



Access to smartphones in Kenya – the research case for mobile as AT

Cluster 1 Inquire
Mobile as Assistive Technology

Country
Kenya

Date
March 2025

Prepared by
Global Disability Innovation Hub, UCL



Insights Paper Series

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Global Disability Innovation Hub

Global Disability Innovation (GDI) Hub accelerates ideas into impact for a more just world - for disabled people, and all people. A world leading delivery and practice centre, an Academic Research Centre at UCL (University College London) and the first WHO Global Collaborating Centre on Assistive Technology (AT) – GDI Hub works in 40+ countries, having reached more than 64 million people since 2016. GDI Hub develops homegrown technologies alongside new knowledge and research.

AT2030

Led by GDI Hub, the UK International Development funded AT2030 programme tests ‘what works’ to improve access to life-changing Assistive Technology (AT) for all. Working with more than 70 global delivery partners, AT2030 has directly reached 10 million people to date. From creating deep community leadership and engagement to generating new evidence & insights, AT2030 answers critical research questions and develops foundational methodologies, addressing intersectional challenges and research and evidence gaps.

ATScale Global Partnership for Assistive Technology

ATscale, the Global Partnership for Assistive Technology, is a cross-sector global partnership with a mission to transform people’s lives through AT. It catalyzes action to ensure that, by 2030, an additional 500 million people in low- and middle-income countries get the life-changing AT they need.

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ATscale's vision is to ensure every person can access and afford the AT they need, enabling a lifetime of potential.

Kilimanjaro Blind Trust Africa (KBTA)

KBTA is a charitable Trust based in Nairobi providing access to quality education for children and youth with visual impairments (VI) in Kenya, Tanzania, Uganda, Rwanda, Malawi & Ethiopia. KBTA uses innovation & technology to provide access to digital Braille literacy & skills. KBTA served as the community partner on this project, facilitating mobile phone procurement, participant recruitment, and digital skills training delivery.

Jomo Kenyatta University of Agriculture and Technology (JKUAT)

JKUAT is one of Kenya's leading technology universities at the forefront of assistive technology innovation. Having recently launched the Innovative Wheelchair Centre, JKUAT is trail-blazing assistive technology awareness and innovation in Kenya. A team from the Department of Rehabilitation Sciences facilitated project delivery and quantitative analysis on this project.

Safaricom

As Kenya's largest telecommunication provider, Safaricom is perfectly positioned as the mobile network partner on this project. Safaricom provided free six-month mobile network data for the research participants. This enabled the researchers to continuously engage the participants throughout the project and examine the impact of Internet access on smartphone use of people with visual and hearing impairments.

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Senses Hub

Established in 2023, Senses Hub is the brainchild of Hope Tech, a pioneering assistive device development company and a collaborator of GDI Hub on the AT2030 programme. Senses Hub provided the workshop space for the delivery of the digital skills training in Nairobi.

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Acknowledgements

We want to extend our immense gratitude to our research participants who deeply engaged with this project and shared their lived experiences and feedback to help improve mobile as assistive technology.

We are grateful to our funders, UK International Development, Google, and ATScale Global Partnership for Assistive Technology, for supporting this research.

We also thank our partners, Jomo Kenyatta University of Agriculture and Technology, Kilimanjaro Blind Trust Africa, Safaricom, and Senses Hub, for their cooperation in delivering this project.

Suggested Citation: Maryam Bandukda, Caroline Yuk, Philip Oyier, Henry Athiany, Wallace Kuruguti, Joseph Mwangi Matheri, Guilia Barbareschi, Victoria Austin, Catherine Holloway. Access to smartphones in Kenya – the research case for mobile as AT. GDI Hub AT2030 Insight Paper Series. 2024.

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Executive Summary

This report presents findings from a pre-post intervention study conducted in Kenya, focusing on improving digital skills among Deaf and Hard of Hearing (DHH) and Blind and Partially Sighted (BPS) participants. The intervention provided participants with smartphones and digital skills training specifically designed to leverage Android accessibility features.

Key findings

- 78.8% of BPS participants showed significant noticeable improvement in digital skills following the intervention.
- 71.8% of DHH participants demonstrated moderate enhanced digital proficiency.
- BPS participants reported notable improvements in independence and privacy through features like TalkBack.
- DHH participants gained substantial communication tools through Live Transcribe and Live Caption features, with perceived helpfulness increasing significantly.
- The intervention addressed critical accessibility gaps in Kenya, where 90% of people with disabilities in low-income countries lack access to assistive technology.

