knowledge around technology and internet use among this population. While the impact of digital technologies on children's lives continues to be a growing concern, there is a gap in understanding the dangers of technology use and how children can effectively navigate it (UNICEF, 2017).

5.5 Q4 What barriers hinder widows' children from accessing and using technology?

The International Telecommunication Union (2022) reported an alarming widening of the global digital divide, which has the potential to have an acute and devastating effect on the lives of widows' children. This population, already affected by significant socioeconomic vulnerabilities, continues to be further marginalised by a lack of access to essential digital resources.

As revealed by the study findings, poverty is the most overwhelming barrier, with 64% of children citing it as a primary obstacle. This aligns with ongoing conversations on the digital divide, which emphasise how economic constraints directly impede people's and communities' ability to develop essential skills and participate fully in society (UNICEF, 2021; ITU, 2022). Children of widows also face child labour, hunger, malnutrition, hazardous employment, mental health issues, substance abuse, and sexual exploitation (Kenya Ministry of Health [KMOH], 2020; Ngugi, 2012). These challenges contribute to their barriers to education and economic opportunities, including limited access to technology (Ngugi, 2012; KMOH, 2020).

Similarly, 47% identified the high cost of technology and the internet as barriers, underscoring the systemic nature of digital exclusion. Studies consistently highlight high costs, weak infrastructure, a lack of human skills, and limited availability of culturally relevant resources as barriers to digital access (Iyamu, 2005; UNESCO, 2019). This systemic exclusion disproportionately affects vulnerable populations, such as widows, children, the poor, the rural disabled, and marginalised

groups, due to poor power supply, limited infrastructure, and constrained connectivity (ITU, 2022; UNICEF, 2021).

Economic barriers, infrastructure limitations such as lack of electricity and weak signal, and socio-cultural factors like stigma and parental strictness create a complex web of disadvantages (UNESCO, 2019; Vurayai, 2022). Viewed through an intersectional lens, these barriers demonstrate how multiple forms of marginalisation converge to severely limit the life chances of widows' children, perpetuating cycles of poverty and exclusion. The implications are profound, threatening to exacerbate educational disparities, economic marginalisation, and social isolation. Children from poorer socio-economic backgrounds tend to have limited access to internet connectivity, computers, mobile phones, functional digital technology skills, and active parental support (Vurayai, 2022; UNICEF, 2021).

As the divide continues to deepen, many children without access will be left behind, outpaced by those with access, limiting their ability to select and process information (Mason & Hacker, 2003; Yu Cheung, 2010). This exclusion is especially acute for low-income households, where being unable to access the internet leads to declining school performance, as connectivity has become essential for teaching and learning (UNESCO, 2019; ITU, 2022).

Unless targeted interventions are implemented, these children will remain trapped in a cycle of digital deprivation, denying them the opportunities necessary to thrive in an increasingly connected world (UNICEF, 2021; ITU, 2022).

5.6 Is there a correlation between widowhood and access to technology?

This study also examined the intersection of the digital divide and social factors, specifically widowhood status and stigma, to understand their potential impact on the population's access to and use of digital technologies. This perspective draws from Blay's (2008) work on feminism, which emphasised the interconnectedness of social categories that potentially influence individuals' experiences of privilege and oppression.

To establish the relationship, a chi-square test was employed to examine the association between sociocultural factors and access to and effective use of technology. The results revealed sufficient evidence to conclude that there exists an association between the following: gender and using smartphones for homework; television for studying and entertainment; and radio for entertainment. Academic qualification was associated with the use of mobile phones for networking, smartphones for communication, and television for communication and networking. Similarly, family financial situation was associated with the use of mobile phones for networking and smartphones for entertainment. These findings demonstrate that sociocultural factors can significantly restrict widows' children's effective use of technology.

This also suggests that access to technology should not be considered solely in financial terms. While economic capacity plays a key role, the cultural environment in which respondents live – and the extent to which cultural norms and stigma shape their digital access and use – must also be critically interrogated. By addressing these intersecting factors, scholars and policymakers can provide a more holistic understanding of the digital divide affecting widows' children and design targeted strategies to improve access for vulnerable and marginalised populations.

5.7 Children's unfiltered voices

When asked about their desire for technologies to meet their needs, it's crucial to hear what the children say, in their own voices. In the study's findings, I highlight the voices of some respondents that are key; these are the voices of children who have access that is either limited or restricted. This section presents some quotes from the collected data. The primary focus is on their voices regarding how technology can be improved to meet their needs as children.

"Made more accessible (being affordable)"

"Punish child predators."

"Responsible persons should create awareness on how children can effectively use technology."

"Better access to the internet and better modification to accommodate all children (language and children with disabilities)."

"Restrictions should be made for underage children not to access phonographic films."

"Cybersecurity."

"Made more age-appropriate"

"Made easier to use."

"The government should supply laptops in schools for everyone to access."

"Technology should be modified in different languages."

"More kids should be educated on technology."

"Provide Wi-Fi everywhere."

"Those who are capable should donate televisions to the rural areas so that they may access technology."

"The government should stop taxing them to make buying technology devices easy."

"Electricity to be made available to allow us to use tech."

"By putting child protection sites on phones to avoid pornographic content."

5.8 Limitations of the study

Since this study mainly focused on widows' children in the Lake Victoria region, it offered insights into the lives of vulnerable children regarding access to, use of, and outcomes from technology. However, its generalizability is limited to children affected by widowhood. While it can be argued that the study findings may be applied to children from poor backgrounds in various countries affected by widowhood, the social and cultural contexts that negatively or positively influence technology adoption among children are not the same everywhere (Mugenda & Mugenda, 2003). Thus, caution should be taken when extending the results beyond the population studied.

The findings may also not be generalisable to other contexts, such as child-headed households, children living with grandparents or other relatives, children in foster care, or children of widowers and other single-parent households. These family structures introduce different dynamics that affect

children's access to resources, including digital technologies, in nuanced ways. Furthermore, the level of vulnerability differs significantly across family structures.

Secondly, in a rapidly digitising and unevenly connected world, investing in children's access to, use of, and outcomes from technology using only a survey design has inherent limitations, even though it provides valuable insights (UNICEF, 2020). In particular, the survey restricted respondents' answers to pre-designed options, as most of the questions were closed-ended. This limitation constrained participants' ability to fully express their emotions, reasoning, and lived experiences behind some responses—dimensions that are often better captured in qualitative designs such as interviews or focus groups (Creswell & Plano Clark, 2017).

Although a mitigation strategy was included through "other" response categories, this did not sufficiently address the lack of depth. Consequently, the study relied on quantifiable data, which limited its ability to provide richer, qualitative insights into children's experiences with technology.

5.9 Future Research Directions

Despite the existence of extensive research on children and digital technologies, there remains a significant gap in the existing body of knowledge specific to widows' children—a void that this study has begun to address. By examining technology access and usage among widows' children aged 13–18 in rural Kenya, this study provides critical initial data in a context where academic work on widows' children is largely absent. This highlights the necessity for further focused investigations among different populations of children, acknowledging their diverse realities (UNICEF, 2017).

The homogenised approach to children and digital technologies restricts effective interrogation of access and usage patterns (Ngaji, 2023). Childhood is not homogenous but gendered, racial, classed, and ethnicised (Alanen, 2016). It is further influenced by socio-economic, political, and cultural factors (ITU, 2020; UNICEF, 2019). To date, there is no global comparative data examining households led by widows versus those led by non-widows with regard to children's access to and use of technology. The findings from this study, therefore, provide initial insights that can serve as a

foundation for such comparisons and extend beyond the study population to inform broader debates on inequality and access (van Dijk, 2005).

Future research should interrogate populations of children and their engagement with digital technologies not as homogeneous but as unique, situated, and context-dependent. It should also highlight what children themselves understand as information and communication technology from tools to services so as to capture their lived digital realities (van Deursen & Helsper, 2015). An intentional investigation into children's knowledge of technology is essential for advancing understanding of their access, use, and digital outcomes.

Even though digital divide research has advanced to what has been termed the third level—focusing on benefits gained from digital engagement many marginalised children, including those in widow-led households, remain excluded from exposure to diverse technologies (van Dijk, 2020). This exclusion represents a hidden yet profound divide that risks further entrenching inequalities and leaving vulnerable populations behind. Thus, future research must not only extend the evidence base but also account for these nuanced and layered inequities in children's digital lives.

CHAPTER 6: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

In this chapter, the researcher summarised and discuss my study findings, in the context of my study's goal: to assess the level of access to, opportunities, and challenges of technology among widows' children and create a foundation that local organisations may use to promote and improve their educational outcomes - followed by reflections sharing both the researcher's and research assistants' observations and experiences throughout the entire study. I then conclude by recommending future studies and development in children and addressing the digital divide.

6.1 Access to technology

Access to technological devices, services and resources is essential for the holistic development of children's lives, futures and wellbeing, even though global disparities continue to push many to the extremes of the digital divide due to limited infrastructure, lack of electricity, poverty and the high cost of the devices, including the internet (van Dijk, 2020; UNICEF, 2021). Access, which is more than just possession of the devices, includes awareness and availability of the necessary resources, skills, positive motivation for their use, the ability to use technology and the internet effectively, safety in use, and the acquisition of the desired outcome after using the services and/or devices (Livingstone & Helsper, 2007).

In this study, access has been determined to be limited based on several factors, including 1) the limited perception of digital technologies among the population, 2) lack of computers among the study respondents' households, 3) limited ownership of technological devices among the population and 4) lack of competence-based skills in effectively using technology and the internet for the realisation of their dreams. Most of the respondents access technology directly or indirectly through shared household devices. With 57% reporting that their family financial situation is average, this proves that their access is primarily attributed to the parental ability to own a particular device.

However, a significant percentage, 37%, of the disadvantaged imply that more than a third of widow families experience financial hardship, drastically limiting their technology purchasing power.

