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DIGITAL LITERACY AND GENDERED EDUCATIONAL INEQUALITY: INCLUSION OF GIRLS WITH SPECIAL NEEDS IN RURAL KENYAN SCHOOLS

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Abstract

Despite Kenya's substantial investments in digital education through the Digital Literacy Programme (DLP), the Competency-Based Curriculum (CBC), and inclusive education policies, limited research has examined how these initiatives promote equitable digital inclusion for girls with special needs in rural primary schools. In Kilifi County, poverty, inadequate educational infrastructure, and limited institutional capacity intersect with gender and disability to create persistent barriers to digital participation. Understanding these intersecting inequalities is essential for advancing equitable digital education. Guided by the Intersectional Digital Capability Framework (IDCF), which integrates intersectionality, the capability approach, and governance theory, this study examines how structural inequalities, institutional capability, governance processes, and capability expansion interact to shape digital literacy among girls with special needs in rural Kenyan primary schools. Specifically, the study identifies barriers that constrain digital literacy development and examines the institutional and community practices that support inclusive digital participation. A qualitative case study design was employed. Data were collected through semi-structured interviews with teachers, headteachers, parents, and girls with special needs, complemented by classroom observations and document analysis. Thematic analysis revealed that digital exclusion extends beyond limited technological infrastructure to include inadequate assistive technologies, insufficient teacher preparation in inclusive digital pedagogy, weak institutional support, inconsistent implementation of inclusive education policies, gendered participation patterns, and socio-economic constraints that restrict learners' opportunities to engage effectively with digital technologies. The findings demonstrate that meaningful digital inclusion cannot be achieved through technological provision alone. Rather, it depends on the interaction of inclusive governance, institutional capability, accessible technologies, and pedagogical practices that expand learners' capabilities and educational opportunities. By developing and applying the Intersectional Digital Capability Framework (IDCF), this study offers a novel conceptual framework together with contextually grounded empirical evidence that advances scholarship on digital inclusion, inclusive education, and educational policy, with implications for Kenya and other resource-constrained settings across the Global South.

Keywords: digital literacy; girls with disabilities; inclusive education; intersectional digital capability framework; educational governance; Kenya.

1. INTRODUCTION

Digital technologies are transforming education systems worldwide by reshaping how learners access knowledge, acquire competencies, and participate in contemporary society. Governments, international development agencies, and education stakeholders increasingly view digital education as central to improving educational quality, expanding learning opportunities, and achieving the aspirations of the United Nations Sustainable Development Goals, particularly Sustainable Development Goal 4 (SDG 4), which calls for inclusive and equitable quality education for all. Yet, despite substantial investments in educational technology, meaningful participation in digital learning remains unevenly distributed. Emerging evidence demonstrates that digital inequalities extend beyond disparities in access to devices and internet connectivity to encompass the broader social, institutional, and economic conditions that shape learners' ability to benefit from digital education (European Agency for Special Needs and Inclusive Education, 2024; Helsper, 2012; Robinson et al., 2015; van Dijk, 2020).

Among those most affected by these inequalities are girls with disabilities living in rural communities across the Global South. Although digital technologies have considerable potential to enhance educational participation through flexible learning opportunities and assistive technologies, their benefits remain inaccessible for many learners experiencing multiple and intersecting forms of disadvantage. Gender norms, disability-related stigma, poverty, and geographic isolation frequently interact to limit access to digital resources, reduce participation in technology-enabled learning, and constrain educational achievement. Consequently, digital education initiatives that prioritize technological provision without strengthening institutional capacity and inclusive pedagogy risk reinforcing, rather than reducing, existing educational inequalities (Alper & Goggin, 2017; Mtebe & Raisamo, 2014).

Kenya has demonstrated a strong commitment to digital transformation through initiatives such as the Digital Literacy Programme (DLP), the Competency-Based Curriculum (CBC), and national policies promoting inclusive education (Kenya Institute of Curriculum Development, 2017; Ministry of Education, 2019). Collectively, these reforms position digital literacy as a foundational competency for participation in a knowledge-based society while seeking to ensure equitable educational opportunities for all learners. Nevertheless, significant disparities persist between policy aspirations and educational practice. Evidence indicates that learners with disabilities continue to encounter substantial barriers arising from inadequate assistive technologies, limited teacher preparedness in inclusive digital pedagogy, insufficient institutional support, and uneven implementation of inclusive education policies (Mwangi et al., 2024; UNESCO, 2020). These challenges suggest that digital inclusion is fundamentally an issue of educational governance, institutional capacity, and social justice, rather than technology alone.

