Social Science and Humanities Journal
Everant Journal
ISSN: 2456-2653
https://sshjournal.com/
Impact Factor: 2024: 6.576
2023: 5.731
Volume 09 Issue 11 November 2025
DOI: https://doi.org/10.18535/sshj.v9i11.2114

Challenges and Opportunities of Online Learning for Higher Education Students in Somalia

Abshir Moalin Mohamed (Dhiblawe)

Researcher & Director, Center for Research and Development Al Hilaal University

Received 10-10-2025
Revised 07-11-2025
Accepted 15-11-2025
Published 23-11-2025

Abstract:

This study investigated the multifaceted challenges and opportunities associated with online learning implementation in Somalia's higher education sector, a critical educational development in a nation recovering from decades of civil unrest. Employing a mixed-methods research approach, the study collected data from 247 university students across seven major Somali universities through structured surveys and conducted 15 in-depth interviews with faculty members and administrators. Quantitative data was analyzed using descriptive statistics and inferential analyses, while qualitative data underwent thematic content analysis to identify recurring patterns. The findings revealed significant infrastructure barriers, with 76% of students reporting unreliable internet connectivity and 68% facing electricity disruptions that severely impacted their learning experience. Despite these challenges, the study found that online learning had democratized access to education, with a 34% increase in rural student participation and a 28% increase in female enrollment between 2018-2022. Additional benefits included flexible learning schedules (valued by 81% of participants) and access to international educational resources (appreciated by 74% of participants). The study concluded that while online learning presents significant opportunities for expanding educational access in Somalia, substantial infrastructure investments and contextualized pedagogical approaches are essential for sustainability. Recommendations include public-private partnerships for technological infrastructure development, faculty development programs focused on online teaching methodologies, and policy frameworks that address digital equity concerns in the Somali educational landscape.

Key words: challenges, opportunities, online learning for higher education students

1. Introduction:

The transformation of higher education through digital technologies has become a global phenomenon, reshaping traditional educational paradigms and creating new possibilities for knowledge dissemination and acquisition. However, the implementation and effectiveness of online learning modalities vary significantly across different socioeconomic and geographical contexts, particularly in developing nations facing unique infrastructural, socio-political, and economic challenges (Unwin et al., 2020). Somalia, a nation gradually recovering from decades of civil conflict and institutional collapse, represents a particularly complex case study for examining the integration of online learning into higher education systems. The country's educational infrastructure, severely damaged during years of instability, has been undergoing a

process of reconstruction that coincided with the global digital revolution in education (Cassanelli & Abdikadir, 2019).

The Somali higher education landscape experienced significant disruption following the collapse of the central government in 1991, with most institutions closing their doors and educational progress stalling for nearly a decade (Abdi, 2018). The period between 2000-2010 witnessed the gradual re-emergence of universities, primarily through private initiatives, with limited resources and constrained by the ongoing security situation. The introduction of online learning technologies in this context represented not merely an educational innovation but a potential solution to overcome geographical barriers, security concerns, and resource limitations that constrained traditional educational delivery (Hassan & Mohamed, 2021). Understanding the dynamics of this educational transition requires examining the intersection of technological adoption, institutional capacity, socioeconomic factors, and cultural dimensions that collectively shape the educational experience of Somali students.

This research aimed to critically investigate the multidimensional challenges and opportunities that characterize online learning implementation in Somalia's higher education sector. Through rigorous empirical investigation, the study sought to identify the structural impediments, technological barriers, pedagogical challenges, and socioeconomic factors that influenced the effectiveness of online learning modalities for Somali university students. Simultaneously, the research explored the transformative potential of digital education in expanding access, improving quality, and creating new educational pathways in a post-conflict society struggling with limited resources and infrastructure (Eno et al., 2020). By situating the analysis within Somalia's unique historical and developmental context, this study contributes to understanding how digital educational technologies interact with local realities in fragile states, potentially informing more contextually appropriate educational interventions and policies.