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“The phone has really changed my life. Number one, personally, as a deaf person, I ... control many things independently; number two, I ... attend meetings without a sign language interpreter... attended so many meetings whereby I don’t need an interpreter, but I use live transcriptions.”

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Understanding the Kenyan Context

Kenya faces unique challenges and opportunities for digital inclusion:

- **Disability prevalence:** Persons with disabilities constitute 2.2% (0.9M) of Kenya's population, with visual impairments (36.4%) and hearing impairments (16.7%) among the common disability types.
- **Rural concentration:** Over 80% of persons with disabilities live in rural areas, creating challenges for service access.
- **Mobile ecosystem:** 92% of Kenya's population has mobile network coverage, with smartphones achieving 72.6% penetration.
- **Android dominance:** 94% of Kenyan smartphones are Android-based, making Android accessibility features particularly relevant.
- **Digital economy integration:** Over 60% of Kenyans use mobile money, highlighting the importance of accessible digital tools for financial inclusion.

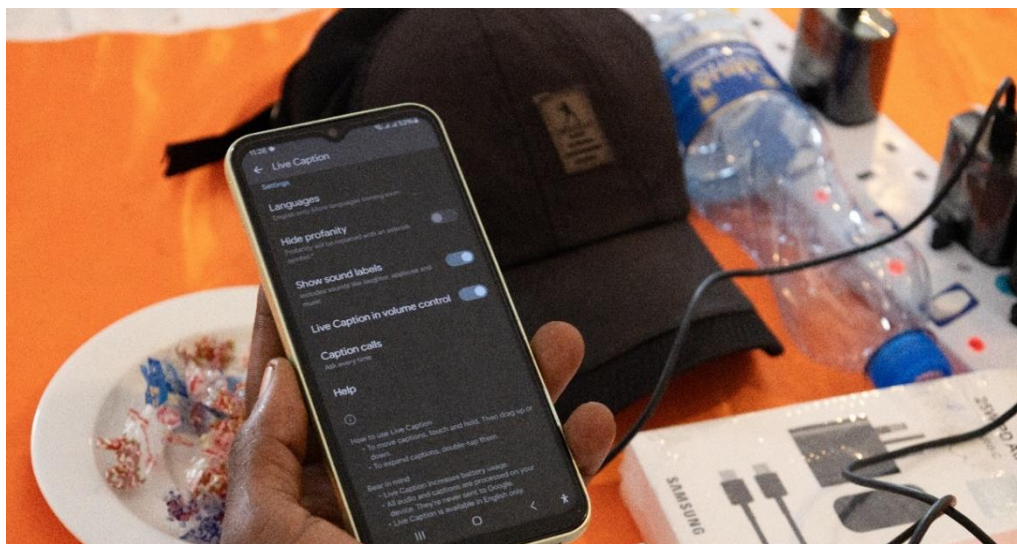


Figure 1: Smartphone showing live caption settings

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This context is particularly significant when interpreting our findings: **the combination of high mobile penetration but low assistive technology access creates an environment where smartphone-based interventions can have an outsized impact.**

Project Methodology

Study Design

The study employed a pre-post design with separate analyses for BPS (n=52) and DHH (n=71) participants. Digital skills were measured using an adapted version of the Mobile Device Proficiency Questionnaire (MDPQ). The smartphone provision and training intervention comprised of:

- Provision of Samsung Galaxy A-14 5G smartphones with Android 13
- Five-module digital skills training programme
- Monthly 2GB internet data allocation for six months