These challenges are particularly pronounced in rural contexts such as Kilifi County on Kenya's coast. Characterized by relatively high poverty levels, inadequate educational infrastructure, unreliable electricity, limited digital connectivity, and shortages of specialized educational resources, Kilifi provides an important setting for examining how national digital education reforms are experienced locally. Within this environment, girls with special needs experience multiple and overlapping forms of marginalization arising from the interaction of gender, disability, socio-economic disadvantage, and rurality. These intersecting inequalities influence not only access to digital technologies but also learners' confidence, participation, and opportunities to benefit from digitally mediated learning.

Although an expanding body of literature has examined digital literacy, inclusive education, gender inequality, and disability, these issues have largely been investigated independently. Comparatively little research has explored how structural inequalities, institutional capability, governance processes, and learners' capabilities interact to shape digital inclusion among girls with special needs in rural primary schools. As a result, existing scholarship provides only partial explanations of why digital exclusion persists despite increasing investment in educational technologies. This gap highlights the need for an integrated analytical perspective capable of explaining how multiple dimensions of inequality combine to influence meaningful participation in digital education.

To address this gap, the present study investigates digital literacy and the inclusion of girls with special needs in rural public primary schools in Kilifi County, Kenya. Specifically, the study seeks to: (i) identify the barriers that constrain digital literacy development among girls with special needs; and (ii) examine the institutional and community practices that support meaningful digital inclusion. Guided by the Intersectional Digital Capability Framework (IDCF), the study examines how structural inequalities, institutional capability, governance processes, and capability expansion interact to shape meaningful digital participation within the implementation of Kenya's Competency-Based Curriculum (CBC).

The paper argues that meaningful digital inclusion cannot be understood solely as a question of technological access. Rather, it emerges through the interaction of structural inequalities, inclusive governance, institutional capability, accessible technologies, and pedagogical practices that enable learners to convert digital resources into meaningful educational opportunities. By proposing the Intersectional Digital Capability Framework (IDCF) and applying it to rural Kenyan primary schools, this study contributes a novel conceptual framework together with contextually grounded empirical evidence that advances scholarship on digital inclusion, inclusive education, educational policy, and digital equity in Sub-Saharan Africa and other resource-constrained settings.

2. LITERATURE REVIEW AND THEORETICAL FOUNDATIONS

Digital technologies have become central to educational transformation worldwide, with governments increasingly investing in digital infrastructure, connectivity, and technology-enhanced learning to improve educational quality and equity. International policy frameworks emphasize digital literacy as a critical competency for participation in knowledge societies, labour markets, and democratic citizenship (UNESCO, 2018). Consequently, digital education has become an important component of efforts to achieve equitable and inclusive quality education under Sustainable Development Goal 4 (SDG 4).

Early scholarship on the digital divide primarily conceptualized digital inequality as disparities in physical access to computers, internet connectivity, and other technological resources. While this perspective highlighted significant infrastructural inequalities between countries and regions, subsequent research has demonstrated that access alone does not ensure meaningful participation in digital learning. Contemporary digital divide scholarship argues that digital inequalities are multidimensional, encompassing disparities in digital skills, patterns of technology use, institutional support, and the capacity to convert technological resources into meaningful educational outcomes. Consequently, digital inclusion increasingly depends not only on the availability of digital technologies but also on the broader social, institutional, and pedagogical environments within which they are embedded.

The capability approach provides an important extension to this debate by shifting attention from the possession of digital resources to learners' substantive freedoms to use those resources in ways that enhance learning and well-being. From this perspective, meaningful digital inclusion requires enabling conditions—including supportive institutions, skilled teachers, accessible technologies, and inclusive learning environments—that allow learners to transform digital resources into valued educational achievements. This perspective is particularly relevant in low-resource settings where access to digital devices may coexist with limited opportunities for meaningful educational participation.

