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Barriers At the Interface: Challenges Faced by Visually Challenged Students in Accessing ICT Services at Kenyan Public Universities and Implications for Inclusive Policy Reform

SAVATIA, E. M.
School of Computing and Informatics, Kibabii University, Kenya

Abstract- ***Despite decades of international normative pressure and domestic legislation, visually challenged students (VCS) in Kenyan public universities continue to encounter profound barriers in accessing ICT services essential to academic participation. This paper presents an in-depth analysis of the challenges experienced by VCS at Kenyatta University and Maseno University, drawing on multi-stakeholder primary research involving 54 VCS, 10 lecturers, 4 ICT experts, 4 student guides, and 2 senior university administrators. Through thematic analysis of interview data and systematic observation, the study identifies seven interconnected challenge domains: (1) inadequate assistive technology provisioning; (2) inaccessible digital content and learning management systems; (3) deficient ICT support staff competence; (4) restrictive physical access environments; (5) insufficient institutional financial commitment; (6) absence of tailored ICT curricula for VCS; and (7) the compounding social burden of dependency on sighted guides. The paper develops a barrier typology that distinguishes between structural, institutional, technical, and social barriers, and maps these against the frameworks of the Convention on the Rights of Persons with Disabilities (CRPD), Kenya's Persons with Disabilities Act (2003), and the WCAG 2.1 accessibility guidelines. Policy recommendations are addressed to university management, the Commission for University Education, the Ministry of Education, and the Kenya Institute of Special Education.***

Keywords: Barriers to ICT Access, Visual Challenges, Higher Education Kenya, Digital inclusion, Disability Policy, Accessibility, CRPD, WCAG

I. INTRODUCTION

Helen Keller, blind and deaf herself, described the transformative potential of information access in terms that resonate with the digital age: books, and by extension, the information systems that have supplanted them are the eyes of the blind. They reveal to us the glories of the light-filled world; they keep us in touch with what other people are doing and think; they help us forget our limitations. The aspiration articulated by Keller has never been more technically achievable than in the present era of digital information; yet for visually challenged students in Kenya's public universities, the structural conditions required for its realization remain persistently absent.

The admission of VCS to mainstream university programmes is a necessary but insufficient condition for educational equity. Meaningful participation requires that VCS be able to access course materials, complete assessments, conduct research, and communicate with academic staff and peers through the same ICT infrastructure that mediates these activities for sighted students. When this infrastructure is inaccessible, the formal commitment to inclusive education is vitiated in practice, and VCS are compelled to navigate a university environment designed around modalities they cannot use.

This paper systematically examines the challenges VCS face in accessing ICT services at Kenyan public universities, addressing the third research objective of the foundational study: to determine the challenges faced by visually challenged students while using ICT services provided in Kenyan public universities. By synthesizing empirical findings through a multi-dimensional barrier typology and mapping challenges against applicable policy and normative frameworks, the paper seeks both to document the scope of the problem and to generate policy-actionable recommendations for its remediation.

1.1 The Stakes of Digital Exclusion

The consequences of inadequate ICT access for VCS are not confined to inconvenience or academic

underperformance. They extend to the reproduction of structural inequality: VCS who are unable to acquire digital competencies during their university education are systematically disadvantaged in a labour market increasingly organized around digital skills. Kenya's growing digital economy, anchored by Nairobi's Silicon Savannah technology ecosystem offers significant employment opportunities, but disproportionately for those with strong digital literacy. For VCS, the university represents a critical window of opportunity for digital skills acquisition; barriers that restrict ICT access during this period have lifetime consequences for employability and economic participation.

II. THEORETICAL FRAMEWORK: A MULTI-DIMENSIONAL BARRIER TYPOLOGY

Existing typologies of barriers to assistive technology use (Scherer, 2005; Borg et al., 2011) tend to focus on individual-level factors such as user attitudes, skill levels, and motivation. This paper adopts a structural perspective, arguing that the predominant barriers encountered by VCS in Kenyan universities are not primarily attributable to individual characteristics but to the configuration of institutional systems, policy environments, and resource allocations. Accordingly, a four-domain barrier typology is proposed:

Structural barriers refer to systemic conditions embedded in the architecture of institutions and policy frameworks that impede access independently of individual circumstances. These include inadequate funding allocation, absence of mandatory accessibility standards for institutional ICT procurement, and the absence of accountability mechanisms for non-compliance with disability legislation.

Institutional barriers refer to the specific organizational practices, cultures, and decision-making patterns within universities that translate structural conditions into operational exclusion. These include the absence of dedicated ICT accessibility units, inadequate staff training, and the failure to integrate accessibility considerations into LMS procurement and course material development processes.

Technical barriers refer to the characteristics of specific technologies and digital environments that impede VCS access. These include screen reader incompatibility with LMS platforms, inaccessible PDF course materials, CAPTCHA mechanisms on university websites, and hardware-binding constraints on screen reader licences.