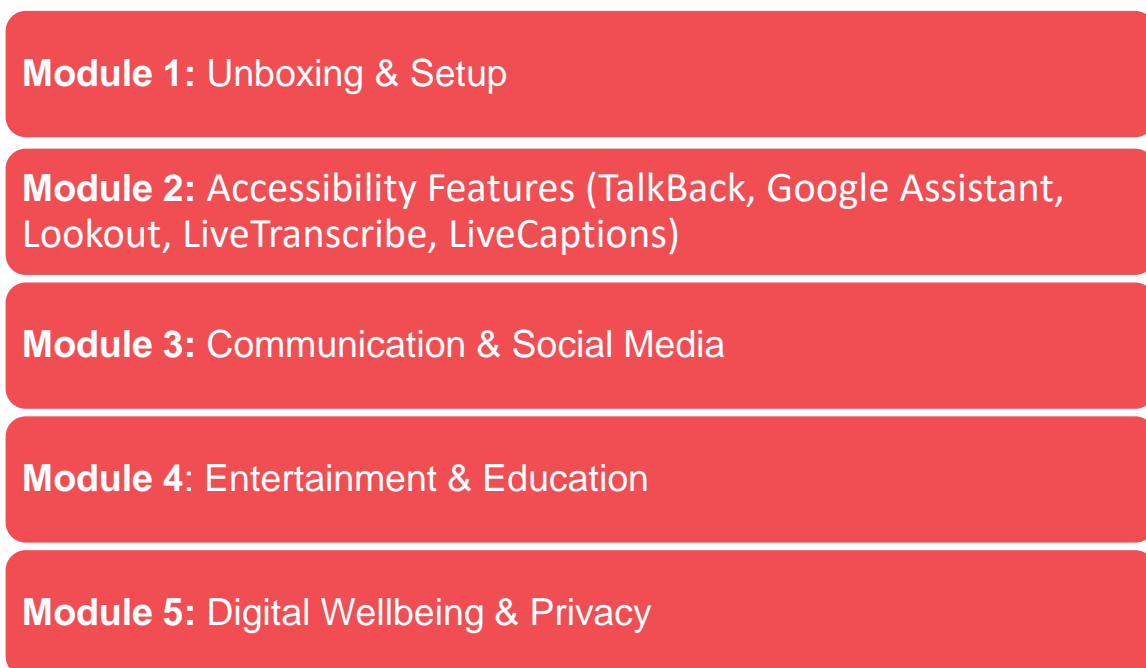


Figure 2: Digital skills training curriculum modular design

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Study Context –

Demographic Characteristics

Characteristic	BPS Participants (n=52)	DHH Participants (n=71)
Age (years)		
Mean (SD)	29.3 (8.9)	30.4 (7.8)
Range	20-62	19-54
Gender		
Male	30 (57.7%)	33 (46.5%)
Female	22 (42.3%)	38 (53.5%)
Education		
Higher education	50 (96.2%)	39 (54.9%)
Secondary school	1 (1.9%)	11 (15.5%)
Vocational training	1 (1.9%)	21 (29.6%)
Occupation		
Student	26 (50.0%)	24 (33.8%)
Employed	21 (40.3%)	38 (53.5%)
Volunteer	3 (5.8%)	7 (9.9%)
Unemployed	2 (3.8%)	1 (1.4%)
Other	0 (0.0%)	1 (1.4%)
Prior phone ownership		
Yes	>47 (>90%)	>60 (>85%)
No	<5 (<10%)	<11 (<15%)
Use of assistive technology		
Yes	47 (90.4%)	19 (26.8%)
No	5 (9.6%)	52 (73.2%)
Need for assistive technology		
Yes	50 (96.2%)	58 (81.7%)
No	2 (3.8%)	13 (18.3%)

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Key Findings

Context – Education Disparity

The education disparity between BPS and DHH groups (96.2% vs 54.9% higher education) provides an important context for interpreting the intervention outcomes. The high percentage of prior phone ownership in both groups suggests that the intervention focused on improving accessibility skills rather than introducing basic digital literacy. The stark contrast in pre-intervention assistive technology use between BPS (90.4%) and DHH (26.8%) participants also helps explain differences in training impact and feature adoption.

Impact on Digital Skills

Despite DHH participants starting with higher baseline digital skills (3.92 vs 3.58), BPS participants showed a larger relative improvement (Cohen's d of 0.83 vs 0.59). This suggests that accessibility-focused training may have a more transformative impact for BPS users, potentially because visual barriers to digital interfaces are more significant than auditory barriers in predominantly visual smartphone interfaces. The high percentage of BPS participants already using assistive technology (90.4%) suggests they were primed to adopt new accessibility tools.

"The skills that I acquired enable me. Before, I had no interpreter in church, but now, with the phone, I don't need one."

These additional communication options are particularly valuable in the Kenyan context where DHH individuals may benefit from multiple tools to

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navigate diverse social and professional settings, especially in rural areas where 80% of persons with disabilities reside.

