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From Fragmentation to Inclusion: Advancing Ergonomic and Digital Accessibility for Students with Physical Disabilities in Kenyan Universities

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Abstract

Purpose – This paper examines how Kenyan universities can transition from fragmented accessibility interventions toward integrated and sustainable systems of inclusion for students with physical disabilities (SWPDs). It advances a practical framework that combines ergonomic design, digital accessibility, institutional governance, and stakeholder participation to strengthen equitable access to information resources within university libraries and digital learning environments.

Design/methodology/approach – The study employed a qualitative, multi-site design involving four Kenyan universities: the University of Nairobi, Mount Kenya University, Alupe University, and Tangaza University. Data were collected through semi-structured interviews with SWPDs, disability coordinators, librarians, ICT personnel, and university administrators. Observations were also conducted within library spaces, ICT laboratories, lecture halls, and administrative environments. Thematic analysis was employed to identify recurring patterns relating to accessibility practices, institutional strategies, stakeholder participation, and implementation barriers.

Findings – The findings reveal that accessibility interventions remain fragmented, inconsistently implemented, and weakly institutionalized across Kenyan universities. While the University of Nairobi and Mount Kenya University demonstrate comparatively stronger policy alignment and infrastructural support, Alupe University and Tangaza University continue to experience structural, technological, and financial constraints. Major challenges include weak integration of assistive technologies, inadequate staff capacity, inconsistent application of universal design principles, limited monitoring mechanisms, and insufficient institutional investment. Accessibility initiatives are frequently confined to libraries and ICT laboratories rather than embedded across institutional systems and governance structures.

Practical implications – The paper proposes a two-pillar framework integrating accessibility systems (universal design, accessibility standards, monitoring mechanisms, and inclusive procurement) with inclusivity enablers (user participation, staff training, assistive technologies, institutional leadership, and stakeholder collaboration). The framework offers practical guidance for universities seeking to institutionalize accessibility and strengthen inclusive service delivery.

Social implications – Beyond institutional reform, the framework contributes to broader social inclusion in higher education by promoting independence, dignity, participation, and equitable access to information for SWPDs. It supports the development of learning environments that reduce dependency, challenge exclusionary practices, and normalize disability inclusion within academic spaces.

Originality/value – The paper contributes context-sensitive evidence from Kenyan universities and advances a practical model for integrating ergonomic and digital accessibility within higher

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education libraries and learning environments. It extends current debates beyond compliance-oriented approaches by emphasizing coordinated, system-wide, and user-centered inclusion.

Keywords: Digital accessibility; Ergonomic interventions; Students with physical disabilities; University libraries; Inclusive higher education; Universal design; Kenya

1. Introduction

The rapid digital transformation of higher education has fundamentally altered how universities create, manage, and disseminate information. Academic libraries, learning management systems, institutional repositories, electronic databases, and integrated ICT infrastructures now occupy central positions in teaching, learning, and research processes (Wang *et al*., 2026). While these technological developments have expanded access to information and educational opportunities, they have simultaneously exposed persistent inequalities affecting students with physical disabilities (SWPDs), particularly where accessibility principles remain weakly integrated into institutional systems (Maina *et al*., 2026).

Globally, universities are increasingly under pressure to adopt inclusive approaches that support equitable participation within digital and physical learning environments. International disability rights frameworks and inclusive education agendas have reinforced the responsibility of higher education institutions to provide accessible infrastructures, technologies, and information systems capable of supporting diverse learner needs (Kioupi *et al*., 2023; Rana *et al*., 2026). In Kenya, these obligations have further been strengthened through national disability policies and expanding institutional commitments toward inclusive education.

Consequently, universities have introduced a range of interventions aimed at improving accessibility for SWPDs. These include infrastructural modifications, assistive technologies, disability support offices, accessible library services, and digital learning accommodations. Despite these efforts, implementation remains uneven across institutions. Emerging evidence from Kenyan universities suggests that accessibility initiatives are often fragmented, inconsistently implemented, and weakly institutionalized (Fakoyede *et al*., 2026). While institutions such as the University of Nairobi and Mount Kenya University demonstrate relatively stronger policy alignment and infrastructural investment, others, including Alupe University and Tangaza University, continue to face significant infrastructural, technological, and financial limitations.