Recent international evidence further suggests that educational investments in digital technologies produce unequal outcomes when institutional capacity fails to keep pace with technological expansion. Schools may possess computers, internet connectivity, or digital platforms, yet these resources remain underutilized because of inadequate teacher preparation, limited technical support, weak maintenance systems, or insufficient pedagogical integration. These findings indicate that digital transformation should be understood not simply as technological modernization but as an institutional process requiring coordinated investments in infrastructure, human capacity, and governance.

A second debate concerns whether digital transformation should be understood primarily as a technological innovation or as a broader issue of

educational justice. Much contemporary policy discourse assumes that expanding access to digital technologies will automatically reduce educational inequalities. However, growing evidence suggests that technology may reproduce existing inequalities when implemented within unequal educational systems.

Educational justice perspectives argue that digital inclusion cannot be separated from broader questions of equity, participation, and human development. Technology is not inherently inclusive; rather, its educational value depends on how it is designed, distributed, and integrated into teaching and learning. Learners who already experience social disadvantage frequently encounter additional barriers to benefiting from digital innovations because educational inequalities shape opportunities to acquire digital competencies, access supportive learning environments, and participate confidently in technology-mediated education.

Within the Global South, structural inequalities associated with poverty, rurality, inadequate educational financing, and uneven institutional capacity continue to shape digital participation. These challenges are particularly evident in many Sub-Saharan African countries where investments in digital infrastructure coexist with persistent disparities in electricity supply, internet connectivity, teacher preparation, and educational resources. Consequently, digital transformation initiatives frequently produce uneven benefits across schools and communities.

In Kenya, national initiatives such as the Digital Literacy Programme and the Competency-Based Curriculum reflect strong governmental commitment to integrating digital technologies into education. Nevertheless, empirical studies indicate that significant disparities remain between policy aspirations and implementation realities. In many rural schools, infrastructural limitations, inadequate digital resources, insufficient teacher preparation, and limited institutional support continue to constrain meaningful digital participation. These findings reinforce the argument that digital transformation should be viewed as an educational justice issue requiring equitable distribution of resources, institutional strengthening, and sustained investment in inclusive teaching practices.

Inclusive education has become a widely accepted international principle emphasizing the right of all learners to participate meaningfully in quality education regardless of disability, gender, or other characteristics. International conventions and national education policies increasingly promote inclusive schooling through curriculum adaptation, teacher preparation, and accessible learning environments (Republic of Kenya, 2009; UNESCO, 2020). Digital technologies have similarly been recognized as offering significant opportunities to enhance participation through adaptive learning systems, assistive technologies, and flexible modes of instruction (European Agency for Special Needs and Inclusive Education, 2024; Manase, 2024; Navas-Bonilla et al., 2025).

Despite these policy commitments, research consistently demonstrates that inclusion remains unevenly implemented. Learners with disabilities continue to

experience barriers associated with inaccessible infrastructure, inadequate assistive technologies, insufficient teacher preparation, and limited institutional support. These challenges are particularly pronounced in resource-constrained educational settings where schools frequently lack specialized equipment and trained personnel capable of supporting diverse learner needs.

However, disability alone does not fully explain patterns of educational exclusion. Intersectionality provides a more comprehensive analytical perspective by recognizing that multiple dimensions of identity and inequality interact to shape educational experiences. Rather than viewing gender, disability, poverty, or geographic location as independent variables, intersectionality emphasizes their mutually reinforcing nature (Collins, 2000; Crenshaw, 1989).

For girls with disabilities living in rural communities, educational exclusion emerges through the interaction of gender norms, disability-related stigma, socio-economic disadvantage, and limited educational opportunities. These overlapping inequalities influence access to digital technologies, opportunities for skill development, classroom participation, and future educational trajectories. Consequently, interventions focusing exclusively on disability or gender may overlook the cumulative disadvantages experienced by learners positioned at the intersection of multiple forms of marginalization.

