

Adaptive Physical Facilities and Academic Performance of Learners with Physical and Visual impairments in Public Comprehensive Schools in Kakuma Refugee Camp, Turkana, Kenya

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ABSTRACT

Theory and guided by a convergent mixed-methods design, the study targeted 21 public comprehensive schools, 957 learners with physical and visual impairments, 116 teachers, 21 heads of institutions and one Quality Assurance and Standards Officer. A sample of 19 schools, 282 learners, 90 teachers, 19 heads of institutions and the Quality Assurance and Standards Officer was drawn using stratified, simple random, purposive and census sampling techniques. Data were collected through questionnaires, in-depth interview guides, an observation guide and a document analysis schedule, and were analysed using descriptive statistics (frequencies and percentages) and a one-way analysis of variance (ANOVA). The findings revealed that a considerable proportion of schools had made progress in providing ramps, handrails, adequate lighting, spacious classrooms and adapted toilets, yet specialised provisions such as adjustable furniture, levelled playgrounds, tactile pathways and mobility aids remained inadequate in a substantial number of schools. Qualitative accounts from Heads of Institutions and the Quality Assurance and Standards Officer confirmed that adaptive infrastructure improved attendance, mobility and participation, but that sustainability was constrained by inadequate financing. Inferential analysis established a statistically significant difference in academic performance across school categories based on the provision of adaptive physical facilities, $F(2, 279) = 18.742$, $p < .001$, leading to rejection of the null hypothesis. The study concludes that adaptive physical facilities are a critical determinant of academic performance among learners with physical and visual impairments and recommends increased and sustained investment in adaptive infrastructure by the Ministry of Education, county governments, humanitarian organisations and development partners.

Keywords: *Adaptive physical facilities; academic performance; inclusive education; physical and visual impairments; Kakuma Refugee Camp*

1.0 INTRODUCTION

1.1 Background of the Study

An inclusive school environment refers to the overall conditions under which teaching and learning occur, including the physical, instructional and social aspects of schooling. It encompasses infrastructure, teaching practices, availability of learning materials and interpersonal relationships within the school setting (UNESCO, 2021), and accommodates the diverse needs of all learners by removing barriers to participation and learning (UNICEF, 2022; World Bank, 2020). Among the components of an inclusive school environment, adaptive physical facilities occupy a central place because they determine whether learners with physical and visual impairments can access, move within and participate safely in the school setting. Adaptive physical facilities include ramps and rails, adequate lighting, adjusted furniture, levelled grounds and accessible latrines, all of which facilitate accessibility, safety and improved learning experiences for learners with physical and visual impairments.

Kakuma Refugee Camp presents an important context for examining adaptive physical facilities because it hosts a large and diverse refugee population whose educational needs are affected by displacement, limited resources and inadequate support systems. A Jesuit Refugee Service assessment conducted in October 2023 identified 170 learners with disabilities in secondary schools in Kakuma, of whom 46 (27%) had physical challenges and 40 (24%) had visual impairments (Jesuit Refugee Service, 2024).

Physical and visual impairments therefore accounted for 86 learners, representing approximately 51% of the identified learners with disabilities, providing an empirical basis for focusing the study on these two categories rather than treating all disabilities as a single group. Learners with physical impairments require accessible classrooms, ramps, adapted toilets, appropriate furniture and safe pathways, while learners with visual impairments require adequate lighting, tactile pathways and safe, well-organised physical spaces. These distinctive requirements directly relate to the physical component of the inclusive school environment examined in this study.

The policy landscape strongly emphasises the need to create inclusive physical environments that support the participation of learners with disabilities. The Salamanca Statement affirmed that schools should adapt their physical environments to accommodate learner diversity (UNESCO, 1994), while the United Nations Convention on the Rights of Persons with Disabilities requires states to provide reasonable accommodation to remove barriers that hinder participation (United Nations, 2006). In Kenya, the Constitution of Kenya (2010) and the Basic Education Act (2013) provide for the right to education and emphasise access to appropriate educational infrastructure for learners with disabilities (Republic of Kenya, 2010, 2013). Despite these policy commitments, implementation gaps remain in Kakuma Refugee Camp, where the camp continues to face challenges related to infrastructure, specialised learning resources and psychosocial support, compounded by the constraints of displacement and limited resources. The Kenya Institute of Special Education (2021) found that only 30% of public schools nationally were equipped with infrastructure to support learners with disabilities, underscoring the urgency of localised, school-level investigation of adaptive physical facilities in marginalised settings such as Kakuma.

