Teaching and Learning in Fragile Contexts (TLFC) Policy Brief

Adapting Mobile Technology to Enhance Access to Quality, Equitable and Inclusive Education in Fragile Contexts:

Evidence from Kakuma Refugee Camp Primary Schools, Kenya

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Executive Summary

Access to quality, equitable, and inclusive education remains a persistent challenge in fragile and displacement contexts. Refugee children are among the most educationally marginalized populations globally, with structural barriers such as overcrowded classrooms, teacher shortages, limited learning materials, linguistic diversity, and fragile infrastructure undermining learning outcomes. In Kenya's Kakuma Refugee Camp one of Africa's largest and longest-established refugee settlements—these challenges are particularly pronounced, yet the demand for flexible, resilient, and inclusive education solutions continues to grow.

This policy brief synthesizes findings from a mixed-methods study examining the role of mobile digital devices (MDDs) in enhancing access to quality, equitable, and inclusive education in Kakuma Refugee Camp primary schools. Drawing on data from 89 participants, including learners, teachers, head teachers, and an education officer across 24 schools, the study explored how mobile technology is currently used, the digital competence and needs of users, the barriers to effective integration, and the demand for a context-sensitive digital education toolkit.

The findings demonstrate strong consensus among education stakeholders that mobile technology has transformative potential in refugee education when implemented thoughtfully. Quantitative results show high levels of agreement that MDDs improve access to learning materials (Mean = 4.65), support distance learning and self-study (Mean = 4.65), and increase flexibility and learner engagement (Mean range = 4.23–4.46). Tablets and smartphones emerged as the most widely used devices, primarily for accessing syllabi, teaching notes, and educational videos, reflecting teachers' pragmatic use of technology to address immediate instructional needs.

However, the study also reveals substantial gaps between access and effective pedagogical use. Over 87% of teachers identified poor internet connectivity as a major barrier, while 63.6% reported limited access to devices and 53.4% cited lack of pedagogical training. Power shortages, high costs of devices and data, and limited availability of curriculum-aligned and culturally relevant digital content further constrain meaningful integration. Statistical analysis confirms a strong association between digital skill levels and user comfort, underscoring the central role of teacher competence in successful technology use.

A key contribution of this research is the strong and consistent demand for a structured, practical, and locally adapted guide to support the integration of mobile digital devices. More than 70% of teachers expressed the need for such a toolkit, emphasizing its value for lesson-time reference, digital literacy development, troubleshooting, and pedagogical

clarity. Head teachers reinforced this need, highlighting the absence of clear operational guidance tailored to refugee contexts.

The evidence points to an urgent need for integrated policy responses that combine infrastructure investment, teacher capacity development, affordable access to devices and connectivity, and the development of inclusive, offline-capable digital resources. Mobile technology alone is not a solution; however, when embedded within supportive systems and guided by contextual realities, it can act as a powerful catalyst for educational equity and resilience in fragile settings. This policy brief offers targeted recommendations for policymakers, education authorities, and practitioners seeking to leverage mobile technology to strengthen refugee education systems in Kenya and comparable contexts.

Context

Kakuma Refugee Camp, located in north-western Kenya, hosts one of the largest refugee populations in Africa, accommodating refugees primarily from South Sudan, Somalia, the Democratic Republic of Congo, Burundi, and Ethiopia. Nearly 68% of the camp's population is below the age of 18, placing immense pressure on already overstretched education services. Primary schools within the camp operate under fragile conditions characterized by overcrowded classrooms, shortages of trained teachers, limited instructional materials, unreliable electricity, and weak internet connectivity.

Learners in Kakuma come from diverse linguistic, cultural, and educational backgrounds, many having experienced prolonged disruptions to schooling due to conflict and displacement. Teachers, often themselves refugees or contract staff, face the dual challenge of managing large, multilingual classes while adapting to Kenya's Competency-Based Curriculum with minimal professional support. Despite these constraints, mobile phones and tablets are increasingly present, creating opportunities for flexible and learner-centered education. Understanding how these technologies can be harnessed responsibly and equitably is critical for improving educational access and quality in this fragile context.

Research Methodology

The study employed a mixed-methods research design to capture both the breadth and depth of mobile technology use in Kakuma Refugee Camp primary schools. The target population comprised 24 primary schools, approximately 645 teachers, over 164,000 learners, and one education officer overseeing refugee education in the camp. Using Krejcie and Morgan's sample size determination table, a total of 89 participants were selected.

Random sampling was used to select 30 teachers and 46 learners to ensure representativeness, while purposive sampling identified 12 head teachers and one education officer as key informants with administrative and policy-level insights. Data collection tools included structured questionnaires for teachers, focus group discussions with learners, and semi-structured interviews with head teachers and the education officer.