Within the Kenyan context, relatively few studies have examined digital literacy through an explicitly intersectional lens. Existing research has often explored gender disparities in ICT, disability inclusion, or rural educational disadvantage independently. Less attention has been devoted to understanding how these dimensions interact within digital learning environments, particularly among girls with special educational needs in rural primary schools. Addressing this gap is essential for developing more comprehensive and contextually responsive approaches to digital inclusion.

A fourth debate concerns the relationship between educational policy and implementation. Across many countries, governments have adopted ambitious digital education strategies designed to improve learning outcomes, strengthen digital competencies, and promote educational inclusion. Nevertheless, successful implementation depends not only on policy design but also on institutional capacity, coordination, financing, and accountability.

Governance scholars argue that educational reforms frequently encounter implementation gaps because policies operate within complex institutional environments characterized by multiple actors, competing priorities, and uneven administrative capacity. Effective implementation therefore requires coordinated action among governments, schools, communities, teacher education institutions, and development partners. Without such coordination, policy commitments often fail to translate into meaningful improvements in classroom practice.

Within digital education, governance challenges frequently include fragmented institutional responsibilities, inadequate funding, weak monitoring

systems, insufficient professional development, and limited mechanisms for ensuring equitable resource allocation. These governance deficits disproportionately affect marginalized learners whose educational participation depends upon sustained institutional support.

The Kenyan experience reflects many of these broader governance challenges. Although national policies strongly emphasize digital literacy and inclusive education, implementation varies considerably across regions and schools. Rural counties frequently experience greater constraints associated with infrastructure, teacher deployment, resource allocation, and institutional support, limiting the realization of policy objectives. Evidence from Kilifi County similarly indicates that the effectiveness of digital literacy initiatives is shaped not only by technological availability but also by institutional coordination, teacher preparedness, community engagement, and local implementation capacity.

Understanding digital inclusion therefore requires moving beyond questions of technology to examine how governance structures influence educational opportunities. Institutional capability, policy coherence, and effective implementation emerge as critical determinants of whether digital transformation contributes to greater educational equity or reproduces existing inequalities.

The reviewed literature demonstrates broad agreement that meaningful digital inclusion extends beyond access to technological infrastructure to encompass institutional capacity, inclusive pedagogy, governance processes, and learners' opportunities to participate effectively in digital education. Nevertheless, several important gaps remain.

First, much of the existing literature continues to conceptualize digital inclusion primarily in terms of access to digital technologies, with comparatively limited attention to learners' capabilities to convert these resources into meaningful educational participation and learning outcomes. Second, although gender, disability, poverty, and rural disadvantage have each received considerable scholarly attention, these dimensions are frequently examined in isolation despite growing recognition that they interact to produce complex and mutually reinforcing forms of educational exclusion. Third, relatively little research has explored how governance processes, institutional capability, and policy implementation collectively influence digital inclusion within rural primary schools in resource-constrained settings. Finally, empirical evidence focusing specifically on girls with special needs in rural Kenya remains limited despite increasing national investment in digital education and inclusive schooling.

These gaps suggest the need for a more comprehensive analytical framework capable of explaining how structural inequalities, institutional capability, governance processes, and learners' capabilities interact to shape meaningful digital participation. Existing theoretical perspectives provide valuable but partial explanations. Intersectionality illuminates the ways in which overlapping social

identities generate compounded disadvantage; the capability approach explains how individuals convert available resources into valued educational outcomes; and governance theory highlights the institutional and policy conditions that determine whether educational reforms are implemented effectively and equitably. However, these perspectives have rarely been integrated within studies of digital inclusion in rural educational contexts.

To address this limitation, this study develops the Intersectional Digital Capability Framework (IDCF), which synthesizes intersectionality, the capability approach, and governance theory into a unified analytical framework. The IDCF explains how structural inequalities, institutional capability, governance processes, and capability expansion interact to influence meaningful digital inclusion among girls with special needs in rural primary schools. By moving beyond access-oriented explanations, the framework provides a more comprehensive understanding of digital participation and offers a conceptual foundation for strengthening inclusive digital education policy and practice.

Using the IDCF to examine rural primary schools in Kilifi County, this study contributes both theoretical and empirical insights to international scholarship on digital literacy, inclusive education, educational governance, and digital equity. The findings further provide evidence to inform the implementation of Kenya's Competency-Based Curriculum and Digital Literacy Programme while offering lessons applicable to other resource-constrained settings across Sub-Saharan Africa and the broader Global South.