However, disparities in access can exacerbate existing inequalities, leaving some children at a disadvantage (OECD, 2021). Furthermore, excessive or unstructured use of technology, particularly without guidance, can lead to adverse outcomes, underscoring the importance of balanced and purposeful technology integration in children's lives (UNESCO, 2019).

In conclusion, families and governments must ensure children have equitable access to technology while addressing device provision and internet connectivity, promoting digital literacy and responsible usage. In bridging the digital divide among children, we take a multidisciplinary approach by having all relevant stakeholders, policymakers, educators, communities, and families create supportive environments where all children, rich and poor, fully benefit from technology advancements without being exposed to biases and harms.

6.2 Opportunities

Technology provides endless possibilities for social and economic development. Technology and the internet are key drivers of globalisation and industrialisation in the digital world, affecting health, education, transportation, and communication (UNESCO, 2019; ITU, 2021). For children, it can foster creativity, enhance their learning experiences and prepare them for the future. For this study, there are two key perceived opportunities of technology for the study population: 1) communications and 2) education.

6.2.1 Technology supporting children's communication

Human beings are social beings. Our best way of interacting is through communication. In this age of technology, calls, SMS, and social media chats continue to offer various opportunities and avenues for communication. This study found that communication, at 48%, is the most prominent use of digital technologies among widows' children, followed by education and entertainment. They often use mobile phones and smartphones to communicate and connect with friends and family. In

this context, mobile phones are the most widely used devices for communication. This is an easily accessible and convenient device among this population.

Despite the growing access to mobile phones across the continent, only 11% of widows' children own mobile devices, which suggests a glaring gap related explicitly to cost. It's crucial to note that owning a cell phone indicates improved social connections and accessibility for individuals (Campbell, 2005; ITU, 2022). Mobile phones have become increasingly desirable among children and are often seen as a fashion statement.

Frequent communication helps strengthen and maintain social relationships with those they consider necessary. In the current digital world, children explore mobile and online texting as a way to stay connected, share knowledge, joke, and have a great time building their relationships.

6.2.2 Value of technology in children's education

Education, as the cornerstone of development, is constantly being constructed to ensure children have the skills to shape their futures and address existing global issues (UNICEF, 2020). In this day and age of technology, education is evolving beyond traditional forms to include personalised learning, collective tools, and interactive tools that allow individuals to consume, create and disseminate their knowledge with others. This brings many opportunities, including expanding access, but also disadvantages those with limited access.

The COVID-19 pandemic was a pivotal moment that shaped online learning and teaching and widened the digital divide in education and other social spheres (OECD, 2021). As Lewis (2020) argued, the ad hoc move to replace face-to-face learning with e-learning faced the digital divide. This meant that learners who lacked access to technology and the skills and knowledge to navigate online classrooms were left behind.

Students in vulnerable and low-income communities and households were most affected due to issues with internet accessibility, infrastructure, and power generation - prerequisites for e-learning (Matimaire, 2020). In my own experience as a researcher, COVID-19 caught up with me during the last year of my bachelor's studies. The quick transition to Google Classrooms without prior

orientation on navigating these spaces was a learning point. I was lucky to have had exposure to Google through my work. Still, it begged the question of what about those students who had no experience with Google or lived in households with no electricity or internet connection? In addition, children find it challenging to interact with online learning, access digital learning resources, and fully participate in online platforms due to a lack of internet access, devices, or the necessary digital tools (Vitalis et al., 2025), which hinders quality learning.

Access to technology has a pivotal effect on modern education, as it contains the potential to offer many learning opportunities, including 1) research and learning about new things, 2) support in completion of assignments, 3) development of new skills and competencies, and 4) study for exams, as stated by 61% of children in this study. Various studies have highlighted the positive effects of digital technologies on a child's cognitive, educational, and social levels (Subrahmanyam et al., 2001; Livingstone, 2012). Many children can learn, innovate, create, share, interact, and resolve world problems through technology.

The study's findings reinforce technology's fundamental role in teaching and learning, as also voiced by the respondents themselves. Even though education in Sub-Saharan Africa continues to suffer from financial difficulties hampering the procurement of relevant digital technology resources and services that can support students (Mutula, 2002), intentional investment in digital technologies, especially within rural and marginalised communities, can ensure that children are at competitive academic levels, allowing the full exploration of talents and skills and the realisation of one's full potential.

In Kenya, where this study is based, the 1991-1992 government introduction of a cost-sharing scheme that required students to pay direct fees of US$80-US$107 annually was a massive barrier to introducing digital technologies in schools due to competing issues (Serem, Njeri, & Kara, 2013). The argument above is crucial in the current context of Kenya, where the Kenyan National Treasury acknowledges budget constraints and the inability to disburse school funds despite the continuous increase in taxation. This saw the rise of nationwide demonstrations dubbed #RejectFinanceBill2024, which was primarily led by "Gen Z" (Al Jazeera, 2024, June 28).

Nonetheless, the competing nature of basic needs continues to sideline education as parents and guardians focus more on food, shelter, and clothing. Technological advancement is an unstoppable wave, and the lack of access and skills is a potential threat to many children. As most higher education institutions have transitioned to a mix of face-to-face and online learning, high schools and primary levels, especially those in developing countries, have not adopted this approach. With the accelerating shift to digital education, educators must hone their technological skills and continually upskill and reskill to meet the requirements for employable skills in this tech-driven age. The current debate centres on the skills gap, which could disrupt education, and how different stakeholders can help bridge it (World Bank, 2021).

This should not stop or even delay the universal access to quality education for all children everywhere. The advancement and strengthening of traditional education in areas where electricity and the internet have not reached should continue to ensure that children are well equipped and resourced for leading responsible lives and dreaming of brighter futures. The realisation of the Sustainable Development Goals (SDG 4) to ensure inclusive and equitable education, promoting a lifelong learning opportunity for all, is a human rights issue (United Nations, 2015). The persistent disparities can exacerbate inequalities, leaving many children disadvantaged, while unstructured technology use, particularly without guidance, can lead to adverse outcomes. Therefore, ensuring children can access personal or shared devices, such as computers and smartphones, at home would significantly improve their education.

6.3 Challenges

The growing digital world presents many challenges and dangers to different populations. The severity of dangers among children has been widely studied, with exposure to pornographic content being a significant concern among parents and other stakeholders (Livingstone & Helsper, 2007; UNICEF, 2017). This study's respondents identified pornography as the most critical technology and internet evil at 86%. For them, the use of nudity and explicit movie scenes continues to be the Internet's worst side. As one of them said, *"Watching those movies that portray bad lifestyles like drug abuse and wearing or exposing dressing that can negatively impact me as a child because I can be forced to imitate or copy them."*

Further, they expressed fear of being exposed to content that promotes fighting and alcoholism, harming a child's mental and social life. As one of the respondents stated, *"When a child/children is exposed to explicit movies where they see people kill themselves or engage in bad things (nudity, drug abuse and theft), it may affect his/her psychological being leading to disturbing dreams." Additionally, one other child said, "Constantly watching movies with fighting scenes can make children aggressive, less able to control their anger and prone to use violence to solve conflicts which in real life situations can lead to death."* Subsequently, the lack of necessary media literacy skills to effectively navigate the internet poses a significant threat to children's lives (Livingstone et al., 2017). This can lead to online abuse and exploitation due to their lack of proper understanding of the use of the internet and their inherent curiosity to connect. It's essential to note that the study population's parental positioning regarding digital technologies is unknown, although it can be generalised as poor relative to their social and cultural disposition. Therefore, a lack of parental knowledge of technology could lead to vast effects, including a child adopting distorted cultures and behavioural models online.

As the world advances, both risks and benefits are associated with technology. In the context of children, the positive shift inviting them to be innovative continues to evolve, allowing those with access to opportunities to explore their talents and skills by engaging with dynamic technology tools and resources. However, on the other hand, technology isn't shining as brightly as required. One thing is that children will require a lot of self-reliance to stay positively focused and engaged with digital technology. They will need support and robust, safe and reliable learning spaces that can allow them to create entirely. While recognising that most parents and guardians are equally digitally disadvantaged, establishing effective spaces is challenging until this population is fully knowledgeable (UNICEF, 2020)

Technological sustainability, especially in the education sector, is an aspect that is often overlooked. The development of more tools, cloud consumption, experience, education, and knowledge retention aren't covered. It is essential to investigate how children apply the knowledge they gain to improve their communities. By trying to understand what is it that children use technology for? How is technology beneficial to them? And how can technology be designed to provide them with insights for intergenerational knowledge sharing and consumption?

The growing amount of online violence is a danger to children. There have been reported cases of children being violated and even experiencing abuse online (ECPAT, 2021). Technology developers should intentionally create harm-free tools that are child-friendly to minimise harm. There have been numerous reported cases of death among children who were lured to commit suicide as a self-actualisation act after being part of an online game or online bullying (UNICEF, 2019). Such radicalisation happens within online speakers, and because our children lack knowledge and are naive about making new connections online, many of them have become prey to digital predators. Some studies have shown that there is a significant increase in mental health issues which negatively affect children due to the use of digital technology. The use of social media has the potential to increase anxiety, depression and suicidal ideation among children (Twenge & Campbell, 2018).

Some scholars argue that technology can improve a child's language skills. However, technological language, especially jargon and terminology, can be a barrier to accessing and using technology. It is a barrier to inclusivity, hindering children's ability to communicate, express themselves, and understand one another. Although language did not emerge as a significant challenge in this study, we must acknowledge that language is a major part of our lives and an essential aspect of digital technologies (UNESCO, 2021). Digital technologies require a language system, and the difference between the language of the electronic device and the user's language can be problematic.