Quantitative data were analyzed using descriptive statistics and inferential tests, including chi-square analysis, to examine associations between device types, usage patterns, skills, and comfort levels. Qualitative data from interviews and focus groups were analyzed thematically, allowing for triangulation and contextual interpretation of quantitative findings. This methodological approach enabled a comprehensive understanding of both the opportunities and constraints associated with mobile digital device integration in a fragile education setting.

Key Findings

Patterns of Mobile Technology Use

Teachers in Kakuma Refugee Camp primarily use mobile digital devices to support core instructional tasks. The most common uses include accessing syllabi (76.3%), teaching notes (74.6%), and educational videos (72.9%). Tablets and smartphones dominate usage, while interactive applications and virtual laboratories remain minimally utilized (below 5%), reflecting both skill and infrastructure limitations.

Table 1: Main Purposes of Mobile Digital Device Use by Teachers

		Responses		Percentage of Cases
		N	Percent	
PURPOSE	E-books	35	8.5%	29.7%
	Teaching Notes	88	21.4%	74.6%
	Syllabus/Designs	90	21.9%	76.3%
	Revision materials	47	11.4%	39.8%
	Online courses	39	9.5%	33.1%
	Educational videos	86	20.9%	72.9%
	Interactive apps	20	4.9%	16.9%
	Virtual labs/Animations	6	1.5%	5.1%
Total		411	100.0%	348.3%

Perceived Impact on Teaching and Learning

Quantitative findings indicate strong agreement that mobile digital devices enhance access, flexibility, and engagement. Mean scores across twelve indicators ranged from 4.03 to 4.65 on a five-point scale. Teachers overwhelmingly agreed that MDDs facilitate distance learning, self-study, and access to learning materials being a key advantage in overcrowded and resource-limited environments.

> "Mobile devices have made it possible to access teaching materials anytime, even when textbooks are not enough." (Teacher, Kakuma)

Digital Competence and Comfort Levels

Statistical analysis revealed a significant association between users' digital skill levels and their comfort in using devices. Tablets showed the strongest positive relationship, while basic phones were widely viewed as unsuitable for learning. More complex tools such as interactive whiteboards and educational software were underutilized highlighting the need for targeted training and pedagogical support.

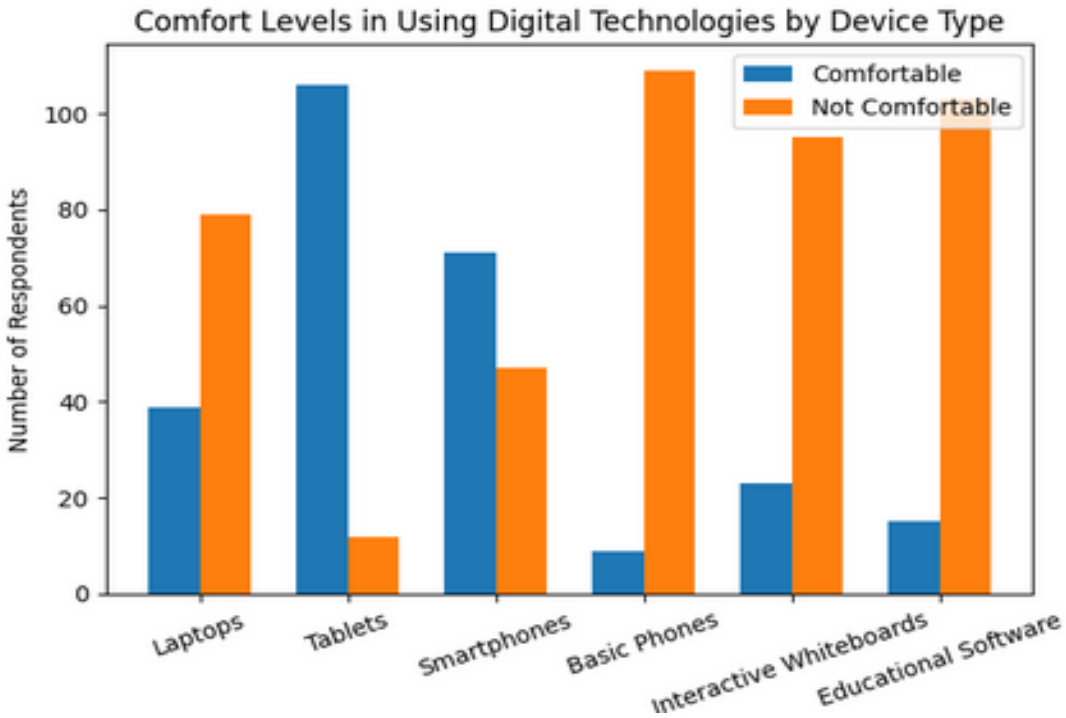

Figure 1: Skill Level vs. Comfort in Using Mobile Devices

Barriers to Effective Integration

Despite positive perceptions, multiple systemic barriers persist. Poor internet connectivity was reported by 87.3% of teachers, followed by limited access to devices (63.6%), lack of pedagogical training (53.4%), and high costs of devices and data (53.4%). Power shortages further disrupt continuity of digital learning.