1.2 Statement of the Problem

Despite government investment and policies guaranteeing inclusive education, academic performance among learners with physical and visual impairments in Kakuma Refugee Camp remains disproportionately low, and implementation of infrastructural provisions remains weak in marginalised, arid regions such as Turkana. Learners with disabilities in this area are severely underrepresented due to inaccessible facilities and pervasive stigma (Akinyi, 2025; Verheyden, 2025). Although prior studies have documented infrastructural gaps in isolation, they have not analysed how the provision of adaptive physical facilities specifically shapes academic performance among learners with physical and visual impairments in a refugee context. Learners with physical and visual impairments in Kakuma continue to face diminished academic confidence and limited participation attributable, in part, to inaccessible school infrastructure. This paper addresses this gap by reporting the findings on the first objective of the wider study: the extent to which schools in Kakuma Refugee Camp provide adaptive physical facilities to support the academic performance of learners with physical and visual impairments.

1.3 Purpose and Objective of the Study

The purpose of the wider study was to investigate the influence of the inclusive school environment on the academic performance of learners with physical and visual impairments in public comprehensive schools in Kakuma Refugee Camp, Turkana, Kenya. This paper focuses specifically on the first objective of that study, which was to establish the extent to which schools provide adaptive physical facilities to support the academic performance of learners living with physical impairment and visual impairment in Kakuma Refugee Camp, Turkana, Kenya.

1.4 Research Question

The paper was guided by the following research question: To what extent do schools provide adaptive physical facilities to support academic performance of learners living with physical impairment and visual impairment in Kakuma Refugee Camp, Turkana, Kenya?

1.5 Null Hypothesis

H₀₁: There is no significant influence in the provision of adaptive physical facilities on academic performance of learners living with physical and visual impairments in Kakuma Refugee Camp, Turkana, Kenya.

1.6 Significance of the Study

The findings may benefit the Ministry of Education, county governments, the Directorate of Quality Assurance and Standards and humanitarian organisations operating in Kakuma by providing empirical evidence to guide investment, monitoring and evaluation of adaptive physical infrastructure. Heads of Institutions may use the findings to prioritise infrastructural adjustments that promote learner mobility, safety and participation, while development partners may draw on the evidence to design context-responsive interventions for refugee and other resource-constrained education settings. Academically, the paper contributes to scholarly understanding of how adaptive physical facilities influence the academic performance of learners with physical and visual impairments in marginalised, displacement-affected contexts, an area where empirical evidence remains limited.

2.0 THEORETICAL FRAMEWORK

The study was anchored on Inclusive Education Theory, developed and articulated by Ainscow, Dyson and Booth (1994) and popularised globally following the 1994 Salamanca Statement on Inclusive Education. The theory is grounded on the principle that learning barriers are created more by the inclusive school environment than by learners with disabilities themselves. Ainscow and Booth (1994) argued that meaningful inclusion occurs when schools transform their physical spaces, teaching methods, policies and attitudes to become flexible and responsive to diverse needs, rather than expecting learners to adapt to rigid systems. This orientation is particularly relevant to the study of adaptive physical facilities because it shifts attention from learner deficits to environmental and infrastructural barriers such as inaccessible classrooms, absent ramps, unlevelled grounds and inadequate sanitation facilities.

The theory's central strength lies in its rights-based foundation, which is closely aligned with international frameworks such as the Salamanca Statement and the United Nations Convention on the Rights of Persons with Disabilities (UNESCO, 1994; United Nations, 2006), both of which affirm that education systems, including their physical infrastructure, must adapt to learners rather than exclude them. By emphasising the removal of environmental and systemic barriers rather than learner deficits, the theory encourages sustainable improvements in physical accessibility, including ramps, handrails, adapted toilets, adjustable furniture and levelled grounds (Booth & Ainscow, 2002). However, the theory faces implementation challenges in resource-constrained contexts, since inadequate financing, weak institutional support and competing humanitarian priorities can limit the translation of inclusive principles into actual infrastructural provision (Florian, 2014). The study addressed this weakness by empirically

examining the actual state of adaptive physical facilities in Kakuma Refugee Camp schools rather than assuming their existence.