Phone Usage Patterns

Despite similar post-intervention usage levels (2.94 vs 2.95), BPS participants showed a much stronger effect size (0.56 vs 0.27). This suggests that BPS users had more significant barriers to phone usage, which were effectively addressed by the intervention. The smaller effect size for DHH participants may indicate they faced fewer fundamental usability barriers, as reflected in their higher pre-intervention usage score.

Digital Skills Improvement

Measure	BPS Participants	DHH Participants
Pre-intervention mean	3.58 (SD=1.01)	3.92 (SD=0.81)
Post-intervention mean	4.27 (SD=0.58)	4.34 (SD=0.60)
Percentage improved	78.8%	71.8%
Effect size (Cohen's d)	0.83 (large)	0.59 (medium)
Statistical significance	p < 0.001	p < 0.001

Phone Usage Patterns

Measure	BPS Participants	DHH Participants
Pre-intervention mean	2.69 (SD=0.51)	2.80 (SD=0.62)
Post-intervention mean	2.94 (SD=0.39)	2.95 (SD=0.46)
Percentage increased usage	65.4%	59.2%
Effect size (Cohen's d)	0.56 (medium)	0.27 (small)

Perceived Helpfulness of Accessibility Features

Measure	TalkBack for BPS	Live Caption/Transcribe for DHH
Pre-intervention mean	4.17 (SD=1.17)	2.86 (SD=1.55)
Post-intervention mean	4.23 (SD=1.17)	3.86 (SD=1.25)

Percentage reporting increased helpfulness	30.8%	63.4%
Effect size (Cohen's d)	0.05 (negligible)	0.71 (medium)
Statistical significance	$p = 0.64$	$p < 0.001$

Impact

Perceived Helpfulness of Accessibility Features

The high pre-intervention TalkBack rating (4.17 out of 5) indicates that BPS participants had already recognised its value before training, explaining the modest increase. In contrast, the significantly lower pre-intervention rating for Live Caption/Transcribe (2.86) reflects limited prior exposure, resulting in a dramatic 63.4% increase after participants discovered its practical benefits. This aligns with our demographic data showing that 90.4% of BPS participants already used assistive technology compared to only 26.8% of DHH participants.

TalkBack enabled independent access to information and financial services, addressing a critical privacy concern in the Kenyan context where, previously, BPS individuals needed to share sensitive information with others. This leads to increased independence and autonomy.

For BPS people, the Android application Lookout addressed a particular challenge in Kenya, where currency notes may be difficult to distinguish and independent financial transactions are essential for economic participation.

"I use Lookout to tell me what is surrounding me. also, when it comes to money, I just display the money to Lookout, and it writes for me the amount if it is Kshs20 shillings, Kshs50."

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Beyond currency, it allows people to explore their environments.

"Sometimes, when I'm home alone, I can turn on the Lookout and try to know what's around me. Secondly, if I want to read something, and I'm alone in the office, or at home, I can use it."

The high need for assistive technology among BPS participants (96.2%) underscores the importance of these navigation tools.

"I think it gives you a sense of freedom. You are able to do things independently and freely, and even when you want privacy, when you have an accessible mobile phone, then you don't need people to do things for you. You have your privacy, and you have your independence. I think it's just a positive impact."

Quality of Life Impact

Measure	BPS Participants	DHH Participants
Pre-intervention mean	3.74 (SD=0.59)	3.55 (SD=0.49)
Post-intervention mean	3.75 (SD=0.51)	3.79 (SD=0.69)
Percentage showing improvement	40.4%	52.1%
Effect size (Cohen's d)	0.01 (negligible)	0.40 (small)
Statistical significance	p = 0.92	p < 0.01

The contrast between BPS participants' strong digital skills improvement and their non-significant quality of life change (Cohen's d = 0.01) suggests that technological proficiency doesn't automatically translate to perceived life quality improvements. For DHH participants, however, even smaller digital skills gains produced statistically significant quality of life benefits (Cohen's d =

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0.40). This indicates that communication barriers may have a more direct impact on quality of life than information access barriers in the Kenyan context.

"Using my phone has enabled me to also look for more jobs, and whenever I am at work, and I see any job advertisement, and I see that I am suitable for that, I search for it and apply."

Educational and Economic Opportunities

"We don't chat, so WhatsApp has been one of the useful apps day-to-day. I don't text, or SMS, I video call because that is the only way you are able to get the information that you want because only some of them [Deaf people] are literate, so not all of them are able to understand whatever that you say."