2. Background:

The evolution of Somalia's higher education system has been inextricably linked to the nation's turbulent political history and socioeconomic development trajectory. Prior to the civil war that erupted in the late 1980s, Somalia maintained a centralized educational system with Somali National University (established in 1954) serving as the primary institution of higher learning. This period was characterized by relatively stable educational provision, though limited in scope and predominantly focused on producing civil servants for the government apparatus (Abdi, 2018). The collapse of the Siad Barre regime in 1991 precipitated a comprehensive breakdown of state institutions, including the educational infrastructure, resulting in what scholars have described as "educational discontinuity" that persisted throughout the 1990s (Cassanelli & Abdikadir, 2019). During this period, educational provision was largely informal, fragmented, and sustained primarily through diaspora remittances and international humanitarian interventions, with higher education virtually non-existent in many regions (Hassan & Mohamed, 2021).

The early 2000s marked the beginning of educational reconstruction in Somalia, characterized by the emergence of privately funded universities that attempted to fill the void left by the collapsed state educational system. Institutions such as Mogadishu University (established in 1997 but fully operational by 2000), East Africa University in Puntland (1999), and Amoud University in Somaliland (1998) pioneered this resurgence, operating under challenging conditions including limited faculty resources, inadequate facilities, and ongoing security concerns (Eno et al., 2020). The period between 2000-2010 witnessed exponential growth in higher education institutions, with over 40 universities established across Somalia's different regions, though questions persisted regarding quality assurance, standardization, and accreditation processes in this largely unregulated educational marketplace (Hussein, 2019). This rapid expansion occurred without corresponding

development in educational infrastructure, creating a system characterized by significant disparities in quality and accessibility.

The introduction of digital technologies and online learning modalities in Somalia's higher education landscape emerged against this backdrop of institutional recovery and expansion. Initial attempts at implementing technology-enhanced learning began around 2010, primarily through partnerships with international universities and development organizations that provided technical support and capacity building (Muse & Abdulle, 2019). The proliferation of mobile telecommunications infrastructure across Somalia, with cellular penetration reaching 73% by 2017 according to the World Bank (2019), created an unprecedented opportunity for educational institutions to leverage digital connectivity despite the country's limited physical infrastructure. Statistics from the International Telecommunication Union revealed that internet penetration in Somalia grew from less than 1% in 2010 to approximately 12% by 2020, with significantly higher rates in urban centers (ITU, 2021), creating a foundation for digital educational delivery, albeit with substantial urban-rural disparities.

The integration of online learning into Somalia's higher education system has been shaped by several interconnected contextual factors. First, persistent security challenges in certain regions continued to impede physical access to educational institutions, with data from the Armed Conflict Location & Event Data Project documenting over 1,400 security incidents affecting civilian movement in southern Somalia between 2018-2021 (ACLED, 2022). This security dimension enhanced the appeal of distance education modalities that could transcend geographical and security barriers. Second, significant demographic pressures, with approximately 70% of Somalia's population under the age of 30 and growing at 2.9% annually according to UNFPA data (2020), generated unprecedented demand for higher education that traditional infrastructure could not accommodate. Third, the substantial Somali diaspora community, estimated at 2 million people globally (Hammond et al., 2019), represented both a market for transnational educational provision and a source of knowledge transfer, with diaspora professionals increasingly involved in online teaching for Somali institutions.

The COVID-19 pandemic that emerged in 2020 served as a catalyst for accelerating digital transformation in Somalia's education sector. Data from Somalia's Ministry of Education revealed that approximately 87% of higher education institutions attempted to transition to some form of online or remote learning during the pandemic-induced closures (Ministry of Education, Culture and Higher Education, 2021). This transition, while necessary, exposed and exacerbated the digital divide within the Somali student population. A survey conducted by the Somali Research and Development Institute in 2020 found that only 23% of university students had consistent access to both internet connectivity and appropriate devices for effective online learning, with significant disparities based on socioeconomic status, geographical location, and gender (SRDI, 2021). These findings highlighted how existing social inequalities were potentially being reproduced and amplified through the digitalization of education in the Somali context.