A major concern emerging from recent discussions on digital inclusion is the absence of coordinated and institution-wide accessibility strategies. In many universities, accessibility interventions remain reactive and department-centered rather than embedded within institutional planning and governance frameworks (White, 2026). Assistive technologies may be available within selected library sections or ICT laboratories, yet remain absent or inconsistently implemented across lecture halls, administrative systems, and online learning platforms (Eneya and Adesina, 2025). Similarly, numerous digital systems continue to exhibit limited compatibility

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with assistive technologies, thereby restricting independent access to academic resources and increasing reliance on peer-mediated support systems (Gupta, 2026).

Ergonomic interventions offer a practical pathway for addressing these challenges. By emphasizing the relationship between users, technologies, and learning environments, ergonomic design enhances usability, accessibility, comfort, and independent participation within academic settings (Alabi and Okiki, 2023). When integrated with universal design principles and user-centered accessibility approaches, ergonomic interventions can significantly improve the educational experiences and information access capabilities of SWPDs (Maina *et al*., 2026).

Against this background, this paper examines emerging accessibility trends within Kenyan universities and proposes a practical framework for advancing inclusive ergonomic and digital information environments within higher education institutions.

Accessibility Gaps in Kenyan Universities

Fragmented Accessibility Interventions

One of the most significant challenges observed across Kenyan universities is the fragmented nature of accessibility implementation. Although institutions have introduced various accessibility initiatives, these interventions frequently operate in isolation rather than as components of integrated institutional systems.

In several universities, assistive technologies and ergonomic adaptations are concentrated within libraries or ICT laboratories, while lecture halls, administrative offices, and online learning systems remain inadequately adapted for SWPDs. Such fragmentation disrupts continuity of access and limits independent engagement with academic resources and institutional services.

This challenge reflects broader concerns raised by White (2026), who argues that accessibility initiatives often fail when institutions implement isolated interventions without embedding inclusion within broader organizational and digital ecosystems. Similarly, Fakoyede *et al*. (2026) observe that fragmented policy implementation and infrastructural inequalities continue to undermine equitable access to information resources within tertiary institutions.

Uneven Integration of Universal Design Principles

The integration of universal design principles remains inconsistent across institutions. While some universities have incorporated accessibility considerations into infrastructure development and digital systems, implementation frequently remains partial, reactive, and compliance-driven.

Physical accessibility features such as ramps, adjustable workstations, adapted furniture, and accessible entrances are present within some institutions but remain inconsistently distributed across campuses. Likewise, digital platforms vary considerably in terms of compatibility with assistive technologies and accessibility standards.

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These disparities reinforce inequalities in information access and academic participation among SWPDs. Eneya and Adesina (2025) note that the effectiveness of inclusive digital services within higher education is significantly shaped by institutional capacity, financial priorities, and organizational commitment toward accessibility.

Staff Capacity and Technical Support Challenges

Institutional staff capacity emerged as another major factor affecting accessibility implementation. Limited training among librarians, ICT personnel, academic staff, and administrators constrains the effective deployment, maintenance, and support of assistive technologies and inclusive learning systems.

In some cases, students with disabilities are compelled to independently navigate inaccessible systems because of inadequate technical or pedagogical support structures. Maina *et al*. (2026) emphasize that digital accessibility interventions can only succeed when institutions invest in personnel with adequate knowledge of inclusive and ergonomic design principles.

Alabi and Okiki (2023) further argue that assistive technologies within academic libraries are most effective when accompanied by continuous technical support, user guidance, and disability-sensitive service delivery practices.

Weak Monitoring and Sustainability Mechanisms

The absence of structured monitoring and evaluation mechanisms remains a persistent weakness across many universities. Accessibility initiatives are frequently implemented without long-term assessment frameworks capable of evaluating usability, effectiveness, maintenance requirements, or sustainability outcomes.

Gupta (2026) observes that modern digital library systems require continuous monitoring and evaluation processes to remain responsive within rapidly evolving technological environments. However, many institutions still lack regular accessibility audits, performance benchmarks, or systematic evaluation frameworks.