The study recognised that the internet and tech language are widely used in English, with most developed countries, such as Germany, France, and China, able to use tech terms in their native languages. This is a privilege that developing countries, especially on the African continent, do not have. In conclusion, when examining the intersection of digital technologies and children, we must consider all potential challenges to ensure effective inclusion among the diverse child populations in the digital world.

6.5 Recommendations

6.5.1 Respondents' recommendations

The study's findings highlighted several needs and gaps that should encourage stakeholders, including policymakers, to ensure access to and usage of technology among children. The respondents called for intentional community and policy-related technology access and distribution interventions. Many of them believed that the government must ensure that all households have access to essential technologies, thus allowing children to learn how to use them early. Further, they called for improved accessibility, including the possibility of making technology free or more affordable to ensure inclusivity. They desire widespread free data and internet services, alongside the banning of unnecessary television channels that expose children to dangerous content. Moreover, some respondents advocated for establishing technology resource centres in rural communities to enhance digital literacy. Some respondents also wished for more opportunities to learn how to search for information online and improve their technological skills.

So, firmly, the respondents pushed for the intentional incorporation and actualisation of policies ensuring that all adults aged 18 and above have access to technology. They argued that as the world evolves, every young person should be technologically capable, allowing them to navigate the world and not be left behind easily. Lastly, many respondents expressed a desire for initiatives that support needy students in accessing technology, such as school-based programmes or tutoring sessions to enhance digital literacy. In addition, that was a call to ensure parents are also educated on technology to help guide their children effectively.

6.5.2 Researcher’s recommendations

One respondent had this to say, *“After the death of our father, our mother left us in 2017 and has never come back. I am traumatised to use a phone because after she left, she has never reached out again,”*. Even though this quote doesn’t explore the basis of this study, it presents a new research angle on exploring a fuller picture of African children’s digital worlds, in addition to conventional barriers like cost and lack of skills. Are there hidden stigmas, trauma and stereotypes that pose as hindrances to children accessing and using technology?

Studies on children and digital technologies have been homogeneous. However, children are fundamentally different even in the exact location. Understanding their socialisation and cultural backgrounds is crucial to knowing how much and in what ways they experience technology. This is a call for digital technology experts and child rights sector to explore the intersecting issues that may widen the digital divide among child populations, beyond economic status and educational level, while studying each child population separately. This is because children raised in a single-parent household by a diverse family and those raised by a deceased parent are affected differently in terms of access to, use of, and outcomes from technology.

Moreover, access to digital technologies goes beyond device ownership. It includes motivational access, which is a child's desire and intention to accept and use technology; 2) physical access, which is one's ability to afford and maintain the devices and technology services; 3) skills access, which is one's ability to command and use the devices and services effectively for their benefit; and 4) usage access, which is one's ability to know how to use and navigate the digital world with activeness and effectiveness. Understanding the multifaceted aspects of technology inclusion studies on digital technologies and children should include a broader assessment that explores these aspects.

Besides, it is essential to ensure that when digital technologies are introduced to marginalised and vulnerable children, their parents are intentionally engaged in understanding how to use tech effectively. This ensures safety by considering filtering programmes and age-appropriate social education as protective measures. It also creates conducive environments, along with continued support and mentorship, where parents find joy in helping their children navigate the digital world while encouraging creativity and innovation.

Finally, there is plenty of evidence suggesting that digital technologies have the potential to influence children's education positively. Different scholars have shown that using technology for educational purposes improves learning, leading to positive academic outcomes. Considering that not all children can enjoy access, governments and civil society organisations must collaborate to ensure technology is available and accessible in rural areas. This can be achieved by equipping public schools with computers, building computer labs, and expanding access to electricity and the Internet in these communities.

6.6 Conclusions

This study underscores the dire, existing digital divide among children, with a case study on widows' children in rural Kenya. While there is a growing landscape of digital technologies, the inequality gap is exacerbated by limited or no access to technological affordances and skills, leading to cultural, social, and developmental disparities. By examining the different levels of the digital divide among these children, the study has shown there is an opportunity to scale up inclusion, one community at a time.

The findings of this study suggest that for improved and competitive education for all children, the vulnerable and marginalised population must be brought to the forefront of digital inclusion, empowerment, and participation. Barriers such as limited infrastructure, lack of access to the internet, electricity and high cost of acquiring digital devices, must be addressed. Further, leveraging on the global sustainable development goals that seek to end poverty, protect the planet and ensure that by 2030 all humans are enjoying peace and prosperity, there's no doubt that technology must be at the centre of this desired change, including for populations cut off due to systemic factors and inequalities. The intentional building of children and young people's creativity and knowhow in this digital era, particularly in the African context, requires that governments proactively and intentionally invest in technology and finance the different resource structures (electricity and education) for African societies.

Specifically, for Kenya, as of 2024, access to basic education has been put in jeopardy due to increased taxation and the current regime's agenda focused more on good housing. The neglect within the education sector will adversely affect children and young people in rural and marginalized communities. If government is intentional about the realization of SDG9, there needs to be structural resourcing for technology and education that allows all children in Kenya to enjoy improved and digitalised ways of being, knowing, seeing and learning. Technology and education should be at the centre of child and youth development.

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APPENDIX

Appendix 1: Study questionnaire

Research Questionnaire on the access, usage, and outcome of technology among widows' children.

Goal: To assess access to and use of technology among widows' children in the Lake Victoria Region in Kisumu, Kenya.

Hello and welcome. My name is ……, and I will be leading you in this survey on behalf of Evelyn. I will ask you about technology, which people create to help make life easier or solve problems.

During this time, I will ask you questions on 1) Access [meaning you can get to or use something], 2) Usage [meaning how something is used or the way people use it], and 3) Outcome [meaning the result of something that happens].

Thank you for being willing to participate in this study. I appreciate your support in my research.

All the responses are anonymous and will not be linked to you.

Background details

1. **Your gender:** Girl Boy
2. **How old are you** _____
3. **What is your highest academic qualification?**

   Primary

   - Ongoing Completed Incomplete

   Secondary

   - Ongoing Completed Incomplete

   College

- Ongoing Completed Incomplete

University

Ongoing Completed Incomplete

I have never been to school

Other

(b) If other, please specify_____

4. **How would you describe your family's financial situation?**
    - Very disadvantaged
    - Disadvantaged
    - Average
    - Advantaged
    - Very advantaged

Questions regarding access to technology

5. **Do you know what technology is?**
    - Yes
    - No
6. **What type of technology do you know/ are you aware of? (Select all that apply to you.)**
    - Mobile phones
    - Smartphones
    - Television
    - Radio
    - Computers
    - Games
    - Digital camera

- Tablets
- Tape recorder
- Film projector
- None
- Other

(b) If other, please specify_____

7. **Which of these technologies is available in your home?**

- Mobile phones
- Smartphones
- Television
- Radio
- Computers
- Games
- Digital camera
- Tablets
- Tape recorder
- Film projector
- None
- Other

(b) If other, please specify_____

8. **Who in your family owns/this technology?**

- My mother
- My brother
- My sister

- My grandmother
- My relatives (uncle, aunt, cousins)
- None
- Other

(b) If other, please specify_____

9. How do you access the technologies at home, and through whom do you have access?

- I have access through my mother
- I have access through my siblings
- I have access through my friends
- I have access through my neighbour
- I have access through the school
- I have access through a cyber cafe
- Other

(b) If other, please specify_____

10. Which technology do you personally own (select all that apply)

- Mobile phones
- Smartphones
- Television
- Radio
- Computers
- Games
- Digital camera
- Tablets
- Tape recorder
- Film projector

- None
- Other

(b) If other, please specify_____

11. How frequently do you use the technology mentioned in 5 above?

- Daily
- Two times a week
- Once a week
- Once a month
- Once a year
- Never

12. What do you use the technology for?

- Communicating with family and friends
- Meeting/networking with new people
- To do homework
- Studying
- Play video games
- Entertainment
- Learn new skills
- Promote my business
- Other

(b) If other, please specify_____

13. How confident do you feel using the technology you mentioned you have access to?

- Very confident

- Somewhat confident
- Not very confident
- Not confident at all
- Other

(b) If other, please specify_____

14. Do you have the needed skills to use the technologies properly?

- Yes
- No
- I don't know

15. If your response in 14 above is yes, what skills do you have

- I know how to handle the device
- I know how to operate the device
- Others

(b) If other, please specify_____

16. Do you have access to the Internet?

- Yes
- No

17. If your response in 16 above was yes, kindly share how you access the internet

- I access the internet through broadband connectivity
- I have access through a cyber cafe
- I have access through home wifi
- I have access through the school
- Other

(b) If other, please specify_____

18. **At what age did you first access the internet? _____**

19. **Do you need permission from your parents/guardians to access/use technology and the internet?**

- Yes
- No

Questions regarding the usage of technology and the internet

20. **How frequently do you use the internet?**
    - Daily
    - Two times a week
    - Once a week
    - Once a month
    - Once a year
    - Never
21. **Can you use the internet/technology when you want to or need to? (Choose one answer.)**
    - Never
    - Hardly ever
    - Sometimes
    - Often
    - Very often
22. **What do you use the internet for?**
    - Communicating with family and friends
    - Meeting/networking with new people
    - To do homework
    - Studying
    - Play video games
    - Entertainment
    - Learn new skills

- Promote my business
- Other

(b) If other, please specify_____

23. How confident are you in using the internet?

- Very confident
- Somewhat confident
- Not very confident
- Not confident at all
- Other

(b) If other, please specify_____

24. Do you have the needed skills to use the internet properly?

- Yes
- No
- I don't know

25. If your response in 20 above was yes, what skill do you have in using technology/the internet? (Choose up to 5 skills)

- I have computer skills
- I know how to search for things online using browsers
- I know how to open downloaded files
- I know how to make new friends online
- I know how to report harmful content relating to me or a group to which I belong
- I know how to post online a video or music that I have created myself
- I know how to install apps on a mobile device (e.g., phone or tablet)
- I know how to open a new tab in a browser
- I only know how to use social media apps (FB, IG, and X)
- Sometimes, I end up on websites without knowing how I got there
- I don't have any skills