3. Literature Review:

Historical Evolution of Online Learning in Developing Nations

The trajectory of online learning in developing nations has followed a distinct evolutionary path characterized by both technological leapfrogging and persistent structural constraints. Early scholarly examinations of this phenomenon, such as Gulati's (2008) comprehensive analysis of distance education in the Global South, documented how developing nations often bypassed intermediate technological stages that characterized Western educational development, moving directly from minimal technological integration to mobile and digital learning platforms. This technological leapfrogging, while

potentially advantageous, created implementation gaps as institutional structures and pedagogical approaches struggled to adapt to rapid technological adoption. Subsequent research by Andersson and Grönlund (2009) identified four critical dimensions affecting e-learning implementation in developing contexts: course-related challenges, individual characteristics (of both students and teachers), technological constraints, and contextual factors including organizational, cultural, and societal dimensions. Their framework, based on empirical studies across multiple developing nations, established an analytical foundation that subsequent research has expanded upon while acknowledging the heterogeneity of developing contexts.

The past decade has witnessed more nuanced examinations of how historical, cultural, and economic factors shape the implementation of online learning in specific developing contexts. Mahboob and Tiantian's (2016) longitudinal study of e-learning adoption across fifteen African nations demonstrated how colonial educational legacies continued to influence institutional receptiveness to technological innovation, with formerly British and French colonies exhibiting distinct patterns of educational technology integration reflecting their historical educational structures. These findings were complemented by Czerniewicz and Brown's (2014) influential work on "bounded techno-rationalism," which documented how technological determinist assumptions underpinning many international educational technology interventions frequently overlooked local epistemological traditions and learning practices, resulting in implementation gaps and cultural discontinuities. Their research in South African universities revealed how seemingly neutral technological platforms often embodied Western pedagogical assumptions that contradicted local educational philosophies and practices.

Research specific to post-conflict societies has identified additional complexities in online learning implementation. Muyinda et al.'s (2019) mixed-methods investigation of mobile learning in Uganda, Rwanda, and South Sudan demonstrated how political instability and institutional fragility significantly impacted the sustainability of educational technology initiatives, with projects often thriving during periods of direct international support but struggling to achieve institutional embeddedness. Their findings indicated that 78% of educational technology initiatives in post-conflict settings failed to achieve sustainability beyond initial funding periods, suggesting structural vulnerabilities that transcended mere technological constraints. These findings aligned with Omar's (2017) comprehensive analysis of higher education reconstruction in post-conflict societies, which identified "institutional memory disruption" as a critical factor affecting educational technology adoption, as the loss of academic expertise during conflict periods created implementation gaps that technology alone could not address.

Infrastructure and Technological Challenges

The infrastructure dimensions of online learning implementation in developing contexts have been extensively documented in the literature, with particular attention to the multifaceted barriers that constrain effective technological integration. Comprehensive research by Aikins (2019) across sub-Saharan Africa identified electricity insecurity as the most pervasive barrier to sustainable online learning, with data from 18 countries revealing that educational institutions experienced an average of 4.3 power outages weekly, disrupting 23% of scheduled online learning activities. These findings were corroborated by Mukhtar et al.'s (2020) longitudinal study of online learning implementation in Pakistan, which found that electricity disruptions accounted for 37% of reported barriers to effective participation, with rural areas experiencing disproportionately higher disruption rates (52%) compared to urban centers (29%). The resulting "participation inequality" created cascading effects on learning outcomes, with students experiencing the most severe infrastructure constraints demonstrating 21% lower course completion rates and 17% lower academic performance metrics.

Internet connectivity issues represent another critical infrastructure constraint extensively analyzed in the literature. Broadband penetration statistics compiled by Nyerere et al. (2022) across 24 developing nations revealed stark urban-rural disparities in connectivity, with urban centers averaging 43% reliable broadband access compared to just 11% in rural regions. These geographical disparities were further exacerbated by the quality of available connections, with bandwidth limitations significantly constraining educational possibilities. Their research demonstrated that 67% of rural educational institutions could not support synchronous video-based instruction due to bandwidth limitations, restricting online learning to less interactive, asynchronous modalities. These constraints were particularly severe in Somalia, where Hassan and Mohamed's (2021) survey of five major universities found that only 17% of students reported having sufficient bandwidth for uninterrupted participation in video-based instruction, with the average student experiencing connectivity disruptions 2.7 times during a typical three-hour online session.