In this paper, Inclusive Education Theory guided the identification of key indicators of physical accessibility, namely ramps and rails, adequate lighting, adjusted furniture, accessible toilets and levelled grounds, which were translated into structured questionnaire items, an observation guide and interview questions. During data analysis, the theory provided a conceptual lens for interpreting how the presence or absence of adaptive physical facilities influenced the mobility, participation and academic performance of learners with physical and visual impairments, and for comparing schools with varying levels of physical accessibility.

3.0 REVIEW OF EMPIRICAL LITERATURE

3.1 Adaptive Physical Facilities and Academic Performance

The adaptive physical setting is an essential element of inclusive school environments that enables learners with physical and visual impairment to participate effectively and succeed academically. A properly structured physical space reduces physical barriers and allows learners with varied functional abilities to access learning areas safely and independently. This section reviews studies on ramps and rails, lighting, modified furniture and accessible latrines as critical aspects of the adaptive physical environment that facilitate accessibility, security and improved learning experiences for learners with physical and visual impairments.

In India, Maniar (2024) carried out quantitative research examining educational infrastructure and academic performance across Indian states between 2017 and 2020, using secondary data from over 300 publicly established schools and regression analysis. The results showed that schools with available facilities such as ramps and rails had better attendance and performance among learners with disabilities, although the study was purely quantitative while the present study employed mixed methods.

García and López (2021) conducted a mixed-methods study in Spain involving 12 primary schools and 210 learners with disabilities to determine the impact of sanitation facilities on learner participation and academic engagement. The findings revealed that schools with modified toilets featuring wide door openings, handrails and non-slippery floors recorded fewer cases of absenteeism, and learners in these schools demonstrated better concentration and confidence in attending school regularly. The study, however, focused primarily on sanitation facilities and did not examine other dimensions such as classrooms and playgrounds.

Johnson and Brown (2022) examined the quality of school sanitation facilities in 18 elementary schools in California involving 240 learners with mobility impairments, using a cross-sectional survey design. Schools with wheelchair-accessible latrines experienced an 18% improvement in attendance and classroom involvement compared with schools lacking adaptive sanitation facilities. McLean and Shaw (2023) conducted a quantitative correlational study in 20 schools across Canada involving 260 learners with physical disabilities and found a strong positive correlation between the availability of sanitation facilities and learner academic involvement, particularly during literacy and numeracy lessons; the study, however, was undertaken in a developed country context, unlike the present study which was situated in Kakuma Refugee Camp.

In Cameroon, Faizefu (2018) used a field-based study involving 72 teachers and administrators in 10 schools in the South West Region and found that more than 60% of institutions had no ramps or rails, forcing learners with physical disabilities to rely on colleagues for mobility, which reduced their participation in academic activities. In Ghana, Opoku-Nkoom and Ackah-Jnr (2023), in a mixed-methods study involving 75 teachers, found that well-lit classrooms enhanced involvement and achievement among learners with special needs. Similarly, Kawesa et al. (2024) used structured classroom observation instruments in 10 primary schools in Wakiso District, Uganda, and found that well-lit classrooms with proper seating arrangements significantly enhanced the participation of learners with visual impairment, while dark classrooms diminished their capacity to read instructional materials.

Adewumi and Mosito (2022) conducted a descriptive survey of school infrastructure in Nigerian primary and secondary schools involving 120 teachers and administrators and found that most schools lacked adapted desks and chairs, compelling learners with disabilities to use improvised seating, which lowered their participation. Abosi and Koay (2021), in a qualitative study of inclusive classroom practice in Ugandan primary schools, similarly established that a lack of adapted furniture constrained the participation of learners with physical and visual impairment in writing and group learning activities.

Mthembu and Nkosi (2023) carried out a descriptive survey in 26 rural primary schools in South Africa involving 198 learners with disabilities and found that the absence of sanitation facilities contributed to absenteeism among learners with mobility impairments, while schools with adapted toilets recorded higher attendance and engagement. Nanyunja and Ssekamwa (2022), in a correlational study of 20 primary schools in Uganda involving 175 learners with special needs, established that accessible latrines significantly improved attendance and learner involvement, which translated into better academic performance outcomes.