- Other

(b) If other, please specify_____

26. If your response in 16 above is yes, how did you acquire these skills?

_____

27. What are your top five benefits of using technology and the internet? (Please select upto five options.)

- Communicating with friends
- Connecting with family
- Meeting/networking with new people
- Doing my homework
- Studying
- Playing games
- Learning new skills
- Entertainment
- Promoting my business
- Other

(b) If other, please specify_____

28. Do you have a good time when you go online? (e.g. you enjoy yourself or get something out of it- Choose one answer)

- Never
- Hardly ever
- Sometimes
- Often
- Very often

Questions regarding the outcome of using technology and the internet

29. Are there things on the internet that are good for children your age?

- Yes
- No
- I don't know
- I am not sure

30. If you said yes in 25 above, what are some of the good things on the internet for children? (allow the child to express and select up to three freely)

- Strengthen my existing friendships
- Communicating and strengthening my relationships with my family
- Meet new people
- Connect and share with other children
- Improving my education and learning
- Letting me express myself
- Keeping me up to date with news and current affairs
- Teaching me about issues I care about
- To take action on issues I care about
- Providing access to health information
- Encouraging me to develop new skills To relax and have fun
- To create content and share it with others
- Strengthening my cultural or religious identity
- Letting me contribute to decision-making in my community
- To buy or sell things online
- Other (please specify)
- Don't know

(b) If other, please specify_____

31. Do you think there are bad things on the internet that can negatively affect children?

- Yes
- No
- I am not sure

32. If your response in 31 above is yes, what are some negative consequences of the internet for children?

- Access to pornographic content
- Child predators
- Child sexual abuse
- Others

(b) If other, please specify_____

33. How has technology helped you in life?

- Meet new friends
- Improve my academic performance
- Relieve stress through entertainment
- Connect with friends and family
- Others

(b) If other, please specify_____

34. How do you think technology can be improved to meet your needs?

- Made easier to use
- Made more accessible (being affordable)
- Made more age-appropriate
- Better access to the internet
- Better modification to accommodate all children (language and children with disabilities)
- Other

(b) If other, please specify_____

35. What do you think is the usefulness of technology in children's education?

- Support me in doing my homework.
- Help with research on new issues.
- Support in peer learning
- Other

(b) If other, please specify_____

36. How has the use of technology and the internet helped improve your education

- I was able to study for my exams
- I learned about additional things in my class
- I was able to get extra lessons from my teacher on a topic
- I learned a new thing and shared it with others at school
- Other

(b) If other, please specify_____

37. Please describe how your desired technology would look and feel (feel free to include a colour preference)

_____

_____

Intersecting questions regarding access and usage of technology and the internet

38. Which one of the following best describes the position of the sole breadwinner in your family?

- Casual worker (farming, vegetable vending, small shop, etc.)
- Domestic worker (maid, washing clothes, etc.)
- Employed (teacher, nurse, school cook, etc.)
- Unemployed

- Other

(b) If other, please specify_____

39. What factors do you think hinder you from accessing technology and the internet?

- Poverty (my parent cannot afford it)
- High cost (Getting access to devices (mobile phone, computer, tablet) is too expensive)
- Lack of electricity at home
- Paying for internet/data is too expensive
- There is no signal or a poor signal where I live
- I am providing for my siblings. Thus, technology and the internet are luxuries I cannot afford
- Stigma
- I have no barrier
- Other

(b) If other, please specify_____

40. What challenges do you face in using and accessing technology and the internet?

- The Internet is too difficult to use
- I do not have enough time to go online
- The Internet is time-consuming
- Technology and the internet are not for people my age
- I am worried about my privacy
- Other

(b) If other, please specify_____

41. Would access to technology and the internet help improve your education?

- Yes
- No

42. If your response in 41 above is yes, kindly tell us how it will

- Doing homework
- Learning new things
- Being innovative
- Other

(b) If other, please specify_____

43. Is there anything else you would love to say concerning technology access, usage, and outcome?

_____

_____

_____

Thank you for taking part in this study.

Your feedback is part of a larger community of voices in this study.

Appendix 2: Ethics

RHODES UNIVERSITY
Where leaders learn

RU 120

Rhodes University Human Research Ethics Committee
Main Admin Building, Drostdy Road, Makhanda, 6139, South Africa
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https://www.ru.ac.za/researchgateway/ethics/
NHREC Registration number: RC-241114-045

30 September 2024

Ms Evelyn Odhiambo

Email: g24o2066@campus.ru.ac.za

Review Reference: 2024-8138-9111

Dear Ms Odhiambo,

Re: Examining the Digital Disparities Among Adolescents in Rural Western Kenya: A Study of Technology Access and Usage Among Children of Widows.

Researcher: Ms Evelyn Odhiambo

Supervisor: Dr Chikezie E. Uzuegbunam

This letter confirms that the above research proposal has been reviewed and **APPROVED** by the Rhodes University Human Research Ethics Committee (RU-HREC). Your Approval number is: 2024-8138-9111

Approval has been granted for 1 year. An annual progress report will be required in order to renew approval for an additional period. You will receive an email notifying you when the annual report is due.

Please apply for a protocol amendment should any substantive change(s) be made, for whatever reason, during the research process. This includes changes in investigators. Email your request to ethics-committee@ru.ac.za.

Please submit a brief report to the ethics committee on the completion of the research. The purpose of this report is to indicate whether the research was conducted successfully, if any aspects could not be completed, or if any problems arose that the ethical standards committee should be aware of.

If a thesis or dissertation arising from this research is submitted to the library's electronic theses and dissertations (ETD) repository, please notify the committee of the date of submission and/or any reference or cataloguing number allocated.

Sincerely,

Dr Janet Hayward

Chair: Rhodes University Human Research Ethics Committee (RU-HREC)

August 13th 2024

Nyanam International,

3871-40100.

Kisumu-Kenya

Dear Evelyn,

RE: APPROVAL TO CONDUCT RESEARCH WITH WIDOWS CHILDREN AGED 13-18 YEARS

Thank you for reaching out regarding your research on digital disparities among adolescents in Rural Western Kenya. I appreciate your detailed proposal, and the comprehensive information provided.

I am pleased to confirm we have reviewed your request and support your research objectives. Your study on technology access and usage among widows' children is both important and timely, and we are happy to assist in facilitating this research within our organization.

This letter therefore acts as an approval of your request to conduct your research study with widows' children aged 13-18 years. Please note the following:

1. That you obtain the necessary ethics approvals and required research license in Kenya before you proceed with the study.
2. That publication of your research findings should be guided by consent from the organization and inclusion of appropriate organizational staff.

Thank you once again for considering our organization for your research. We look forward to collaborating with you on this important project.

Sincerely

Jackline Atieno Odhiambo

Executive Director

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REPUBLIC OF KENYA

NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **511030**

Date of Issue: **11/October/2024**

RESEARCH LICENSE

This is to Certify that Ms.. Evelyn Achieng Odhiambo of Rhodes University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Kisumu on the topic: Examining the Digital Disparities among Adolescents in Rural Western Kenya: A Study of Technology Access and Usage among Children of Widows for the period ending : 11/October/2025.

License No: **NACOSTI/P/24/40762**

511030

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY &
INNOVATION

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See overleaf for conditions

Appendix 3: Consent forms

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CHILD PARTICIPANT'S ASSENT FORM

INFORMED ASSENT DECLARATION

(Child participant aged 11 – 17 years)

Project Title: Examining the Digital Disparities among Adolescents in Rural Western Kenya: A Study of Technology Access and Usage among Children of Widows

Researcher's name: Evelyn Achieng Odhiambo

Name of participant: ……..

I confirm the following:

1. The researcher has explained what this research is about, why they want me to take part and what I will be doing during the research.
2. I know that my name will not be used in the research and that I can create another name for myself if I want to.
3. I have asked the researcher any questions I have about the research and am satisfied with their answers / I did not have any questions I wanted to ask the researcher about the research.
4. I understand that if I decide not to take part in the research, nothing will happen to me.
5. I know who to talk to if I am worried or have any other questions to ask.
6. Nobody has forced me to take part in this research.
7. I am willing to take part in the research.
8. I will not be compensated for participating in the research, but my out-of-pocket expenses will be reimbursed. All participants will receive transport reimbursement and a bar of soap as an appreciation.

_____ _____

Signature of Child **Date**

Ethics Coordinator, Rhodes University Research Office,
Room 204, Main Admin Building, Drostdy Road, Grahamstown, 6139
ethics-commitee@ru.ac.za t: +27 (0) 46 603 7314

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PARTICIPANT INFORMED CONSENT DECLARATION
(To be signed by research participant/s)

Project Title: Examining the Digital Disparities among Adolescents in Rural Western Kenya: A Study of Technology Access and Usage among Children of Widows

Evelyn Achieng Odhiambo from the Department of **Journalism and Media Studies** at Rhodes University has requested my permission to participate in the above-mentioned research project.

I have been explained to the nature and purpose of the research project and of this informed consent declaration in a language that I understand.

I am aware that:

1. **The purpose of the research project is to** assess the access, opportunities, and challenges of technology among widows' children and create a foundation local organizations can use to promote/improve their educational outcomes.

2. Rhodes University has given ethical clearance to this research project ***(Ethics Approval Number- yet to be awarded),*** and I have seen/may request to see the clearance certificate by contacting the Ethics Coordinator (ethics-committee@ru.ac.za)

3. **By participating in this research project, I will contribute** in advocating for technological access for vulnerable young people, shedding light on the digital divide faced by widows' children, and informing ICT programming priorities for local organizations in Kenya and beyond.