Device accessibility represents a third critical dimension of the infrastructure challenge, with several studies documenting how limited access to appropriate technology creates significant barriers to equitable participation. Research by Johnson et al. (2021) spanning six East African nations found that while mobile phone penetration had reached near-universal levels (94% of university students), only 31% of students had consistent access to laptops or desktop computers suitable for comprehensive educational engagement. This "device divide" created significant constraints on the types of learning activities students could effectively engage in, with Ibrahim's (2020) experimental study in Nigerian universities demonstrating that students restricted to mobile-only access spent 37% less time on interactive learning tasks and 42% less time on content creation activities compared to peers with computer access. The resulting pedagogical compromises often reinforced passive learning approaches, with Mtebe and Raphael's (2018) content analysis of 42 online courses across East Africa finding that 76% of mobile-accessible courses relied predominantly on content consumption rather than interactive engagement, potentially limiting the development of higher-order thinking skills.

Research specific to the Somali context has identified additional infrastructure complexities related to the country's post-conflict reality. Ahmed et al.'s (2020) mixed-methods study of technological infrastructure across Somali regions documented significant geographical disparities in digital readiness, with universities in relatively stable regions (particularly Somaliland and Puntland) demonstrating substantially higher infrastructure capacity than those in southern and central regions where insecurity persisted. Their comparative analysis revealed that universities in more secure regions had invested three times more in technological infrastructure between 2015-2020, creating widening disparities in digital learning capacity that potentially reinforced existing educational inequalities. These findings were complemented by Omar and Hassan's (2019) institutional analysis of technology integration in Somali universities, which found that 87% of institutions lacked comprehensive technology plans and dedicated budgets for infrastructure development, resulting in ad hoc approaches to technology acquisition that frequently failed to address systemic needs.

Pedagogical and Instructional Challenges

The literature on pedagogical dimensions of online learning in developing contexts reveals complex challenges that transcend mere technological considerations, encompassing faculty preparedness, instructional design appropriateness, and cultural congruence of teaching methodologies. Comprehensive research by Adedoyin and Soykan (2020) examining faculty readiness across 12 developing nations found that only 23% of instructors had received formal training in online teaching methodologies prior to institutional adoption of digital learning platforms. Their multinational survey of 873

faculty members revealed significant self-efficacy gaps, with 68% of instructors reporting moderate to severe anxiety regarding their ability to effectively facilitate online learning experiences. These findings were corroborated by Lwoga's (2018) longitudinal study of faculty development initiatives in Tanzania, which documented how limited institutional investment in pedagogical training resulted in the reproduction of traditional teacher-centered approaches in online environments, with 71% of observed online courses characterized by information transmission rather than constructivist engagement.

The literature identifies several distinct pedagogical challenges that consistently emerge across developing contexts. First, research by Wang et al. (2021) analyzing online course designs across multiple Asian and African universities documented persistent "transposition fallacies" wherein face-to-face instructional approaches were directly transferred to online environments without appropriate adaptation, resulting in diminished student engagement and higher discontinuation rates. Their comparative analysis found that courses exhibiting this transposition pattern demonstrated 32% lower student satisfaction ratings and 27% lower completion rates compared to courses designed specifically for online delivery. Second, Andersson and Grönlund's (2009) influential framework has been expanded by subsequent researchers who identified specific pedagogical barriers including assessment integrity concerns (Gamage et al., 2020), inadequate student feedback mechanisms (Adarkwah, 2021), and insufficient accommodation of diverse learning styles (Ibrahim, 2020).

Research examining student experiences of online learning in developing contexts has revealed additional pedagogical complexities. Comprehensive survey data collected by Adedoyin and Soykan (2020) across 1,247 university students in developing nations found that 76% reported difficulties with self-regulated learning in online environments, while 61% identified inadequate instructor presence and feedback as significant barriers to effective engagement. These findings aligned with Bozkurt et al.'s (2020) mixed-methods study examining learning experiences during COVID-19 emergency remote teaching across 31 countries, which found that students in developing nations reported significantly higher levels of "instructional transactional distance" – perceiving greater psychological and communication gaps between themselves and instructors – compared to students in developed economies. Their analysis suggested that this increased distance stemmed not merely from technological constraints but from pedagogical approaches that failed to establish meaningful instructor presence and facilitate substantive interaction.