> "We want to use technology, but without power and internet, it becomes impossible." (Head Teacher)

Table 2: Key Barriers to Mobile Technology Integration

		% of Total Responses	% of Total Responses	% of Teachers
integration	limited access to MDD	75	14.5%	63.6%
	Lack of pedagogical training	63	12.1%	53.4%
	poor internet connectivity	103	19.8%	87.3%
	Inadequate DD	62	11.9%	52.5%
	high cost of digital tools	63	12.1%	53.4%
	lack of relevant content	24	4.6%	20.3%
	power/electricity problems	41	7.9%	34.7%
	internet connectivity issues	88	17.0%	74.6%
Total		519	100.0%	439.8% (multiple responses)
a. Dichotomy group tabulated at value 1.				

Demand for a Digital Education Toolkit

Over 70% of teachers expressed a clear need for a structured guide to support mobile device use. Teachers identified lesson-time reference (80%), digital literacy improvement (57.6%), and pedagogical guidance as key benefits. Head teachers emphasized that such a toolkit must go beyond technical instructions to include pedagogy, classroom management, and offline functionality as shown in figure 2.

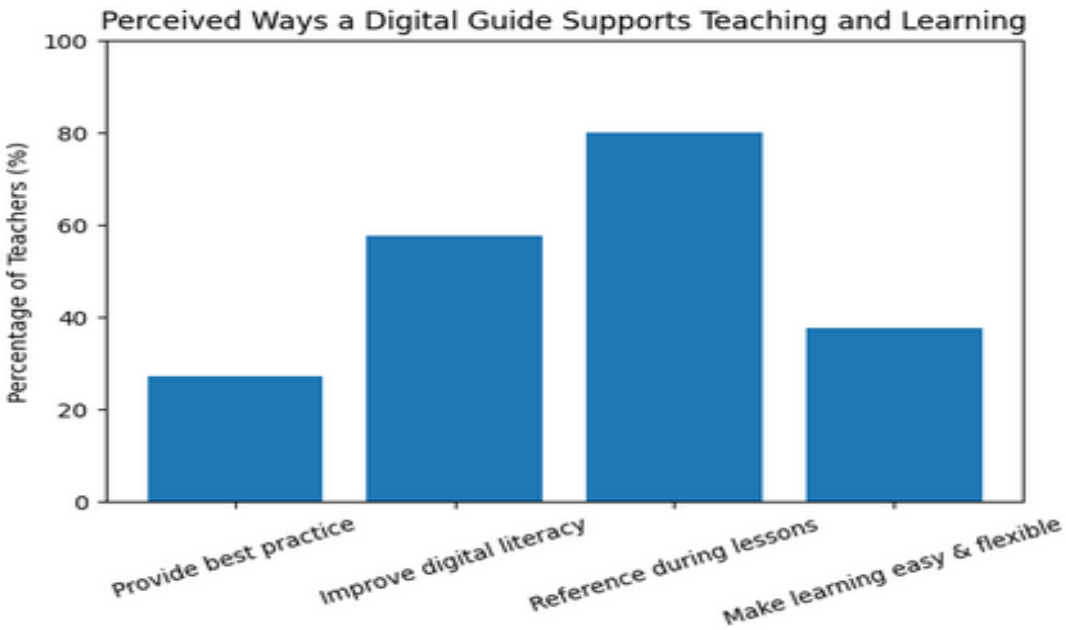

Figure 2: Teachers' Perceived Benefits of a Mobile Technology Guide

Preferred Toolkit Content

Teachers prioritized interactive modules, step-by-step guides, resource libraries, and video tutorials. There was strong emphasis on offline accessibility, curriculum alignment, and contextual relevance to refugee learners' linguistic and cultural realities.

> "A guide that shows real examples from our classrooms would give teachers confidence to use technology." (Head Teacher)

Key Recommendations

1. **Strengthen Infrastructure:** Invest in reliable internet connectivity and solar-powered electricity solutions to support consistent use of mobile technologies in refugee schools.
2. **Expand Access to Devices:** Establish subsidized or centralized procurement mechanisms to ensure equitable access to tablets and smartphones for teachers and learners.
3. **Build Teacher Capacity:** Implement continuous, practice-oriented professional development focused on both digital literacy and pedagogical integration.
4. **Develop a Context-Sensitive Toolkit:** Produce an offline-capable, multimedia guide aligned with Kenya's curriculum and refugee learners' needs, integrating pedagogy, troubleshooting, and inclusive design.
5. **Embed Policy and Monitoring Frameworks:** Develop clear national and institutional guidelines to support safe, equitable, and sustainable integration of mobile technology in refugee education.

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