Social barriers refer to the relational and attitudinal dimensions of VCS ICT access challenges. These include dependency on sighted guides for ICT navigation, lecturer attitudes toward VCS accommodation, and the social stigma associated with visible assistive technology use in shared computing environments.

III. EMPIRICAL FINDINGS: SEVEN CHALLENGE DOMAINS

3.1 Inadequate Assistive Technology Provisioning

The most consistently reported challenge across all respondent groups was the inadequacy of assistive technology provisioning relative to VCS demand. At Kenyatta University, the ratio of screen-reader-enabled computers to VCS was approximately 1:15, requiring VCS to queue for ICT access and to schedule computing time around institutional access hours rather than their own academic workflows. At Maseno University, the situation was marginally better in ratio terms but was compromised by equipment failures that went unaddressed for extended periods due to the absence of specialized technical support.

VCS respondents consistently described ICT resource scarcity as the most significant barrier to their academic performance, rating it above other challenges including course material accessibility and lecturer support. This finding is consistent with the 'first-order barrier' framework (Ertmer, 1999), which distinguishes between barriers that prevent access to technology altogether (first order) and those that affect the quality of use once access is achieved (second order). For Kenyan VCS, first-order barriers remain unresolved.

3.2 Inaccessible Digital Content

A structural challenge reported by VCS across both institutions was the near-universal inaccessibility of digitally distributed course materials. Lecturers predominantly distributed course notes and readings as scanned PDF files — digital images of printed text

— which are structurally opaque to screen readers. Unlike text-layer PDFs, scanned PDFs contain no machine-readable text; a screen reader encounters them as blank documents. Remediation requires OCR processing, but as noted in the previous section, OCR workstations were severely limited.

University websites and library databases presented additional inaccessibility challenges. Navigation menus relying on drop-down structures, image-based links without alternative text, CAPTCHA authentication mechanisms, and interactive forms with unlabelled fields collectively rendered standard web-based academic activities — searching the library catalogue, submitting assignments through the student portal, accessing course notices — routinely inaccessible to screen reader users. Neither institution had conducted a WCAG compliance audit of its digital infrastructure at the time of the study.

3.3 Deficient ICT Support Staff Competence

ICT support staff at both institutions lacked formal training in assistive technology configuration and troubleshooting. When VCS reported screen reader failures, staff were unable to diagnose problems, and resolution times were prolonged. More subtly, support staff who lacked experience with non-visual computing were unable to advise VCS on efficient navigation strategies, keyboard shortcuts, or workarounds for inaccessible content — guidance that would substantially enhance the functional usability of available tools.

One ICT expert respondent at KENYATTA UNIVERSITY acknowledged: 'When a visually challenged student comes to us with a problem with JAWS, we are honest — we tell them we do not know this software very well. We try our best but we are not trained for it.' This candid admission reflects an institutional staffing gap that no quantity of technology investment can compensate for: accessible technology is only as effective as the human support system that enables its use.

3.4 Restrictive Physical Access Environments

Observation data documented a range of physical environment barriers that compound the technical challenges experienced by VCS. ICT resource rooms were organized around the navigational conventions of sighted users, with insufficient tactile wayfinding cues for VCS to independently locate assistive technology workstations. Ambient noise in open-plan labs — from fan noise, keyboard sounds, and conversations — interfered with screen reader audio output, requiring VCS to use headphones while simultaneously managing keyboard commands and listening to synthesized speech at elevated volumes.

The physical location of dedicated VCS resource facilities was also identified as a barrier. At KENYATTA UNIVERSITY, the resource room was situated in a building with unreliable lift access, effectively excluding wheelchair users with visual impairments from independent access during lift outages. Although wheelchair users were not the primary focus of this study, the co-occurrence of physical and sensory disabilities among university VCS populations is not uncommon, and the compound effect of overlapping inaccessibilities is worthy of policy attention.

3.5 Insufficient Institutional Financial Commitment

Analysis of university budgetary data revealed that neither institution had a dedicated ICT accessibility budget line. Expenditures on assistive technology were classified under general ICT or student welfare headings, making it impossible to establish the precise level of investment or to track it over time. Senior administrator respondents were unable to specify the percentage of the ICT budget allocated to VCS provision, with responses ranging from 'less than 5%' to 'no specific allocation.' This budgetary opacity is itself a governance concern: resources that are not specifically allocated are routinely underprovided.

The declining per-capita budgetary allocation to Kenyan public universities — documented in the Kenya Economic Survey (2014) — provides structural context for this inadequacy. As student numbers have grown faster than budget allocations, the resources available per student have declined, intensifying competition for discretionary expenditures and disadvantaging provision for small, high-need subgroups such as VCS.