Cultural dimensions of pedagogy represent another critical consideration extensively explored in the literature. Influential theoretical work by Gunawardena et al. (2019) on "cultural repositioning" in online learning highlighted how educational technologies often embed cultural assumptions about teaching and learning that may conflict with local educational traditions and epistemologies. Their cross-cultural analysis of learning management systems used across diverse contexts documented how platform designs frequently privileged Western conceptions of individual learning, direct questioning, and explicit knowledge construction that conflicted with more collectivist, relationship-centered, and implicit learning approaches common in many developing societies. These theoretical insights were empirically validated by Mittelmeier et al.'s (2019) comparative study of online learning experiences across four countries (China, South Africa, Mexico, and the Netherlands), which found that platform features perceived as culturally incongruent resulted in 43% lower utilization rates and significant differences in participation patterns across cultural contexts.

Research specific to the Somali educational context has identified additional pedagogical complexities related to language and cultural factors. Hussein's (2019) linguistic analysis of online learning materials used in Somali

universities found that 73% of digital content was exclusively in English despite over 60% of students reporting limited English proficiency, creating significant comprehension barriers. This linguistic mismatch was compounded by what Abdi (2018) termed "epistemic disconnection," wherein imported curricula and teaching methodologies failed to incorporate relevant local knowledge and contextual applications. His qualitative study involving 47 Somali students documented consistent themes of cultural alienation in online learning experiences, with participants reporting difficulties relating abstract concepts to their lived experiences and professional contexts. These findings suggested the need for what Hassan and Mohamed (2021) termed "contextual pedagogical adaptation" – systematic processes for localizing both content and teaching approaches to enhance cultural relevance and student engagement.

Socioeconomic Factors and Digital Divide

The literature examining socioeconomic dimensions of online learning in developing contexts has consistently documented how existing social inequalities are frequently reproduced and sometimes amplified in digital learning environments. Comprehensive research by Czerniewicz et al. (2020) analyzing data from 24 African universities found strong correlations between students' socioeconomic background and their digital learning outcomes, with students from lower-income households experiencing what they termed "compound disadvantage" – facing multiple, interconnected barriers that collectively constrained educational engagement. Their statistical analysis demonstrated that socioeconomic factors explained 42% of the variance in online learning performance, significantly higher than in traditional face-to-face settings (27%), suggesting that digital modalities potentially amplified existing inequalities. These findings aligned with Rambe and Moeti's (2017) influential work on "digital stratification" in South African higher education, which documented how access limitations interacted with digital literacy gaps and cultural capital differences to create multilayered disadvantage for students from marginalized backgrounds.

Gender dimensions of the digital divide have received significant scholarly attention, with substantial research documenting how cultural norms, economic constraints, and institutional practices interact to create gender-specific barriers to online learning. Cross-national research by UNESCO (2020) examining gender disparities in digital education across 11 developing nations found that female students were 27% less likely to have dedicated devices for educational purposes and 33% more likely to report family responsibilities constraining their online learning engagement. These access disparities were compounded by what Nsibirano et al. (2022) termed "digital confidence gaps," with their survey of 1,638 university students across East Africa finding that female students reported significantly lower self-efficacy regarding technological skills despite demonstrating equivalent proficiency in objective assessments. Their research suggested that gendered social messaging about technology competence created psychological barriers that influenced educational engagement and professional aspirations in technological fields.

Geographical dimensions of digital inequality have been extensively documented in the literature, with consistent findings regarding urban-rural disparities in online learning opportunities and outcomes. Comprehensive data compiled by Agyapong et al. (2021) across six African nations revealed that rural students faced a "triple disadvantage" in online learning access: 67% lower rates of reliable internet connectivity, 54% less access to appropriate devices, and 38% higher incidence of electricity disruptions compared to urban counterparts. These infrastructure gaps translated directly into educational disparities, with rural students 47% more likely to report missing scheduled online activities and 39% more likely to discontinue online courses. These findings were consistent with Kassahun's (2021) longitudinal study of higher education access in Ethiopia, which found

that the transition to online learning during COVID-19 resulted in a 23% decrease in rural student participation compared to just 7% for urban students, potentially reversing previous gains in geographical inclusivity.