Closer to the study area, Ekal and Lokwam (2022) conducted a case study in Turkana County, Kenya, involving 15 public primary schools and 130 learners with special needs, and found that the lack of adaptive latrines discouraged learners with disabilities from attending school regularly, while schools with adapted sanitation systems recorded better attendance, participation and learning outcomes. Kabwos and Bitok (2022) carried out a descriptive survey in preschools in Belgut Sub-County, Kenya, and found that modified desks and seating arrangements were associated with greater engagement among learners with mobility impairments, although the study was limited to early childhood education. Mwangi and Orodho (2023), in a correlational study of public primary schools in Kiambu County, Kenya, established that schools with modified classroom furnishings recorded better participation and learning experiences among learners with physical disabilities, although the study emphasised participation rather than academic achievement directly.

Finally, Okello (2024) used a quantitative design to investigate the influence of the inclusive school environment on the inclusion of learners with visual impairment in regular public primary schools in Nyatike Sub-County, Migori County, Kenya, involving 98 respondents. The study found that environmental factors, particularly classroom lighting, played a key role in determining the involvement of visually impaired learners, with inclusive school environment variables explaining an 18.4% variance in inclusion, although the study used inclusion rather than academic performance as its dependent variable.

3.2 Summary of Knowledge Gaps

The reviewed literature provides strong evidence that adaptive physical facilities, including sanitation facilities (García & López, 2021; Johnson & Brown, 2022; McLean & Shaw, 2023) and modified classroom furniture (Kabwos & Bitok, 2022; Mwangi & Orodho, 2023), improve attendance, participation and engagement among learners with disabilities. Nonetheless, gaps remain. Much of the evidence originates from developed countries such as Canada (McLean & Shaw, 2023), where resources and institutional support are relatively strong, while African studies, such as Adewumi and Mosito (2022) in Nigeria and Mthembu and Nkosi (2023) in South Africa, often focus on urban or better-resourced areas, leaving limited empirical data from marginalised, resource-constrained and geographically isolated contexts. In Kenya, although studies such as Mwangi and Orodho (2023) in Kiambu County and Okello (2024) in Migori County have explored inclusive environments, and Ekal and Lokwam (2022) provided insights into sanitation challenges in Turkana, comprehensive evidence on adaptive physical facilities and academic performance from Kakuma Refugee Camp remained sparse prior to this study. This paper addresses that gap by generating context-specific empirical evidence on the influence of adaptive physical facilities on academic performance among learners with physical and visual impairments in Kakuma Refugee Camp.

4.0 RESEARCH METHODOLOGY

4.1 Research Design

The wider study adopted a convergent mixed-methods design, in which quantitative and qualitative data were collected during the same phase, analysed independently, and subsequently integrated during interpretation. The quantitative component employed a cross-sectional design to establish patterns and differences relating to the provision of adaptive physical facilities and academic performance, while the qualitative component employed Grounded Theory to explore the experiences and perceptions of learners, teachers, Heads of Institutions and the Quality Assurance and Standards Officer regarding adaptive physical facilities. Quantitative and qualitative findings were compared and integrated during interpretation to establish areas of convergence and complementarity, enhancing the comprehensiveness and credibility of the findings (Creswell & Plano Clark, 2021).

4.2 Study Area

The study was conducted in Kakuma Refugee Camp, situated in Turkana West Sub-County, Turkana County, in north-western Kenya. Established in 1992, the camp hosts nearly 190,000 people from over 20 countries, more than half of whom are children (UNHCR, 2023). The camp is located in an arid and semi-arid environment characterised by high temperatures, unreliable rainfall and limited infrastructure. Education is coordinated by UNHCR in partnership with organisations such as the Lutheran World Federation, Windle International Kenya, Jesuit Refugee Service and Finn Church Aid, and the camp hosts 21 public comprehensive schools operating under the Competency-Based Education framework.