Without sustained oversight, assistive technologies and ergonomic interventions risk becoming underutilized, poorly maintained, or technologically obsolete.

Limited Participation of Students with Physical Disabilities

Another critical concern is the limited participation of SWPDs within institutional decision-making processes. Although students with disabilities are directly affected by accessibility policies and interventions, their involvement in planning, implementation, and evaluation processes often remains minimal.

This exclusion weakens the responsiveness and usability of accessibility interventions because institutional decisions may fail to reflect the lived experiences and practical needs of intended users. Contemporary accessibility scholarship increasingly emphasizes participatory and user-

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centered approaches that position persons with disabilities as active contributors rather than passive beneficiaries of inclusion initiatives (Rana *et al*., 2026).

Strengthening participatory governance mechanisms can therefore enhance institutional responsiveness, improve service relevance, and support sustainable accessibility implementation within higher education environments.

Toward an Integrated Accessibility Framework

To address the fragmented nature of accessibility implementation within Kenyan universities, this paper proposes a two-pillar framework for institutionalizing ergonomic and digital inclusion.

Pillar One: Accessibility Systems

The first pillar focuses on institutional systems that establish accessibility as a core organizational function rather than an isolated intervention. Key components include:

- integration of universal design principles in infrastructure and digital systems;
- institution-wide accessibility standards and compliance guidelines;
- inclusive procurement policies for technologies and learning resources;
- regular accessibility audits and monitoring frameworks; and
- sustainable funding and maintenance structures for assistive technologies.

Embedding these mechanisms within institutional governance structures can promote consistency, accountability, and long-term sustainability.

Pillar Two: Inclusivity Enablers

The second pillar emphasizes human and organizational factors necessary for sustaining inclusive environments. These include:

- active participation of SWPDs in institutional planning and evaluation;
- continuous staff training on digital and ergonomic accessibility;
- strengthened technical support services;
- institutional leadership commitment toward inclusion; and
- collaboration among libraries, ICT departments, disability support offices, and external stakeholders.

These enablers strengthen institutional capacity to operationalize accessibility beyond infrastructure and technology alone.

Implications for Higher Education Libraries

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University libraries remain central to accessibility implementation because they function as primary gateways to information and digital learning resources. However, libraries can only support meaningful inclusion when accessibility principles are integrated across both physical and digital service environments.

Inclusive library systems should therefore prioritize:

- ergonomic learning spaces;
- accessible digital repositories and databases;
- compatibility with assistive technologies;
- adaptive furniture and workstations;
- accessible cataloguing and navigation systems; and
- user-centered service delivery models.

Libraries also play an important institutional role in promoting accessibility awareness, staff training, and cross-departmental collaboration. As information ecosystems become increasingly digitized, libraries are uniquely positioned to lead institutional transitions toward inclusive knowledge environments.

Conclusion

The findings presented in this paper demonstrate that accessibility implementation within Kenyan universities remains fragmented, inconsistently institutionalized, and unevenly distributed across physical and digital learning environments. Although important progress has been achieved through infrastructural modifications, assistive technologies, and disability support initiatives, many interventions continue to operate in isolation rather than within integrated institutional systems.

The study argues that sustainable inclusion requires universities to move beyond compliance-oriented and department-centered approaches toward coordinated accessibility ecosystems grounded in ergonomic design, universal accessibility principles, institutional governance, and participatory inclusion. Accessibility should not be treated as a supplementary service but as a fundamental dimension of educational quality, digital transformation, and equitable participation.

The proposed two-pillar framework provides a practical pathway for universities seeking to institutionalize accessibility and strengthen inclusive information environments. By integrating accessibility systems with inclusivity enablers, higher education institutions can enhance independent participation, improve learning experiences, and promote equitable access to information for SWPDs.

Ultimately, advancing ergonomic and digital accessibility within Kenyan universities is not merely a technical or infrastructural challenge. It is a broader institutional and social responsibility that

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requires sustained leadership commitment, collaborative engagement, and user-centered innovation to ensure that no student is excluded from participation within contemporary knowledge societies.

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