Research specific to the Somali context has identified additional socioeconomic complexities related to clan dynamics, displacement patterns, and remittance dependencies. Eno et al.'s (2020) comprehensive analysis of higher education access in Somalia documented how clan affiliations continued to influence educational opportunities, with universities in certain regions predominantly serving specific clan constituencies, potentially reinforcing existing social stratifications. Their institutional analysis found that 78% of universities demonstrated enrollment patterns that reflected local clan demographics, with limited cross-clan educational mobility. These findings were complemented by Hassan and Mohamed's (2021) examination of internally displaced persons' access to higher education, which found that displaced students were 63% less likely to participate in online learning despite physical proximity to educational institutions, suggesting that displacement status created multidimensional disadvantages beyond geographical considerations.

Financial aspects of the digital divide have received increasing scholarly attention, with research documenting how the costs associated with online learning created significant barriers in resource-constrained contexts. Survey data collected by Nyerere et al. (2022) across 1,734 university students in East Africa found that internet costs represented a substantial financial burden, with students reporting spending an average of 18% of their monthly disposable income on connectivity for educational purposes. These financial pressures were particularly acute in Somalia, where Ahmed et al.'s (2020) economic analysis found that the cost of reliable internet connectivity sufficient for video-based learning represented approximately 27% of average monthly household income, creating significant affordability barriers. Their research documented coping strategies including "connectivity pooling" (where multiple students shared a single connection) and "time-shifting" (accessing materials during lower-cost off-peak hours), adaptations that frequently compromised learning quality and consistency.

Opportunities and Benefits of Online Learning in Developing Contexts

Despite the substantial challenges documented in the literature, research has also identified significant opportunities and potential benefits associated with online learning implementation in developing contexts. Access expansion represents the most consistently documented benefit, with multiple studies confirming online learning's potential to overcome geographical, socioeconomic, and infrastructure barriers that constrain traditional educational delivery. Comprehensive research by Traxler et al. (2020) analyzing enrollment data from 17 developing nations found that institutions implementing robust online learning programs experienced average enrollment increases of 34% over five years, with particularly significant gains among previously underserved populations including rural students (47% increase), working professionals (53% increase), and female students in conservative societies (29% increase). These findings aligned with Bozkurt et al.'s (2020) global analysis of educational responses to COVID-19, which documented how crisis-induced online transitions, despite their limitations, created unprecedented educational continuity and access during disruption.

Flexibility benefits have been extensively documented across diverse contexts, with research confirming online learning's capacity to accommodate students navigating complex life circumstances. Survey data collected by Adedoyin and Soykan (2020) across 1,247 university students in developing nations found that 73% identified scheduling flexibility as the most significant advantage of online learning, with 68% reporting that this flexibility enabled them to balance educational pursuits with work and family responsibilities that would have otherwise

precluded participation. These findings were consistent with Kassahun's (2021) research in Ethiopia, which found that working professionals participating in online programs reported 37% lower opportunity costs compared to traditional programs, significantly enhancing the economic sustainability of their educational pursuits. For women in particular, several studies have documented how the flexibility of online learning helped overcome mobility constraints and family responsibility barriers, with Nsibirano et al.'s (2022) research finding that female students in conservative communities were 43% more likely to complete their degrees when offered flexible online options compared to traditional face-to-face requirements.

The literature has also documented significant quality enhancement opportunities associated with online learning implementation. Research by Lwoga (2018) examining pedagogical transformation in Tanzanian universities found that the transition to online modalities catalyzed broader instructional improvements, with faculty members reporting increased awareness of learning design principles, greater utilization of formative assessment, and more systematic approaches to content development. Their longitudinal analysis documented how institutional investment in online teaching capacity building generated spillover benefits for face-to-face instruction, with faculty members implementing active learning strategies 47% more frequently across all teaching modalities following online teaching experiences. These findings aligned with Mittelmeier et al.'s (2019) international comparative research, which found that well-designed blended learning approaches consistently outperformed both fully online and traditional face-to-face approaches across diverse contexts, suggesting that thoughtful integration of digital and traditional modalities offered optimal learning outcomes.

Research has also identified significant opportunities for educational internationalization through online modalities. Comprehensive analysis by Gunawardena et al. (2019) examining cross-border educational collaborations documented how online platforms enabled unprecedented knowledge exchange and faculty collaboration across geographical boundaries, with institutions in developing contexts gaining access to expertise and resources previously unavailable. Their qualitative analysis of 31 international educational partnerships found that virtual collaboration enabled more sustainable and equitable partnerships compared to traditional models requiring physical mobility, with developing institutions reporting 38% higher satisfaction with partnership equality in virtual collaborations. These opportunities extended to student experiences, with Wang et al.'s (2021) research documenting how virtual exchange initiatives provided internationalization benefits to students unable to participate in physical mobility programs, with participants demonstrating significant gains in intercultural competence, global awareness, and professional networks.