4.3 Target Population and Sample

The study targeted 957 learners with physical and visual impairments, 116 teachers, 21 Heads of Institutions (HOIs) and one Quality Assurance and Standards Officer (QASO) drawn from 21 public

comprehensive schools in Kakuma Refugee Camp. Simple random sampling was used to select 19 of the 21 schools. Stratified sampling, followed by simple random sampling within strata, was used to select 282 learners with physical and visual impairments, applying Slovin's formula at a 5% margin of error. Purposive sampling was used to select 90 teachers directly involved in teaching learners with physical and visual impairments, while all 19 HOIs of the sampled schools and the sole QASO were included through census sampling.

Table 1: Sample Size and Sampling Procedures

Target Population	Available	Sampling Method	Required Sample
Teachers	116	Simple Random	90
Learners	957	Stratified and Simple Random	282
Heads of Institutions	21	Census / Purposive	19
Schools	21	Simple Random	19

Source: Adapted from the study's target population and sampling procedures.

4.4 Research Instruments

Data on adaptive physical facilities were collected using multiple instruments to strengthen validity through triangulation (Creswell & Plano Clark, 2021). A structured questionnaire, incorporating a five-point scale (1 = Not true at all to 5 = Very true), was administered to learners and teachers to capture their perceptions of the accessibility of ramps, rails, classrooms, toilets, furniture and grounds. An observation guide, using a Yes/No format with space for comments, enabled the researcher to independently assess the accessibility of school infrastructure. In-depth interview guides, consisting of semi-structured questions, were used with Heads of Institutions and the Quality Assurance and Standards Officer to gather qualitative data on the availability, adequacy and sustainability of adaptive physical facilities. A document analysis schedule was used to review learners' progress records and 2025 Kenya Junior School Education Assessment (KJSEA) outcomes to establish academic performance.

4.5 Validity and Reliability

Content and face validity were established through expert review by specialists in education and research methodology, who examined the relevance, clarity and adequacy of the instruments (Creswell & Creswell, 2020). The instruments were piloted in two comprehensive schools not included in the main study, involving 20 learners with physical and visual impairments, six teachers and two head teachers, to identify ambiguities and refine data collection procedures. Reliability of the quantitative instruments was assessed using Cronbach's Alpha, yielding a coefficient of 0.80, considered acceptable for internal

consistency (Mugenda & Mugenda, 2020). Trustworthiness of the qualitative data was ensured through credibility (triangulation and member checking), transferability (detailed contextual description), dependability (documented research procedures) and confirmability (multiple data sources).

4.6 Data Collection Procedures

Following authorisation from the Catholic University of Eastern Africa, the National Commission for Science, Technology and Innovation (NACOSTI), the Turkana West Sub-County Director of Education and the heads of the sampled schools, the researcher conducted interviews with Heads of Institutions and the Quality Assurance and Standards Officer, administered questionnaires to teachers and learners, and used observation checklists to assess the availability and condition of adaptive facilities such as ramps, handrails and accessible toilets. Learners' progress records were reviewed to complement data obtained through questionnaires and interviews. Research assistants fluent in English, Kiswahili and Braille supported learners with communication and visual barriers. Data collection was conducted over a period of four weeks.

4.7 Data Analysis

Quantitative data were coded and analysed using the Statistical Package for the Social Sciences (SPSS) version 27, employing descriptive statistics (frequencies and percentages) to summarise learners' and teachers' responses on adaptive physical facilities, and a one-way analysis of variance (ANOVA) to test the null hypothesis relating to differences in academic performance across school categories based on the provision of adaptive physical facilities. Qualitative data from interviews were transcribed verbatim and analysed thematically, with themes derived inductively (Nowell et al., 2021). Quantitative and qualitative findings were triangulated to validate and enrich interpretation.

4.8 Ethical Considerations

Ethical clearance was obtained from the Catholic University of Eastern Africa and NACOSTI, together with authorisation from the Sub-County Director of Education and heads of the sampled schools. Written informed consent was obtained from teachers and head teachers, while assent and/or guardian consent was obtained from learners. Confidentiality and anonymity were maintained throughout, with no personal identifiers recorded, and all data collection procedures were age-appropriate, culturally sensitive and adapted to the needs of learners with disabilities, consistent with international ethical standards for educational research (British Educational Research Association, 2021).