4. **I will participate in the project by** responding to a questionnaire and answering questions on technology access, usage, and outcomes. Some of these questions will include: 1) What types of technology are widows' children aware of and have access to? 2) How do they access and use technology? 3) What are the outcomes of using technology? 4) What barriers hinder widows' children from accessing and using technology?

5. My participation is entirely voluntary and should I wish to withdraw from participating further at any stage, I may do so without any negative consequences.

6. I will not be compensated for participating in the research, but my out-of-pocket expenses will be reimbursed. All participants will receive transport reimbursement and a bar of soap as an appreciation.

7. **The following risks are associated with my participation**:

I. **Confidentiality of personal information.**
The researcher will collect essential personal data using a participant registration form, including names, ages, villages, groups, parent/guardian names, and contact details. To protect confidentiality, the data will be coded early, securely stored, and accessed only by the researcher using a password-secured tablet. Participants' identities will not be released without their consent. The data collected will be used in the dissemination of the study results.

8. The Researcher intends to publish the research results in the form of a research abstract/journal and key study findings and recommendations published on a fact sheet on the researcher's website. However, confidentiality and anonymity of records will be maintained, and my name and identity will not be revealed to anyone who has not been involved in conducting the research.

9. In terms of the Protection of Personal Information Act (No. 4 of 2013), it remains my right to request the Researcher provide me with a detailed explanation of exactly how confidentiality and anonymity of the data I provide will be achieved. I may also request to know exactly how my personal information will be stored securely and for how long it will be stored.

10. I consent to data collected from me for this research project being used by the Researcher in a follow-up study.

11. **In terms of the POPI Act, I possess the right to receive feedback about this research. This will be** conducted during a one-day study-finding forum presentation to all the study participants. The researcher will organize a one-day feedback meeting with the Nyanam Widows Rising organization for all participants. The study results will be disseminated through a PPT presentation and simple study findings and recommendation fact sheet will be distributed to all participants for further engagement with the study results unless ***I elect not to receive this feedback.***

12. Any further questions I might have regarding the nature of the research and/or my participation in it will be answered by **Evelyn Achieng Odhiambo** g24o2066@campus.ru.ac.za or mariaeva089@gmail.com

13. By signing this informed consent declaration, I am not waiving any legal claims, rights, or remedies. A copy of this informed consent declaration will be given to me, and the original will be kept on record by the Researcher.

I, ……., have read the above information / confirm that the above information has been explained to me in a language that I understand, and I am aware of this document's contents. I have asked all the questions I wished to ask, which have been answered to my satisfaction. I fully understand what is expected of me during the research.

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I have not been pressured in any way, and I voluntarily agree to participate in the above-mentioned project.

…… …….. ……

Participant's signature **Witness** **Date**

Ethics Coordinator, Rhodes University Research Office,
Room 204, Main Admin Building, Drostdy Road, Grahamstown, 6139
ethics-commitee@ru.ac.za t: +27 (0) 46 603 7314

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PARENT AND GUARDIAN'S INFORMED CONSENT

INFORMED CONSENT DECLARATION
(To be signed Parent or Guardian of research participant aged 17 years or younger)

Project Title: **Examining the Digital Disparities among Adolescents in Rural Western Kenya: A Study of Technology Access and Usage among Children of Widows**

Evelyn Achieng Odhiambo from the Department of Journalism and Media Studies at Rhodes University has requested my permission to allow my child to participate in the above-mentioned research project.

The nature and the purpose of the research project, and of this informed consent declaration have been explained to me in a language that I understand.

I am aware that:

1. The purpose of the research project is to assess access, opportunities, and challenges of technology among widows' children and create a foundation local organizations can use to promote/improve the educational outcomes of widows' children using technology

2. The Rhodes University has given ethical clearance to this research project [**Ethics clearance number**] and I have seen/ may request to see the clearance certificate from ethics-committee@ru.ac.za

3. By participating in this research project my child will be contributing towards increased access to technology, improved usage, and beneficial outcomes among widows' children in Kenya and beyond

4. My child will participate in the project by responding to a questionnaire tackling questions on technology access, usage, and outcomes.

5. My child's participation is entirely voluntary and s/he must also agree to participate.

6. Should I or my child at any stage wish to withdraw from participating further, we may do so without any negative consequences.

7. My child may be asked to withdraw from the research before it has finished if the researcher or any other appropriate person feels it is in my child's best interests, or if my child does not follow instructions.

8. Neither my child nor I will be compensated for participating in the research. However my child's out-of-pocket expenses will be reimbursed. All participants will receive transport reimbursement and a bar of soap as an appreciation.

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9. There may be risks associated with my child's participation in the project. I am aware that

   a. the following risks are associated with participation: participants' personal information confidentiality and safety.
   b. the following steps have been taken to prevent the risks: all participants' personal information will be entered into an online system and stored safely and only accessible to the researcher.

10. The researcher intends to publish the research results in the form of an academic journal. However, confidentiality and anonymity of records will be maintained, and my or my child's name and identity will not be revealed to anyone who has not been involved in the conduct of the research ***unless my child and I agree to waive this confidentiality***.

11. In terms of the POPI Act, I possess the right to receive feedback about this research. This will take the form of a one-day feedback meeting including study results fact sheets distributed among all participants and to be shared with parents. Unless ***I elect not to receive this feedback.***

12. Any further questions that I might have concerning the research or my participation will be answered by Evelyn Achieng Odhiambo- g24o2066@campus.ru.ac.za or mariaeva089@gmail.com

13. By signing this informed consent declaration, I am not waiving any legal claims, rights, or remedies that I or my child/ward may have.

14. A copy of this informed consent declaration will be given to me, and the original will be kept on record.

I, …….. have read the above information / confirm that the above information has been explained to me in a language that I understand and I am aware of this document's contents. I have asked all questions that I wished to ask and these have been answered to my satisfaction. I fully understand what is expected of my child during the research.

I have not been pressured in any way to let my child take part. By signing below, I voluntarily agree that my child/ward …… (**insert name of child**), who is …….. years old, may participate in the above-mentioned research project if they want to.

…… ……

Parent/Guardian's signature **Date**

These are the translated version of the consent forms

Swahili versions

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FOMU YA RIDHAA YA MTOTO
TAMKO LA RIDHAA ILIYOHARIBIWA
(Mtoto mwenye umri wa miaka 11-17)

Kichwa cha Mradi: Kuchunguza Tofauti za Kidijitali miongoni mwa Vijana katika Vijijini Magharibi mwa Kenya: Utafiti wa Upatikanaji na Matumizi ya Teknolojia miongoni mwa Watoto wa Wajane.

Jina la mtafiti: Evelyn Achieng Odhiambo
Jina la mshiriki: ……

Ninathibitisha yafuatayo:

1. Mtafiti ameeleza utafiti huu unahusu nini, kwa nini wanataka nishiriki na nitakuwa nikifanya nini wakati wa utafiti.
2. Ninajua kuwa jina langu halitatumika katika utafiti na kwamba ninaweza kujiundia jina lingine nikitaka.
3. Nimemuuliza mtafiti maswali yoyote niliyo nayo kuhusu utafiti na nimeridhika na majibu yake/Sikuwa na swali lolote nililotaka kumuuliza mtafiti kuhusu utafiti huo.
4. Ninaelewa kuwa nikiamua kutoshiriki katika utafiti huo, hakuna kitakachotokea kwangu.
5. Ninajua ni nani wa kuzungumza naye ikiwa nina wasiwasi au nina maswali mengine yoyote ya kuuliza.
6. Hakuna mtu amenilazimisha kushiriki katika utafiti huu.
7. Niko tayari kushiriki katika utafiti.
8. Sitalipwa kwa kushiriki katika utafiti, lakini gharama zangu za nje ya mfuko zitarejeshwa. Washiriki wote watapokea malipo ya usafiri na kipande cha sabuni kama shukrani.

Sahihi ya Mtoto _____ **Tarehe** _____

Ethics Coordinator, Rhodes University Research Office,
Room 204, Main Admin Building, Drostdy Road, Grahamstown, 6139
ethics-commitee@ru.ac.za t: +27 (0) 46 603 7314

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MSHIRIKI ALIFAHAMISHA TAMKO LA RIDHAA
(Itiwe saini na Mshiriki/Mtafiti)

Kichwa cha Mradi: Kuchunguza Tofauti za Kidijitali miongoni mwa Vijana katika Vijijini Magharibi mwa Kenya: Utafiti wa Upatikanaji na Matumizi ya Teknolojia miongoni mwa Watoto wa Wajane.

Evelyn Achieng Odhiambo kutoka Idara ya **Uandishi wa Habari na Mafunzo ya Vyombo vya Habari** katika Chuo Kikuu cha Rhodes imeomba ruhusa yangu ya kushiriki katika mradi wa utafiti uliotajwa hapo juu.

Nimefafanuliwa kuhusu asili na madhumuni ya mradi wa utafiti na kuhusu tamko hili la kibali katika lugha ninayoelewa.

Ninafahamu kuwa:

1. **Madhumuni ya mradi wa utafiti ni** kutathmini ufikiaji, fursa, na changamoto za teknolojia miongoni mwa watoto wa wajane na kuunda msingi mashirika ya ndani yanaweza kutumia kukuza/kuboresha matokeo yao ya elimu.

2. Chuo Kikuu cha Rhodes kimetoa kibali cha kimaadili kwa mradi huu wa utafiti ***(Nambari ya Uidhinishaji wa Maadili- 2024-8138-9111),*** na nimeona/ninaweza kuomba kuona cheti cha kibali kwa kuwasiliana na Mratibu wa Maadili (ethics-committee@ru.ac.za)

3. **Kwa kushiriki katika mradi huu wa utafiti, nitachangia** katika kutetea upatikanaji wa teknolojia kwa vijana walio katika mazingira magumu, kutoa mwanga kuhusu mgawanyiko wa kidijitali unaokabili watoto wa wajane, na kufahamisha vipaumbele vya programu ya ICT kwa mashirika ya ndani nchini Kenya na kwingineko.