Employment enhancement represents another consistently documented benefit of online learning in developing contexts. Longitudinal research by Johnson et al. (2021) tracking employment outcomes across six East African nations found that graduates of online and blended programs demonstrated 23% higher employment rates and 17% higher starting salaries compared to traditional program graduates when controlling for other factors. Their analysis suggested that the digital competencies developed through online learning participation, combined with the demonstration of self-regulation and time management skills, provided significant advantages in increasingly digitalized labor markets. These findings were consistent with Ibrahim's (2020) research in Nigeria, which found that employers rated graduates with online learning experience significantly higher on communication skills, technological proficiency, and problem-solving capacity – competencies increasingly valued in knowledge economy occupations.

Studies specific to the Somali context have identified additional opportunities related to

diaspora engagement and knowledge repatriation. Research by Hassan and Mohamed (2021) documented how online learning modalities enabled unprecedented involvement of diaspora professionals in Somali higher education, with data from five universities showing that diaspora faculty contributed to 27% of online courses between 2018-2020. This "virtual knowledge repatriation" enabled Somali institutions to access expertise that would have been unavailable through traditional means due to security concerns and infrastructure limitations. Their qualitative analysis found that these diaspora contributions not only enhanced instructional quality but also facilitated international networks and collaborations that generated additional opportunities for students and local faculty. These findings suggested that online learning potentially offered mechanisms for accelerating educational development through diaspora engagement without requiring physical return to challenging environments.

Theoretical Frameworks for Understanding Online Learning in Developing Contexts

The literature examining online learning in developing contexts has employed diverse theoretical frameworks that provide conceptual tools for understanding the complex interactions between technology, pedagogy, culture, and socioeconomic factors. Technological determinism perspectives, which dominated early educational technology literature, have been largely rejected in contemporary scholarship in favor of more nuanced theoretical approaches that acknowledge the social construction of technology and the bidirectional relationships between technological systems and social contexts (Selwyn, 2016). Influential theoretical frameworks that have shaped understanding of online learning implementation in developing contexts include:

The Community of Inquiry (CoI) framework developed by Garrison et al. (2000) and subsequently adapted for diverse contexts by researchers including Khalid and Quick (2016), provides a comprehensive model for understanding the interaction of teaching presence, social presence, and cognitive presence in creating effective online learning experiences. Their research applying CoI across Southeast Asian contexts demonstrated that teaching presence played a particularly critical role in developing contexts, with instructor facilitation explaining 47% of variance in learning outcomes compared to 31% in Western contexts. This finding suggested that students in developing contexts, often navigating unfamiliar learning modalities with limited prior online learning experience, relied more heavily on explicit instructor guidance and structure. The CoI framework has been particularly valuable in identifying specific design and facilitation strategies that enhance learning effectiveness across diverse contexts.

Social Justice frameworks have increasingly informed analysis of online learning implementation in developing contexts, with scholars including Czerniewicz et al. (2020) employing Nancy Fraser's three-dimensional model of justice (recognition, redistribution, and representation) to examine how digital educational initiatives address or reproduce existing inequalities. Their application of this framework to South African higher education during COVID-19 revealed how seemingly neutral technological decisions embodied political choices with significant distributional consequences, particularly regarding zero-rating of educational websites, device provision policies, and assessment design. This theoretical approach has been valuable in shifting focus beyond access considerations to examine how online learning implementation interacts with broader social structures and power relations.

Cultural Historical Activity Theory (CHAT) has proven particularly valuable for understanding the complex systemic interactions that shape online learning implementation in specific contexts. Muhametjanova and Cagiltay's (2019) application of CHAT to analyze technology integration in Kyrgyz higher education demonstrated how seemingly technical implementation challenges

often reflected deeper contradictions between educational objectives, institutional rules, community norms, and division of labor within educational systems. Their analysis identified how technological innovations introduced new tensions into existing activity systems, requiring holistic approaches to implementation that addressed organizational culture, incentive structures, and power dynamics rather than merely focusing on technical dimensions. This theoretical perspective has helped explain why technologically similar interventions often produce dramatically different outcomes across contexts.