5.0 FINDINGS AND DISCUSSION

This section presents the results on the extent to which schools provide adaptive physical facilities to support the academic performance of learners with physical and visual impairments in Kakuma Refugee Camp. Data were gathered from learners, teachers, Heads of Institutions and the Quality Assurance and Standards Officer, and are presented in Tables 2 and 3, followed by qualitative findings and the results of hypothesis testing.

5.1 Learners' Responses on Adaptive Physical Facilities

Table 2: Learners' Responses on Adaptive Physical Facilities and Academic Performance (n = 282)

Statement	Very True f (%)	True f (%)	Sometimes True f (%)	Not True f (%)	Not True at All f (%)
I am able to move around the school buildings and classroom without problems	31 (11.0)	122 (43.3)	45 (16.0)	49 (17.4)	35 (12.3)
There are ramps, rails, paths and steps that make it easier for me to walk or use a wheelchair	37 (13.1)	110 (39.0)	43 (15.2)	53 (18.8)	39 (13.9)
The classrooms are big enough, well arranged and comfortable for me to learn in	42 (14.9)	118 (41.8)	44 (15.6)	40 (14.2)	38 (13.5)
I am able to access toilets because they are adapted, safe, clean and easy to use when I need them	34 (12.1)	104 (36.9)	42 (14.9)	55 (19.5)	47 (16.6)
I have chairs, desks and spaces that fit my body and make learning easier	39 (13.8)	124 (44.0)	34 (12.1)	43 (15.2)	42 (14.9)
I do not feel comfortable moving around the school because the ground is not levelled	36 (12.8)	95 (33.7)	48 (17.0)	51 (18.1)	52 (18.4)
The school buildings and facilities help me to join school activities with other learners because I can access them easily	40 (14.2)	128 (45.4)	39 (13.8)	34 (12.1)	41 (14.5)

Source: Research Data, 2026.

Table 2 shows that 122 (43.3%) of learners reported that it was true that they could move around school buildings and classrooms without difficulty, indicating that a considerable number of schools had created accessible physical environments; independent mobility improves learner confidence, attendance and participation. However, 49 (17.4%) reported that it was not true, indicating that accessibility problems persisted in some schools, a finding consistent with Mugo and Wambua (2024), who concluded that access to good learning facilities improves the mobility, attendance and engagement of learners with disabilities.

Regarding ramps, rails, paths and steps that ease movement, 110 (39.0%) of learners reported these facilities were present, while 53 (18.8%) reported their absence, pointing to inequalities in the provision of adaptive infrastructure across schools, consistent with Njoroge and Ochieng (2025), who found that adaptive physical infrastructure fosters learner autonomy, safety and access to education. On classroom size and arrangement, 118 (41.8%) of learners found classrooms sizeable and comfortable, while 40 (14.2%) disagreed, indicating persistent infrastructural limitations in some institutions.

On accessibility of toilets, 104 (36.9%) of learners agreed that toilets were adapted, safe and easy to use, while 55 (19.5%) reported the contrary, highlighting continuing sanitation infrastructure challenges. Regarding chairs, desks and learning spaces suited to learners' physical needs, 124 (44.0%) of learners found these adequate, while 43 (15.2%) did not, pointing to gaps in adaptive classroom furniture in some schools. Notably, 95 (33.7%) of learners felt the school grounds were not levelled enough for comfortable movement, underscoring that environmental accessibility, particularly outdoor spaces, remains a significant challenge in the refugee context. On participation in school activities, 128 (45.4%) of learners agreed that accessible school buildings and facilities helped them join activities with other learners, while 34 (12.1%) disagreed, suggesting that physically inclusive spaces support belonging and engagement (Cheruiyot & Kamau, 2025).

5.2 Teachers' Responses on Adaptive Physical Facilities

Table 3: Teachers' Responses on Adaptive Physical Facilities and Academic Performance (n = 90)

Statement	Very True f (%)	True f (%)	Sometimes True f (%)	Rarely True f (%)	Not True at All f (%)
My school has ramps, wide doors, and paths that make movement easier for learners	12 (13.3)	42 (46.7)	15 (16.7)	8 (8.9)	13 (14.4)
The classrooms are arranged in a way that supports learners with physical and visual impairment to learn comfortably and move around easily	11 (12.2)	38 (42.2)	16 (17.8)	10 (11.1)	15 (16.7)
The toilets are accessible for learners with physical and visual impairment	10 (11.1)	35 (38.9)	14 (15.6)	12 (13.3)	19 (21.1)
The playground is levelled and learners are able to move around easily	9 (10.0)	32 (35.6)	17 (18.9)	11 (12.2)	21 (23.3)
There are no adjusted desks and chairs that help learners with physical impairment sit comfortably in class	14 (15.6)	28 (31.1)	15 (16.7)	11 (12.2)	22 (24.4)

Source: Research Data, 2026.