3.6 Absence of Tailored ICT Curricula

A less frequently discussed but structurally significant challenge is the absence of any tailored ICT

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curriculum for VCS within Kenyan universities. The national ICT curriculum, developed by the Kenya Curriculum Development Institute, does not include specific provisions for ICT training for students with visual impairments, and KISE classifies ICT literacy as extra-curricular for this group (Gakuu et al., 2009). The result is that VCS enter university with widely variable and typically limited ICT skills, acquiring screen reader proficiency through ad hoc peer learning rather than structured instruction.

This curricular gap means that VCS face a double disadvantage: they must simultaneously navigate unfamiliar assistive technology interfaces while engaging with the substantive demands of university-level coursework. The cognitive load imposed by this dual learning requirement — acquiring tool proficiency while applying tools to academic tasks — is significant and constitutes a barrier that could be substantially reduced through pre-enrolment or induction-phase ICT training programmes tailored to VCS.

3.7 The Social Burden of Guide Dependency

Perhaps the most poignant challenge category identified through VCS interview data was the social burden of dependency on sighted guides. At both institutions, VCS relied on paid or voluntary guides for navigation to ICT facilities, physical operation of non-accessible interfaces, and assistance with tasks that should have been independently executable with appropriate assistive technology. This dependency is not merely practically inconvenient; it is fundamentally incompatible with the dignity and autonomy that the CRPD identifies as core principles of disability rights.

VCS respondents described experiences of waiting for guides to become available before accessing ICT facilities, of guides' interpretations of on-screen content introducing errors into their academic work, and of social embarrassment associated with requiring assistance in public computing environments. These experiences reflect a failure of institutional design that forces VCS into dependent relationships that sighted students do not face.

IV. CHALLENGE-BARRIER MATRIX

Table 1: Challenge-Barrier Matrix with Policy Levers

Challenge Domain	Barrier Type	Key Policy Lever
Inadequate AT provisioning	Structural / Institutional	Ring-fenced accessibility budget; procurement standards
Inaccessible digital content	Technical / Institutional	Mandatory WCAG compliance; lecturer training
Staff competence deficits	Institutional	Mandatory AT training for ICT staff; specialist hiring
Physical environment barriers	Structural / Technical	Universal design standards for ICT spaces
Insufficient budget commitment	Structural	Government disability education funding earmarks
Absence of tailored curricula	Structural / Institutional	KISE/MoE ICT curriculum reform for VCS
Guide dependency burden	Social / Technical	Comprehensive AT provisioning reduces dependency

V. POLICY IMPLICATIONS

5.1 University-Level Reforms

Kenyan public universities should adopt formal ICT accessibility policies that establish minimum standards for assistive technology provision, digital content accessibility, and ICT support staff competence. These policies should include: dedicated budget allocations for VCS ICT provision (recommended minimum: 2% of the ICT budget per enrolled VCS); mandatory WCAG 2.1 compliance auditing of university websites, LMS platforms, and student portals on a biennial basis; mandatory AT training for ICT support staff at induction and refreshed annually; and an ICT accessibility needs assessment conducted with each newly enrolled VCS at the beginning of their programme.

5.2 National Policy Reforms

The Commission for University Education should incorporate ICT accessibility standards into its institutional accreditation frameworks, creating accountability incentives for universities to invest in accessible provision. The Kenya Institute of Special Education should develop a formal ICT curriculum for VCS and advocate for its integration into secondary school and pre-university education, addressing the curricular gap that leaves VCS under-prepared for university-level digital demands. The Ministry of Education should explore the viability of a national assistive technology grant fund, providing dedicated capital for universities to procure and maintain assistive technology infrastructure.

5.3 Legislative Alignment

The Persons with Disabilities Act (2003) should be updated to include explicit provisions on digital accessibility in higher education, aligned with CRPD Article 9 (Accessibility) and Article 24 (Education). Enforcement mechanisms should be strengthened, with the National Council for Persons with Disabilities empowered to receive and act on complaints regarding ICT accessibility failures in educational institutions.

VI. CONCLUSION

The challenges faced by visually challenged students in accessing ICT services at Kenyan public universities are not natural, inevitable, or immutable. They are the product of institutional decisions, resource allocations, policy omissions, and design choices that can be reformed. This paper has documented the scope and nature of these challenges through systematic empirical investigation, classified them through a four-domain barrier typology, and mapped them against actionable policy levers at institutional and national levels.

The moral case for action is anchored in Kenya's constitutional commitments, international treaty obligations, and the foundational educational justice principle that no student's academic potential should be limited by the failure of institutions to provide the tools they need to learn. The economic case is equally compelling: in a knowledge economy, the systematic exclusion of visually challenged graduates from digital competency represents an irretrievable loss of human capital. The time for incremental accommodation has passed; what is required is systemic transformation.

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