4. **Nitashiriki katika mradi kwa** kujibu dodoso na kujibu maswali kuhusu ufikiaji wa teknolojia, matumizi na matokeo. Baadhi ya maswali haya yatajumuisha: 1) Je! ni aina gani za teknolojia ambazo watoto wa wajane wanazifahamu na wanaweza kuzifikia? 2) Je, wanapataje na kutumia teknolojia? 3) Ni nini matokeo ya kutumia teknolojia? 4) Ni vikwazo gani vinazuia watoto wa wajane kupata na kutumia teknolojia?

5. Kushiriki kwangu ni kwa hiari kabisa na iwapo nitapenda kujiondoa katika kushiriki zaidi katika hatua yoyote, naweza kufanya hivyo bila matokeo yoyote mabaya.

6. Sitalipwa kwa kushiriki katika utafiti, lakini gharama zangu za nje ya mfuko zitarejeshwa. Washiriki wote watapokea malipo ya usafiri na kipande cha sabuni kama shukrani.

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7. **Hatari zifuatazo zinahusishwa na ushiriki wangu** :

   I. **Usiri wa taarifa za kibinafsi.**
   Mtafiti atakusanya data muhimu za kibinafsi kwa kutumia fomu ya usajili ya mshiriki, ikijumuisha majina, umri, vijiji, vikundi, majina ya mzazi/mlezi na mawasiliano. Ili kulinda usiri, data itawekwa msimbo mapema, kuhifadhiwa kwa usalama, na kufikiwa na mtafiti pekee kwa kutumia kompyuta kibao iliyolindwa na nenosiri. Utambulisho wa washiriki hautatolewa bila idhini yao. Data iliyokusanywa itatumika katika usambazaji wa matokeo ya utafiti.

8. Mtafiti anakusudia kuchapisha matokeo ya utafiti katika mfumo wa muhtasari wa utafiti/jarida na matokeo muhimu ya utafiti na mapendekezo yaliyochapishwa kwenye karatasi ya ukweli kwenye tovuti ya mtafiti. Hata hivyo, usiri na kutokujulikana kwa kumbukumbu kutadumishwa, na jina na utambulisho wangu hautafichuliwa kwa mtu yeyote ambaye hajahusika katika kufanya utafiti.

9. Kwa mujibu wa Sheria ya Ulinzi wa Taarifa za Kibinafsi (Na. 4 ya 2013), inasalia kuwa haki yangu kumwomba Mtafiti anipe maelezo ya kina kuhusu jinsi usiri na kutokujulikana kwa data ninayotoa kutafikiwa. Ninaweza pia kuomba kujua jinsi maelezo yangu ya kibinafsi yatahifadhiwa kwa usalama na kwa muda gani yatahifadhiwa.

10. Ninakubali data iliyokusanywa kutoka kwangu kwa ajili ya mradi huu wa utafiti kutumiwa na Mtafiti katika ufuatiliaji wa utafiti.

11. **Kwa mujibu wa Sheria ya POPI, nina haki ya kupokea maoni kuhusu utafiti huu. Hii itafanywa** wakati wa wasilisho la siku moja la jukwaa la kutafuta utafiti kwa washiriki wote wa utafiti. Mtafiti ataandaa mkutano wa siku moja wa maoni na shirika la Nyanam Widows Rising kwa washiriki wote. Matokeo ya utafiti yatasambazwa kupitia wasilisho la PPT na matokeo rahisi ya utafiti na karatasi ya ukweli ya mapendekezo itasambazwa kwa washiriki wote kwa ajili ya kujihusisha zaidi na matokeo ya utafiti isipokuwa kama ***nitachagua kutopokea maoni haya.***

12. Maswali yoyote zaidi ninayoweza kuwa nayo kuhusu aina ya utafiti na/au ushiriki wangu katika utafiti huo yatajibiwa na **Evelyn Achieng Odhiambo -g24o2066@campus.ru.ac.za au mariaeva089@gmail.com**

13. Kwa kutia saini tamko hili la idhini iliyoarifiwa, siondoi madai yoyote ya kisheria, haki au masuluhisho. Nakala ya tamko hili la kibali cha taarifa nitapewa, na asilia itawekwa kwenye kumbukumbu na Mtafiti.

Mimi,……,
nimesoma maelezo hapo juu / nathibitisha kuwa habari hiyo hapo juu nimefafanuliwa katika

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a lugha ninayoelewa, na ninajua yaliyomo kwenye hati hii. Nimeuliza maswali yote niliyotaka kuuliza, ambayo yamejibiwa kwa kuridhika kwangu. Ninaelewa kikamilifu kile kinachotarajiwa kutoka kwangu wakati wa utafiti.

Sijashinikizwa kwa njia yoyote, na ninakubali kwa hiari kushiriki katika mradi uliotajwa hapo juu.

.....	.....	.....
Sahihi ya Mshiriki	**Tarehe**	**ya Shahidi**

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RIDHAA YA MZAZI NA MLEZI

TAMKO LA RIDHAA ILIYOHARIBIWA
(Kutiwa saini Mzazi au Mlezi wa mshiriki wa utafiti mwenye umri wa miaka 17 au chini)

Kichwa cha Mradi : **Kuchunguza Tofauti za Kidijitali miongoni mwa Vijana katika Vijijini Magharibi mwa Kenya: Utafiti wa Ufikiaji na Matumizi ya Teknolojia miongoni mwa Watoto wa Wajane**

Evelyn Achieng Odhiambo kutoka Idara ya Uandishi wa Habari na Mafunzo ya Vyombo vya Habari katika Chuo Kikuu cha Rhodes ameomba ruhusa yangu ili kumruhusu mtoto wangu kushiriki katika mradi wa utafiti uliotajwa hapo juu.

Asili na madhumuni ya mradi wa utafiti, na tamko hili la ridhaa iliyoarifiwa nimefafanuliwa katika lugha ninayoelewa.

Ninafahamu kuwa:

1. Madhumuni ya mradi wa utafiti ni kutathmini ufikiaji, fursa, na changamoto za teknolojia kati ya watoto wa wajane na kuunda msingi mashirika ya ndani yanaweza kutumia kukuza / kuboresha matokeo ya elimu ya watoto wa wajane kwa kutumia teknolojia.

2. Chuo Kikuu cha Rhodes kimetoa kibali cha kimaadili kwa mradi huu wa utafiti [**Nambari ya kibali cha Maadili-2024-8138-9111**] na nimeona/ ninaweza kuomba kuona cheti cha kibali kutoka kwa ethics-committee@ru.ac.za

3. Kwa kushiriki katika mradi huu wa utafiti mtoto wangu atakuwa akichangia katika kuongeza ufikiaji wa teknolojia, matumizi bora na matokeo ya manufaa miongoni mwa watoto wa wajane nchini Kenya na kwingineko.

4. Mtoto wangu atashiriki katika mradi kwa kujibu dodoso linalojibu maswali kuhusu ufikiaji wa teknolojia, matumizi na matokeo.

5. Ushiriki wa mtoto wangu ni wa hiari kabisa na lazima pia akubali kushiriki.

6. Iwapo mimi au mtoto wangu katika hatua yoyote tutataka kujiondoa katika kushiriki zaidi, tunaweza kufanya hivyo bila matokeo yoyote mabaya.

7. Mtoto wangu anaweza kuombwa kujiondoa katika utafiti kabla haujakamilika ikiwa mtafiti au mtu mwingine yeyote anayefaa anahisi kuwa ni kwa manufaa ya mtoto wangu, au ikiwa mtoto wangu hafuati maagizo.

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8. Si mtoto wangu wala mimi hatutalipwa kwa kushiriki katika utafiti. Hata hivyo gharama za nje za mfuko wa mtoto wangu zitalipwa. Washiriki wote watapokea malipo ya usafiri na kipande cha sabuni kama shukrani.

9. Kunaweza kuwa na hatari zinazohusiana na ushiriki wa mtoto wangu katika mradi. Ninafahamu hilo

   a. zifuatazo zinahusishwa na ushiriki: usiri na usalama wa taarifa za kibinafsi za washiriki.
   b. zifuatazo zimechukuliwa ili kuzuia hatari: taarifa za kibinafsi za washiriki wote zitaingizwa kwenye mfumo wa mtandaoni na kuhifadhiwa kwa usalama na kupatikana kwa mtafiti pekee.

10. Mtafiti ananuia kuchapisha matokeo ya utafiti katika mfumo wa jarida la kitaaluma. Hata hivyo, usiri na kutokujulikana kwa rekodi kutadumishwa, na jina na utambulisho wangu au wa mtoto wangu hautafichuliwa kwa mtu yeyote ambaye hajahusika katika uendeshaji wa utafiti ***isipokuwa mimi na mtoto wangu tukubali kuondoa usiri huu*** .

11. Kwa mujibu wa Sheria ya POPI, nina haki ya kupokea maoni kuhusu utafiti huu. Hii itachukua fomu ya mkutano wa siku moja wa maoni ikijumuisha karatasi za matokeo ya utafiti zinazosambazwa kati ya washiriki wote na kushirikiwa na wazazi. Isipokuwa ***ningechagua kutopokea maoni haya.***

12. Maswali yoyote zaidi ambayo ninaweza kuwa nayo kuhusu utafiti au ushiriki wangu yatajibiwa na Evelyn Achieng Odhiambo- g24o2066@campus.ru.ac.za au marjaeva089@gmail.com

13. Kwa kutia saini tamko hili la idhini iliyoarifiwa, siondoi madai yoyote ya kisheria, haki, au masuluhisho ambayo mimi au mtoto/wadi yangu tunaweza kuwa nayo.