3. THEORETICAL AND CONCEPTUAL FRAMEWORK

This study is guided by an integrated theoretical perspective that combines intersectionality, the capability approach, and governance theory to explain digital inclusion among girls with disabilities in rural Kenyan primary schools. While each perspective offers valuable insights into educational inequality, none independently provides a sufficiently comprehensive explanation of how structural disadvantage, institutional capacity, governance systems, and individual opportunities interact to shape meaningful participation in digital learning. Building on the complementary strengths of these perspectives, the study develops the Intersectional Digital Capability Framework (IDCF) as an analytical framework for examining digital literacy and inclusion within resource-constrained educational contexts.

Intersectionality, first articulated by Crenshaw (1989), explains how multiple and overlapping social identities—including gender, disability, socio-economic status, and geographic location—interact to produce distinct experiences of marginalization. Rather than viewing these dimensions in isolation, intersectionality recognizes that educational inequalities emerge through interconnected systems of power and discrimination that reinforce one another.

Collins (2000) further argues that inequalities are embedded within broader social and institutional structures that shape access to opportunities, resources, and participation. Within educational settings, girls with disabilities often experience exclusion not simply because they are female or because they have disabilities, but because these identities intersect with poverty, rurality, and institutional disadvantage to create cumulative barriers to educational participation.

Applied to digital education, intersectionality provides an important lens for understanding why access to digital technologies remains unequally distributed and why seemingly universal digital initiatives frequently produce unequal outcomes across different groups of learners.

The capability approach, developed by Sen (1999) and further expanded by Nussbaum (2000), shifts attention from the mere provision of resources to individuals' substantive freedoms to achieve outcomes they value. From this perspective, educational success depends not only on whether learners possess digital devices or internet connectivity, but also on whether they have genuine opportunities to convert these resources into meaningful learning experiences.

Applied to digital literacy, the capability approach distinguishes among:

- **Digital resources** (devices, connectivity, and assistive technologies);
- **Conversion factors** (teacher competence, accessibility, family support, and institutional capacity); and
- **Capabilities** (learners' real opportunities to participate meaningfully in digital learning).

This distinction is particularly important in rural educational settings, where technological resources may be available but remain underutilized because institutional, pedagogical, and social conditions constrain their effective use.

While intersectionality explains structural inequalities and the capability approach emphasizes learners' opportunities to transform resources into valued outcomes, governance theory focuses on the institutional conditions that determine whether educational policies are effectively implemented. Educational reforms frequently fail to achieve their intended outcomes because of weak institutional coordination, inadequate financing, fragmented implementation, and limited accountability.

Within digital education, governance therefore shapes the extent to which national commitments to digital literacy and inclusive education are translated into meaningful classroom practice. Institutional capability, teacher preparation, resource allocation, policy coordination, monitoring, and stakeholder collaboration become critical determinants of equitable digital participation and sustainable educational inclusion.

Although intersectionality, the capability approach, and governance theory each provide valuable insights into digital inclusion, they are rarely integrated within studies of digital inclusion in rural African education systems. Existing research has largely examined structural inequalities, learners' capabilities, or

governance processes independently, resulting in only partial explanations of why digital exclusion persists despite increasing investment in educational technologies.

To address this theoretical gap, this study develops the Intersectional Digital Capability Framework (IDCF). The framework integrates the complementary strengths of intersectionality, the capability approach, and governance theory to explain how structural inequalities, institutional capability, governance processes, and learners' substantive freedoms interact to shape meaningful digital participation and inclusion.

The IDCF comprises four interrelated dimensions. First, structural inequalities—including gender, disability, poverty, and rural location—shape learners' initial opportunities for digital participation. Second, institutional capability—including teacher preparedness, inclusive pedagogy, assistive technologies, school leadership, and digital resources—determines the extent to which schools can support inclusive digital learning. Third, governance processes—including policy implementation, institutional coordination, funding, accountability, monitoring, and stakeholder participation—influence the sustainability, effectiveness, and equity of digital education initiatives. Finally, capability expansion reflects learners' ability to convert digital opportunities into meaningful educational participation, improved learning outcomes, empowerment, and broader life opportunities.