As shown in Table 3, 42 (46.7%) of teachers confirmed the presence of ramps, wide doors and pathways, indicating that meaningful efforts had been made in several schools to integrate physical accessibility, consistent with Smith and Rodriguez (2024), who found that accessible school infrastructure significantly affects educational access for learners with disabilities. Still, 13 (14.4%) of teachers reported the absence of such facilities, highlighting variation in the extent of adaptive infrastructure across schools.

On classroom arrangement, 38 (42.2%) of teachers reported that classrooms were organised to support learners with physical and visual impairment, while 15 (16.7%) disagreed, consistent with Thompson and Williams (2025), who found that physically accessible classrooms enhance instructional effectiveness.

Regarding toilets, 35 (38.9%) of teachers confirmed accessibility, while 19 (21.1%) reported inaccessibility, corroborating García and Martínez (2024), who linked accessible sanitation facilities to improved learner well-being and educational continuity.

On levelled playgrounds, 32 (35.6%) of teachers confirmed accessibility, while 21 (23.3%) reported that playgrounds were not levelled, consistent with Anderson and Cooper (2025), who established that accessible outdoor educational environments contribute positively to learner mobility and participation. Regarding adjusted desks and chairs, 28 (31.1%) of teachers confirmed the absence of adaptive furniture in their schools, while 22 (24.4%) indicated that adaptive furniture had been acquired, consistent with Brown and Taylor (2024), who found that adaptive classroom furniture improves learners' physical comfort and facilitates classroom participation.

5.3 Qualitative Findings on Adaptive Physical Facilities

Heads of Institutions and the Quality Assurance and Standards Officer were interviewed to explore the available adaptive physical facilities in schools and their effect on the performance of learners with physical and visual impairments, as well as the challenges encountered in providing and sustaining adaptive infrastructure. One Head of Institution observed:

"Ramps are present in most classroom blocks, some modified desks, handrails in strategic places and some accessible toilets; many learners are able to attend classes regularly and participate in learning activities as a result." — **Head of Institution 6**

This response indicates that adaptive physical facilities make a positive contribution to attendance, mobility and learning engagement among learners with physical and visual impairments, consistent with Wanjiku and Kibet (2024), who reported that accessible educational infrastructure promotes mobility, inclusion and learning outcomes. However, another Head of Institution noted the sustainability challenges facing infrastructural provision:

"Adequate facilities for learners with disabilities are not conducive to their performance and are difficult to maintain due to inadequate financial resources, limited availability of donors and high cost of specialised equipment and repairs." — **Head of Institution 11**

This finding suggests that although adaptive physical facilities are an important component of educational performance, the sustainability of inclusive educational infrastructure continues to be constrained by financial and institutional problems, consistent with Kiptoo and Wairimu (2025). A further Head of Institution identified specific unmet needs:

"Learners with physical and visual impairments would benefit from being able to use additional facilities including more accessible toilets, tactile pathways, adjustable furniture, more ramps and assistive technologies to enhance their participation and academic achievement." — **Head of Institution 2**

This response indicates that expanding adaptive infrastructure and specialised educational resources would further improve participation, access and academic achievement, consistent with Cheruiyot and Mutua (2024). The Quality Assurance and Standards Officer confirmed that although efforts had been made in most schools to provide ramps and other adapted facilities, provision remained insufficient in a number of schools:

"Efforts were made in most schools to provide ramps and some adapted facilities but existing facilities remain insufficient to cater for learners with physical and visual impairments. There were still a few schools that continued to experience shortages of accessible facilities and specialised educational resources." — **Quality Assurance and Standards Officer**

This is consistent with Mwende and Karanja (2025), who found that inadequate educational infrastructure remains a major challenge in the implementation of inclusive education policy and practice. The Officer further recommended increased budgetary allocation and stronger partnerships:

"For adaptive physical facilities, we have recommended that the government increases its budget and that more partnerships with development agencies are formed so that physical facilities can be adapted, and that the physical facilities in school are monitored regularly to improve the standard of inclusive education." — **Quality Assurance and Standards Officer**

This recommendation validates the role of adaptive physical facilities as a key determinant of participation and achievement among learners with disabilities and underscores the need for coordinated resource allocation, institutional support and regular monitoring, consistent with Odhiambo and Kiplagat (2024).