14. Nakala ya tamko hili la idhini iliyo na taarifa nitapewa, na asilia itawekwa kwenye kumbukumbu.

Mimi, ……... nimesoma maelezo hapo juu/ nimethibitisha kuwa habari iliyo hapo juu nimefafanuliwa kwa lugha ninayoielewa na ninafahamu yaliyomo kwenye waraka huu. Nimeuliza maswali yote ambayo nilitaka kuuliza na haya yamejibiwa kwa kuridhika kwangu. Ninaelewa kikamilifu kile kinachotarajiwa kutoka kwa mtoto wangu wakati wa utafiti.

Sijashinikizwa kwa njia yoyote kuruhusu mtoto wangu kushiriki. Kwa kutia sahihi hapa chini, ninakubali kwa hiari yangu kwamba mtoto/wodi yangu …… (**weka jina la mtoto**), ambaye ni …… .. umri wa miaka , wanaweza kushiriki katika mradi wa utafiti uliotajwa hapo juu ikiwa wanataka.

…… ……

Sahihi ya Mzazi/Mlezi **Tarehe**

Dholuo versions

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FOMO MAR AYIE MAR NYATHI

LER MAR AYIE ASENG'EYO
(Nyathi ma ja higni 11 nyaka 17)

Nying nonro: Rango pogruok ma nitie e kind joma tin e gwenge ma ni e piny Kenya ma milambo: Nonro mar yudo teknoloji kod tiyo kodgi e kind Nyithind Mon ma Chi liel

Nying jatim nonro: Evelyn Achieng Odhiambo

Nying ng'at mitomo godo nonro:_____
Higni mari: _____

Ayie gi gik maluwogi:

1. Jatim nonro oselero gima nonro ni ochung'ne, gimomiyo gidwaro ni abed gi ng'eyo kod gima abiro timo e kinde ma nonrono timore.
2. Ang'eyo ni nyinga ok bi tiyogo e nonro kendo ni anyalo loso nying' machielo ka adwaro.
3. Ne apenjo jatim nonro penjo moro amora ma an-go kuom nonro kendo ne amor gi dwokogi / ne ok an gi penjo moro amora ma ne adwaro penjo jatim nonro kuom nonro.
4. Ang'eyo ni ka aneno ni ok abi timo nonro, onge gima biro timorena.
5. Ang'eyo ng'at ma onego awuo godo ka an gi parruok kata ka an gi penjo moro amora ma adwaro penjo.
6. Onge ng'at ma osechuna ni abedo gi gombo mar timo kata ni atim nonroni.
7. Ne ayie mondo akaw okang' mar timo nonro.
8. Ange'yo ni ok abi yudo chudo kuom bedo e nonroni. Kata kamano ibiro duokna pesa ma ne atiyogo e yore mag transport. Jogo duto ma biro bedo e nonroni biro yudo kipande mar sabun kaka ranyisi mar erokamano.

Ayie mar Nyathi _____
Tarik_____

Ethics Coordinator, Rhodes University Research Office,
Room 204, Main Admin Building, Drostdy Road, Grahamstown, 6139
ethics-commitee@ru.ac.za t: +27 (0) 46 603 7314

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OBOKE MAR AYIE MAR JALO MITIMO GODO NONRO BANG' NGEYO WECHE NONRO
(Obiro keto lwedo gi jogo mitimo godo nonro)

CHIWO AYIE BANG' NGEYO WECHE NONRO.

Nying Nonro: Nono Pogruok mantie yore mag Teknoloji e kind rowere e Gwenge mag Western Kenya: Nonro maluwore gi yudruok mar Teknoloji kod kaka itiyo kodgi e kind nyithind Mond liete.

Evelyn Achieng Odhiambo mowuok e migawo mar somo mar puonjruok weche mag Fwambo gi Lendo, e Mbalariany mar Rhodes kwayo ayie mari mondo nyathini ochiwre e nonro moler e wiye malo kanyono.

Gik matimore e nonroni kod gima nonroni dwaro timo, kaachiel kod weche motudore gi chiwo ayie oselerna e dhok ma awinjo.

Ang'eyo ni:

1. Gima nonroni dwaro timo en rango yore mag yudo teknoloji, thuolo mag ber manyalo bedoe, kaachiel gi chandruoge ma teknoloji kelo e kind nyithind mond liete, kendo mondo olos mise ma migepe mayudore e gwenge nyalo tiyo godo e jiwo/medo nyak e somb nyithind mond liete kokalo e tiyo gi teknoloji.

2. Mbalariany mar Rhodes osechiwo thuolo mar dhi nyime gi timo nonroni kaluwore gi chike marito ratiro mag dhano [Namba mar thuolo-2024-8138-9111] kendo aseneno/daher kwayo neno satifiket mar dhi nyime kowuok e ethics-committee@ru.ac.za

3. Ka odonjo e chenro mar nonroni, abiro konyo e medo yudo teknoloji, medo lony e tiyo kode, kelo nyak maber e kind nyithind mond liete kendo keto ler kuom pogruok ma nyithind mond liete yudo, kendo nyiso gik ma onego oket mokuongo e chenro mag ICT ne jodak mag alwora e Kenya kod oko.

4. Abiro bedo e nonroni ka a dwoko penjo ma mulo kaka inyalo yudo teknoloji, kaka itiyo kode, kod gik ma biro timore. Moko kuom penjogi biro bedo kaka: 1) Gin teknoloji mage ma nyithind mond liete ong'eyo kendo ma gin-go? 2) Ere kaka giyudo kendo tiyo kod teknolojia? 3) Ang'o ma nyalo timore ka watiyo gi teknolojia? 4) Gin gik mage ma geng'o nyithind mond liete yudo teknoloji kendo tiyo kodgi?

5. Bedo na e nonroni luwore mana gi yiero mara kendo ok ochuno ni nyaka oyie chiwre e nonro.

6. Ok-abiyudo chudo moro amora e bedo e nonroni. Kata kamano, pesa ma anyalo biro tiyo godo ka agolo e ofukona nikech wach motudore gi nonroni, ibiro dwokna. Jochiwre e nonro duto ibiro miyo pes wuoth kod sabun achiel kaka erokamano.

7. Nyalo bedo ni nitie rach manyalo yudore ka abedo e nonroni. Ang'eyo ni

a) Rach ma luwore gi nyalo tudore gi bedo e nonro: ng'eyo weche jochiwre giwuon, rito siri, kod weche motudore gi yudo hinyruok (safety)
b) Okange maluwogi osekaw mondo ogeng' godo rach manyalo bedoe: Weche duto motudore gi jochiwre ibiro rwak e kompyuta kendo, ibiro kan e yo ma-onge ng'ama nyalo yudo. Janonro kende ema biro nyalo yudogi.

8. Jatim nonro biro dwaro ni ondik weche ma ofwenyore bang' timo nonro, e buge mag josomo. Kata kamano, ibiro ne ni weche ma ondik ok-otudore gi ng'ato ang'ata mowachogi kendo ni gin siri moloyo. Kendo nyinga, gi gima nyalo fwenya ok-bi yangi ne ng'ato ang'ata ma-ok otudore gi nonroni, mak mana ka an ayie ni otim kamano.

9. Kaluwore gi chik mar rito weche mag ng'ato (Namba 4 mar higa mar 2013), pod en ratiro mara mar kwayo Jatim nonro mondo omiya ler matut mar kaka weche ma amiye biro bedo mabor kendo ma ok ong'ere. Bende, anyalo kwayo mondo ang'e kaka weche ma ng'ato oting'o ibiro riti maber kendo kuom kinde ma ibiro ritogi.

10. Ayie ni data ma ochoki kuoma mar tich mar nonro ni otigodo gi Jatim nonro e nonro maluwo.

11. Kaluwore gi Chik mar POPI, an gi ratiro mar yudo paro gi weche duto mowuok kuom nonroni. Ma biro timore e romo mar odiechieng' achiel, kinde ma weche motudre gi nonro, kaachiel gi kalatese moting'o weche duto e wi nonro ibiro chiwo ne jochiwre e nonro duto kod jonyuolgi, mak mana ka ayiero ni kik ayud dwoko gi.

12. Penjo moro amora ma dabed-godo e wi nonro kata bedona e nonro ibiro dwoko gi Evelyn Achieng Odhiambo - g24o2066@campus.ru.ac.za or mariaeva089@gmail.com

13. Ka aketo lweta e oboke mar yie ma ng'ato ong'eyo, ok aweyo gimoro amora ma chik dwaro, ratiro, kata yore mag geng'o wachno. Kopi mar oboke mar yie ma ng'ato ong'eyo ibiro miya, kendo oboke mokwongo biro keto e rekod gi Jatim nonro.

An, …….. asesomo weche man malogo/ ayie ni adier osenyisa weche man malogo e dhok ma awinjo maber kendo ang'eyo weche manie obokeni. Asepenjo penjo duto ma daher penjo, kendo dwoko momiya mag penjogo oroma. Ang'eyo maber gigo ma nyaka atim e kinde ma itime nonro.

Ok osechuno e yo moro amora, kendo ayie gi chunya duto mondo atim tich ma osewuoye malo kanyo.

…….. …….. ……..

Saini mar jachiwre e nonro **Janeno** **Tarik**

Appendix 4: study invitation letter and advert

RHODES UNIVERSITY
Where leaders learn

PARTICIPANT INVITATION LETTER

Project Title: **Examining the Digital Disparities among Adolescents in Rural Western Kenya: A Study of Technology Access and Usage among Children of Widows**

Summary

I am Evelyn Achieng Odhiambo from the Department of Journalism and Media Studies, at Rhodes University. I have received ethical clearance [Ethics Clearance number 2024-8138-9111] to study technology access and usage among widows' children in rural Kenya. My study seeks to assess access, opportunities, and challenges of technology among widows' children and create a foundation local organizations can use to promote/improve the educational outcomes of widows' children using technology.