Rather than conceptualizing digital inclusion as simply providing access to technology, the IDCF views meaningful digital participation and inclusion as the outcome of dynamic interactions among these four dimensions. The framework extends conventional digital divide perspectives by demonstrating that equitable digital education depends not only on technological access, but also on institutional capability, effective governance, and the expansion of learners' capabilities within their broader social and educational contexts.

Figure 1 presents the Intersectional Digital Capability Framework (IDCF), illustrating the relationships among the four dimensions and their collective contribution to meaningful digital participation and inclusion among girls with disabilities in rural Kenyan primary schools.

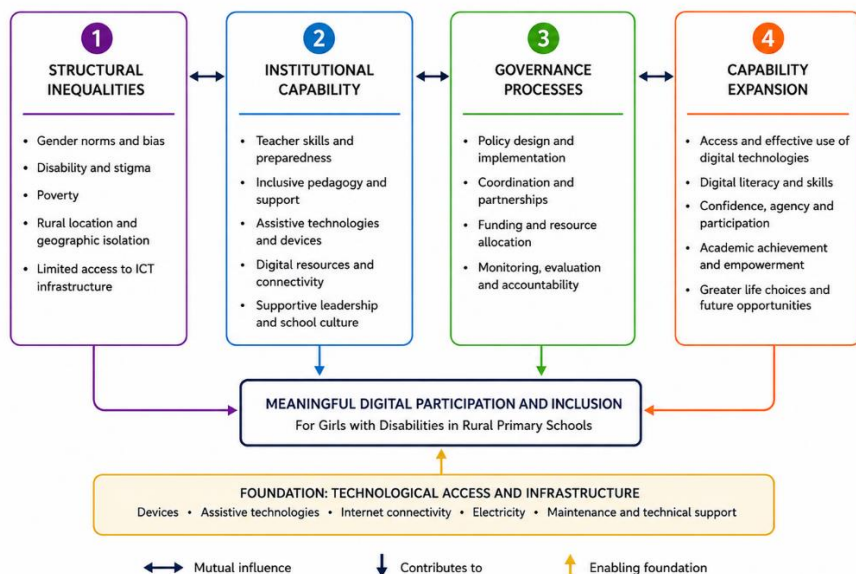


Figure 1. The Intersectional Digital Capability Framework (IDCF)

Source: Developed by the author (2026)

Figure 1 illustrates the relationships among the four dimensions of the Intersectional Digital Capability Framework (IDCF) and their collective contribution to meaningful digital participation and inclusion among girls with disabilities in rural Kenyan primary schools. The framework demonstrates how structural inequalities, institutional capability, governance processes, and capability expansion interact dynamically rather than functioning independently. Technological access and infrastructure provide the enabling foundation upon which these dimensions operate, while contextual and intersectional factors influence each stage of capability development. Collectively, the framework emphasizes that equitable digital inclusion is achieved not merely through access to technology, but through coordinated institutional support, effective governance, and the expansion of learners' substantive freedoms to participate fully in digital learning.

The IDCF provides the conceptual foundation for the empirical analysis undertaken in this study. It informs the identification of the study variables, guides data collection and analysis, and serves as the analytical lens for interpreting how structural, institutional, governance, and capability-related factors shape digital literacy and inclusion among girls with disabilities in rural Kenyan primary schools.

The Intersectional Digital Capability Framework (IDCF) is situated within Kenya's evolving policy landscape, which places increasing emphasis on inclusive education, digital transformation, and equitable learning opportunities.

The Competency-Based Curriculum (CBC) promotes learner-centred pedagogy, inclusion, and digital literacy as a core competency essential for preparing learners for the demands of the twenty-first century. Complementing this, the Digital Literacy Programme (DLP) seeks to expand equitable access to digital technologies in public primary schools, while the Special Needs Education Policy Framework advocates for the inclusion of learners with disabilities within mainstream education through appropriate support services, assistive technologies, and inclusive teaching practices.