5.4 Hypothesis Testing

H₀₁: There is no significant influence in the provision of adaptive physical facilities on academic performance across different school categories in Kakuma Refugee Camp, Kenya. A one-way analysis of variance (ANOVA) was used to test this hypothesis, applying a decision rule in which the null hypothesis was rejected where $p < 0.05$.

Table 4: One-Way ANOVA for the Influence of Adaptive Physical Facilities on Academic Performance

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	31.084	2	15.542	18.742	<.001
Within Groups	231.274	279	0.829		
Total	262.358	281			

Source: Research Data, 2026.

The results in Table 4 show a statistically significant difference in academic performance based on the provision of adaptive physical facilities across school categories, $F(2, 279) = 18.742$, $p < .001$. Since the p-value was less than the significance level of 0.05, the null hypothesis was rejected, and it was concluded that there was a statistically significant difference in academic performance across school categories based on the provision of adaptive physical facilities.

This finding suggests that differences in the provision of adaptive physical facilities were associated with differences in learners' academic performance across school categories. Accessible facilities enable learners with physical and visual impairments to move safely, access classrooms and learning resources, and participate fully in school activities, while inadequate facilities create physical barriers that limit participation and learning. This finding agrees with Opio et al. (2024), who found a significant positive relationship between the physical learning environment and academic achievement among learners in inclusive secondary schools, demonstrating that accessible and suitable physical learning environments enhance learners' participation and engagement, which in turn contributes to improved academic achievement.

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

This paper set out to establish the extent to which schools in Kakuma Refugee Camp provide adaptive physical facilities to support the academic performance of learners with physical and visual impairments. The findings show that although schools had made moderate progress in providing ramps, handrails, adequate lighting, accessible classrooms and adapted toilets, there remained insufficient provision of specialised facilities, including adjustable furniture, levelled grounds, tactile pathways and mobility support equipment, in a substantial number of schools. Qualitative findings confirmed that accessible infrastructure supports learners' mobility, participation, independence and attendance, while inadequate infrastructure constrains access to education for some learners with disabilities, largely due to financial and institutional constraints. Inferential analysis confirmed a statistically significant difference in academic performance across school categories based on the provision of adaptive physical facilities, leading to rejection of the null hypothesis. The paper concludes that adaptive physical facilities have a significant influence on the academic performance of learners with physical and visual impairments in Kakuma Refugee Camp, Kenya, and that continued gaps in infrastructural provision constrain the full realisation of inclusive education in this context.

6.2 Recommendations

Arising from these findings, the Ministry of Education, county governments, humanitarian organisations and development partners should increase and sustain investment in adaptive physical infrastructure, including ramps, handrails, adapted classrooms, accessible toilets, specialised furniture, mobility equipment and tactile pathways. This would improve educational access, participation and academic performance among learners with physical and visual impairments in Kakuma Refugee Camp. In addition, the Directorate of Quality Assurance and Standards should strengthen the monitoring, supervision and evaluation of the state of adaptive physical facilities in schools serving learners with physical and visual impairments, to support effective policy implementation and improve educational outcomes. Schools should also explore partnerships with humanitarian and development agencies to mobilise supplementary resources for the acquisition and maintenance of adaptive infrastructure, given the financial constraints reported by Heads of Institutions.

6.3 Suggested Areas for Further Research

Future researchers may undertake comparative studies on the state and influence of adaptive physical facilities on the performance of learners with disabilities in refugee and non-refugee schools in Kenya. Long-term studies may also be needed to investigate the sustained impact of adaptive physical infrastructure on academic outcomes, participation and social outcomes of learners with physical and visual impairments in displacement-affected contexts.

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