This highlights how smartphone access addresses the limitations of text-based communication in a country where literacy challenges exist among some DHH individuals. The quote also reveals an important insight about communication preferences: video calls enable Kenyan Sign Language communication, which overcomes literacy barriers. This is especially significant given that only 26.8% of DHH participants were using assistive technology before the intervention, suggesting substantial room for growth in communication tool adoption.

"When browsing, I am able to learn, and I can download quality material from the internet and from my friends, ... I am able to download and read them through the Google assistive features, so I am benefiting from it academically."

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Ongoing Challenges

Despite the intervention's success, several challenges persist:

Technological Challenges

- Touchscreen difficulties for BPS users: Many BPS participants struggled with virtual keyboards and touchscreen navigation, particularly those transitioning from button phones. Despite 90.4% of BPS participants already using some form of assistive technology, touchscreen interfaces remain challenging.
- Voice recognition limitations: Voice technologies often struggle with Kenyan accents and dialects, reducing usability.
- Internet affordability: DHH participants face high data costs due to reliance on video calls for KSL communication.

Structural Challenges in Kenya

- Low-cost smartphone limitations: Affordable smartphones often lack full accessibility feature sets. This is particularly relevant given the high need for assistive technology expressed by participants (96.2% of BPS and 81.7% of DHH).
- Rural connectivity gaps: The 80% of persons with disabilities living in rural areas face infrastructure challenges.
- Limited digital skills training: Few structured opportunities exist for ongoing digital literacy development.

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Conclusion: The Case for Smartphones as Assistive Technology

This study demonstrates that smartphone-based interventions can significantly improve digital inclusion for persons with sensory disabilities in Kenya. The substantial improvements in digital skills (78.8% for BPS, 71.8% for DHH) and the meaningful real-world impacts shared by participants highlight the potential of mobile technology as an accessible and relatively affordable assistive technology solution in the Kenyan context.

The qualitative insights reveal significant transformations in participants' lives, with many reporting newfound independence, educational opportunities, and social connections that were previously unattainable.

Our results provide evidence that Kenya's high baseline digital literacy (with pre-intervention scores of 3.58 and 3.92 for BPS and DHH participants, respectively) provides fertile ground for accessibility-focused interventions.

The impact appears particularly pronounced for features addressing specific practical challenges:

- Currency identification features addressing documented pain points for BPS individuals
- Video calling capabilities resolving communication barriers for DHH individuals where literacy challenges may limit text-based solutions
- Independent transportation booking that directly addresses mobility restrictions in Kenya's predominantly rural disability population

The data suggests that digital literacy interventions have the greatest impact when they target specific practical needs rather than general technology exposure. The strong difference in pre-intervention assistive technology use

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between BPS (90.4%) and DHH (26.8%) participants also indicates that there may be significant untapped potential for accessibility feature adoption in the DHH community.

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Evidence-Based Recommendations

- **Develop Kenya-specific voice models:** The feedback revealing challenges with voice recognition suggests investment in voice recognition models that better accommodate Kenyan accents and local languages.
- **Create targeted data bundles:** The reliance on video calls among DHH participants for KSL communication justifies specialised, affordable data plans for persons with disabilities.
- **Focus on practical use cases:** The contrast between skills improvement and quality of life changes suggests future training should emphasise practical everyday applications rather than general technology skills.
- **Prioritise rural access:** With 80% of persons with disabilities living in rural areas, yet participants showing improved independence with smartphone access, mobile-based assistive technology represents a feasible path to scale.
- **Target early assistive technology adoption:** The dramatic difference in pre-intervention AT use between BPS (90.4%) and DHH (26.8%) participants suggests that DHH communities could potentially benefit from an earlier introduction to specific accessibility features.
- **Embed in existing support networks:** The need for assistive technology is high across both groups (96.2% of BPS and 81.7% of DHH participants), indicating the importance of integrating AT training with Kenya's Organizations for Persons with Disabilities (OPDs)

By implementing these evidence-driven recommendations, Kenya can leverage its existing mobile infrastructure to become a leader in digital inclusion for persons with disabilities across Africa. The data demonstrates that targeted, contextually appropriate interventions yield measurable improvements in digital participation and quality of life for people with sensory disabilities.

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