Benefit to participants

Your participation in this research will

1. Highlight the existing digital inequalities/disparities among different populations of children
2. Create awareness of the existing digital divide among widows' children
3. Promote access to technology for widows' children through policy advocacy
4. Provide you with increased knowledge on technology access, usage, and potential outcomes from the study results.

Your participation

Participation is voluntary and your responses will be kept strictly confidential. You may withdraw from the research study at any stage without any explanation. During the study, you will be requested to complete a questionnaire on access, usage, and outcome of technology.

How do you become a participant?

Your participation is linked to your being part of the Nyanam Widows Rising youth mentorship group. You must be between 13 and 18 years of age and living in Kisumu, Kenya, Kisumu West Sub-County. Further, you must assent and have parental consent if you are under 18 and consent if you are above 18 to participate in the study.

If you require further information please contact Evelyn Achieng Odhiambo at g24o2066@campus.ru.ac.za/ mariaeva089@gmail.com or the Rhodes University Human Research Ethics Committee (details below).

Rhodes University, Research Office, Ethical Review
Ethics Coordinator: ethics-commitee@ru.ac.za
t: +27 (0) 46 603 7314
Room 204, Main Admin Building, Drostdy Road, Makhanda, 6139

VOLUNTEER PARTICIPANTS NEEDED FOR A STUDY:

Examining the Digital Disparities Among Adolescents in Rural Western Kenya: A Study of Technology Access and Usage Among Children of Widows

This study seeks to: assess access to and use of technology among widows' children in the Lake Victoria Region in Kisumu, Kenya. The research aims to assess the level of access to, opportunities, and challenges of technology among widows' children and create a foundation local organisations can use to promote/improve the educational outcomes of widows' children.

I AM LOOKING FOR:

1. Nyanam widows' children aged 13-18 years old residing in Kisumu West Sub-County - Kisumu County
2. Volunteer and willing participants (Nyanam widows' children aged 13-18 years) to take part in one face-to-face survey interview session, which
    a. will be 1 hour in length, led by a trained research assistant who will be years 18-year-old or above
    Nyanam youth mentor. The session will be held
    b. at Sabako AIC church

The data collection session will discuss/negotiate participants' informed assent and content, as well as guardian/parent informed consent for participants aged 17 years and below. Informed consent and assent will be obtained before interviews.

The face-to-face survey interviews will invite participants to respond to questions on technology access, usage, and outcomes. These will be preloaded on a tablet and made available in English, Swahili, and Dholuo to allow participants comfort.

Your child's participation in this research will be strictly confidential, and all materials collected will be carefully anonymised.

- Does your child meet the criteria as mentioned above?
- Are you willing to allow your child to be part of this study?
- Do you have questions concerning this study?

Please contact:

Researcher: Evelyn Achieng Odhiambo - Master's of Social Science in Journalism and Media Studies at Rhodes University, South Africa. Email: g24o2066@campus.ru.ac.za, Tell: +254711420628

Supervised by: Dr. Chikezie E. Uzuegbunam - Email: chikezie.uzuegbunam@ru.ac.za

The Human Research Ethics Committee at Rhodes University has approved this research project.

Appendix 5: participants volunteer registration list

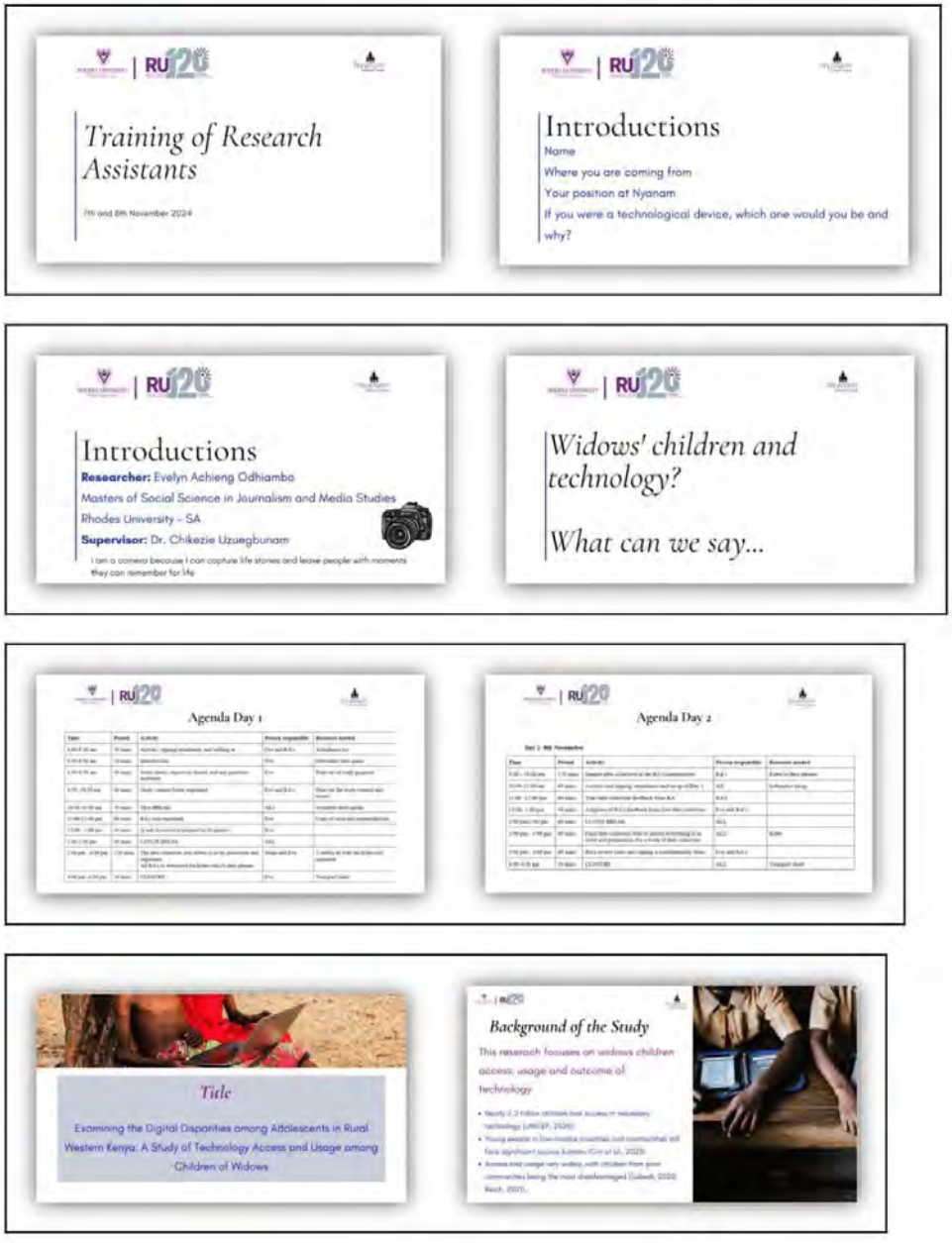
Title: Examining the Digital Disparities Among Adolescents in Rural Western Kenya: A Study of Technology Access and Usage Among Children of Widows

Study participants' volunteer form

Name of the Leadership Circle/Youth Group:
L's contact person name:
LC's contact person tel:

No	Name of parent/Guardian	Name of participants	Age	Gender	Contact
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					

Appendix 4: Research Assistance Training PowerPoint



Problem Statement

The research aims to assess the level of access to, opportunities, and challenges of technology among widows' children and create a foundation local organizations can use to promote/improve the educational outcomes of widows' children.

Scope

The study will assess access to and use of technology among widows' children in the Lake Victoria Region in Kisumu, Kenya.

Study relevance

Using the study findings we can shed light on the digital divide faced by widows' children and inform programming priorities for grassroots organizations.

key terms explored

Access: Do they know what technology is, have they seen it, do they own it or do they have it in their families?

Usage: have they used technology before, do they have skills to use tech?

Outcome: What benefits have they had using tech, and what do they prefer most?

Research questions

1. What types of technology are widows' children aware of and have access to?
2. How do they access and use technology?
3. What are the outcomes of using technology?
4. What are the barriers that hinder widows' children from accessing and using technology?

Study participants

- *Nyanam widows' children aged 13-18*
- *300 participants*
- *Kisumu West-Sub County*

Ethics

Consenting

10-17 years
- Parental consent
- Child assent

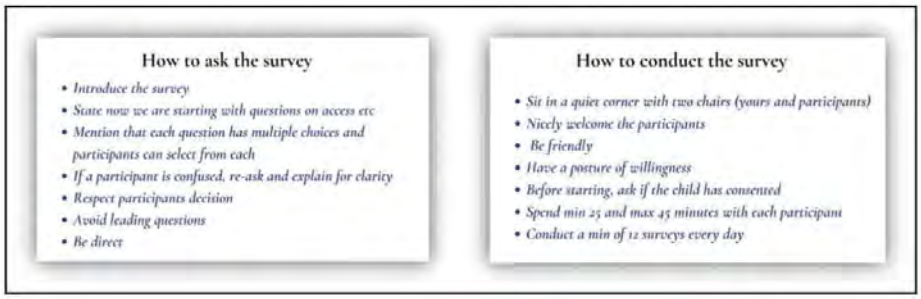
18 year
- Own consent

Study ethics

- School ethics
- Kenyan government licence
- Nyanam approval letter

Methodology

Data tool


How to ask the survey
• Introduce the survey
• State now we are starting with questions on access etc
• Mention that each question has multiple choices and participants can select from each
• If a participant is confused, re-ask and explain for clarity
• Respect participants decision
• Avoid leading questions
• Be direct
How to conduct the survey
• Sit in a quiet corner with two chairs (yours and participants)
• Nicely welcome the participants
• Be friendly
• Have a posture of willingness
• Before starting, ask if the child has consented
• Spend min 25 and max 45 minutes with each participant
• Conduct a min of 12 surveys every day


Questions
Thank You

Appendix 5: Field photos