Despite these progressive policy commitments, significant implementation challenges continue to limit meaningful digital participation among learners with disabilities, particularly in rural schools. These challenges include inadequate digital infrastructure, limited availability of assistive technologies, insufficient teacher preparation for inclusive digital pedagogy, weak institutional coordination, inconsistent policy implementation, and inequitable resource allocation. Consequently, many learners remain unable to benefit fully from national digital education initiatives.

These implementation gaps reinforce the central proposition of the Intersectional Digital Capability Framework (IDCF): meaningful digital inclusion cannot be achieved through the provision of technology alone. Rather, it requires the interaction of supportive governance, strong institutional capability, equitable resource allocation, and the expansion of learners' capabilities within inclusive educational environments. The Kenyan policy context therefore provides an appropriate setting for examining how structural, institutional, governance, and capability-related factors collectively influence digital literacy and inclusion among girls with disabilities in rural primary schools.

4. METHODOLOGY

A qualitative case study design was adopted to explore how digital literacy initiatives are experienced by girls with special needs in public primary schools in rural Kilifi County, Kenya. The design enabled an in-depth examination of the interaction between structural inequalities, institutional practices, and learners' opportunities for meaningful digital participation within their real educational contexts.

Participants comprised girls with visual, hearing, and mild cognitive impairments, together with classroom teachers, headteachers, and parents. This range of participants provided multiple perspectives on the institutional, socio-cultural, and household factors influencing digital inclusion.

Data were collected through semi-structured interviews, classroom observations, and document analysis to facilitate methodological triangulation and strengthen the credibility of the findings. Data were analysed using thematic analysis, guided by the integrated theoretical framework comprising intersectionality, the capability approach, and governance theory. The analysis focused on identifying how intersecting forms of disadvantage, institutional

capacity, and governance processes influenced learners' ability to access, participate in, and benefit from digital learning opportunities.

Ethical approval was obtained from the relevant authorities, and informed consent was secured from all participants prior to data collection.

5. FINDINGS

The findings demonstrate that digital inclusion among girls with special needs is shaped by the interaction of structural inequalities, institutional capability, and governance factors, consistent with the proposed Intersectional Digital Capability Framework (IDCF).

Although most participating schools had received digital devices through Kenya's Digital Literacy Programme, limited availability of assistive technologies substantially constrained meaningful participation by learners with disabilities. Digital content was rarely adapted for learners with visual, hearing, or cognitive impairments, indicating that access to technology alone is insufficient to achieve genuine digital inclusion.

Institutional capability emerged as a major determinant of learners' digital experiences. Many teachers reported inadequate preparation in inclusive digital pedagogy and expressed limited confidence in adapting digital technologies to accommodate diverse learning needs. As one teacher explained:

"I want to help, but I am not sure how to modify the software for children with hearing difficulties."

Classroom observations further revealed the influence of intersecting gender and disability inequalities. Boys frequently dominated the use of digital devices, while girls with disabilities participated less actively and demonstrated lower confidence when engaging with technology. One learner reflected:

"I want to use the computer, but I feel shy because the boys always take the keyboard first."

The findings also highlighted the influence of broader socio-economic and governance constraints. Inadequate electricity supply, limited internet connectivity, insufficient funding for assistive technologies, and the absence of digital devices in many households reduced opportunities for learners to develop digital skills beyond the classroom. These institutional and contextual limitations weakened the effectiveness of national digital education policies at the school level.

Despite these challenges, several schools demonstrated promising inclusive practices. Teachers who employed peer-support approaches, differentiated instruction, simplified digital tasks, and adaptive teaching strategies created more supportive learning environments that enhanced participation among girls with special needs. These findings suggest that meaningful digital inclusion depends not only on technological provision but also on strengthening institutional capability, inclusive governance, and learners' opportunities to convert digital resources into valued educational outcomes.

6. DISCUSSION, IMPLICATIONS, AND CONCLUSION

The findings demonstrate that digital exclusion among girls with special needs in rural Kilifi County is multidimensional and reflects the interaction of structural inequalities, institutional capability, and governance processes, consistent with the proposed Intersectional Digital Capability Framework (IDCF). They reinforce growing evidence that digital inequalities are socially embedded and often reproduce existing forms of marginalization when educational technologies are introduced without adequate attention to contextual barriers (van Dijk, 2020; Warschauer, 2004). Similar findings from Kilifi County indicate that although schools have benefited from Kenya's Digital Literacy Programme, learners with disabilities continue to experience exclusion due to inadequate assistive technologies, limited teacher preparedness, and weak institutional support for inclusive digital learning (Mwangi et al., 2024).

From an intersectionality perspective, the study illustrates how gender, disability, poverty, and rural location interact to create multiple and overlapping forms of disadvantage that restrict meaningful participation in digital education. These intersecting inequalities influence not only learners' access to technology but also their confidence, participation, and educational experiences within digitally enabled classrooms.

The findings further demonstrate the importance of institutional capability. Teacher preparedness, inclusive pedagogical practices, school leadership, and the availability of assistive technologies emerged as critical determinants of whether digital resources could be translated into meaningful learning opportunities. These findings suggest that technological investment alone cannot achieve equitable digital inclusion unless educational institutions possess the capacity to implement inclusive teaching and learning practices effectively.

The capability perspective provides additional insight by explaining that digital technologies constitute resources whose educational value depends on learners' ability to convert them into meaningful capabilities and learning outcomes. This conversion process is shaped by multiple factors, including teacher competence, accessible technologies, supportive learning environments, family resources, and positive social attitudes toward disability. Where these conversion factors are weak, the provision of digital devices may inadvertently reinforce rather than reduce educational inequalities.

Governance processes also emerged as an important enabling dimension. Although Kenya's Competency-Based Curriculum (CBC), the Digital Literacy Programme, and the Special Needs Education Policy Framework collectively demonstrate a strong national commitment to inclusive digital education, gaps in implementation, coordination, financing, accountability, and institutional monitoring continue to constrain equitable outcomes. These findings underscore that meaningful digital inclusion depends not only on policy formulation but also

on effective governance mechanisms that ensure policies are implemented consistently across diverse educational contexts.

The study therefore has important policy implications. Advancing inclusive digital literacy requires strengthening teacher preparation in inclusive ICT pedagogy, expanding investment in assistive technologies and accessible digital content, enhancing institutional capacity within schools, embedding gender-responsive and disability-inclusive approaches throughout CBC implementation, improving monitoring and accountability systems, and promoting community awareness to reduce disability-related stigma. Such integrated interventions would strengthen learners' capabilities while ensuring that national digital education reforms benefit all learners equitably.

In conclusion, Kenya's commitment to digital transformation provides an important foundation for educational inclusion. However, the findings demonstrate that meaningful digital inclusion cannot be achieved through technological provision alone. Rather, it requires the interaction of inclusive governance, institutional capability, and the expansion of learners' capabilities within supportive educational environments. By integrating these dimensions, the Intersectional Digital Capability Framework (IDCF) offers a comprehensive explanation of digital inclusion and provides a practical framework for guiding future research, policy development, and implementation aimed at ensuring that digital education reforms translate into equitable learning opportunities for girls with special needs and other marginalized learners.

7. RESEARCH CONTRIBUTIONS

This study makes several important theoretical, empirical, and policy contributions. First, it advances the literature by developing the Intersectional Digital Capability Framework (IDCF), which integrates intersectionality, the capability approach, and governance theory to provide a comprehensive explanation of digital inclusion among girls with special needs in rural educational settings. Second, the study demonstrates that digital inclusion is shaped by the interaction of structural inequalities, institutional capability, governance processes, and learners' capabilities, extending existing research that has typically examined these dimensions independently. Third, it provides empirical evidence that the provision of digital technologies alone is insufficient to achieve equitable learning outcomes. Instead, meaningful digital inclusion requires well-prepared teachers, accessible technologies, inclusive pedagogical practices, effective school leadership, supportive governance structures, and adequate institutional resources. Fourth, the study identifies practical strategies—including peer-supported learning, differentiated instruction, adaptive teaching practices, and inclusive school environments—that can strengthen digital participation among girls with special needs. Finally, by developing and applying the Intersectional Digital Capability Framework (IDCF), the study offers a novel theoretical lens

and evidence-based policy insights for designing inclusive digital education initiatives within Kenya's Competency-Based Curriculum and similar educational contexts.

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