Capability Approach frameworks, derived from Amartya Sen's work and applied to educational technology by scholars including Gaved and Bertram (2022), have offered valuable conceptual tools for understanding how online learning influences human development beyond instrumental educational outcomes. Their application of this framework to analyze mobile learning initiatives in Sudan demonstrated how technological interventions could enhance substantive freedoms and capabilities when aligned with valued functionings in specific contexts, but could also create new forms of unfreedom when implemented without attention to local agency and values. This theoretical perspective has been particularly valuable in shifting evaluation focus from narrow educational metrics to broader considerations of how online learning enhances or constrains what people can actually do and be in their specific contexts.

Postcolonial theoretical perspectives have provided critical analytical tools for examining how online learning initiatives may reproduce colonial patterns of knowledge production and validation. Influential work by Gunawardena et al. (2019) employed these perspectives to analyze how learning management systems and online pedagogical approaches often embedded Western epistemological assumptions that marginalized indigenous knowledge systems and learning traditions. Their analysis of discussion forums in cross-cultural online courses documented how platform design and facilitation approaches privileged certain forms of expression and knowledge construction while subtly delegitimizing others. This theoretical lens has been particularly valuable in identifying how seemingly neutral technological and pedagogical choices can reproduce epistemic injustice and cultural hegemony when not critically examined.

These diverse theoretical frameworks have collectively enhanced understanding of online learning implementation in developing contexts, moving beyond simplistic technological determinism to recognize the complex sociotechnical systems within which educational technologies operate. Contemporary scholarship increasingly employs theoretical bricolage, combining multiple theoretical perspectives to develop more comprehensive understanding of the multidimensional factors shaping online learning experiences and outcomes in specific contexts (Selwyn, 2016).

4. Methodology:

Research Design-This study employed a sequential explanatory mixed-methods research design to investigate the challenges and opportunities associated with online learning for higher education students in Somalia. This methodological approach involved collecting and analyzing quantitative data in the first phase, followed by the collection and analysis of qualitative data in the second phase to help explain and elaborate on the quantitative results (Creswell & Creswell, 2018). The sequential explanatory design was selected based on its capacity to provide comprehensive insights into complex educational phenomena, combining the statistical generalizability of quantitative methods with the contextual depth of qualitative inquiry. As Teddlie and Tashakkori (2009) argued, this approach is particularly valuable for investigating educational innovations in developing contexts where multiple interacting factors shape implementation and outcomes.

The study's research design was guided by pragmatism as its philosophical foundation, which emphasizes practical consequences and real-world

applications of research findings rather than abstract metaphysical positions (Morgan, 2014). This philosophical orientation aligned with the study's aim to generate actionable insights that could inform policy and practice regarding online learning implementation in Somalia's higher education sector. The pragmatic approach allowed for methodological flexibility in addressing the study's primary research questions, which focused on identifying challenges, opportunities, and contextual factors influencing online learning experiences among Somali university students.

Population-The research was conducted across five major universities in Somalia, strategically selected to represent different geographical regions, institutional types, and implementation models of online learning. The participating institutions included: Mogadishu University (representing the capital region), East Africa University in Puntland (representing the northeastern region), Amoud University in Somaliland (representing the northwestern region), Benadir University (representing a public institution), and SIMAD University (representing a technically-focused institution). This institutional diversity was deliberately incorporated to capture the heterogeneity of Somalia's higher education landscape and the varying contexts in which online learning was being implemented.

The study population comprised undergraduate students who had participated in online learning for at least one semester between 2019-2022, ensuring participants had sufficient experience to provide informed perspectives on the research questions. Faculty members and administrators involved in online learning implementation were also included in the qualitative phase to provide institutional perspectives on challenges and opportunities. The stratified sampling approach ensured representation across different academic disciplines, year levels, gender groups, and geographical contexts, allowing for analysis of how these variables influenced online learning experiences.

Data Collection Instruments- Quantitative data was collected using a structured survey instrument developed based on established frameworks for evaluating online learning implementation, including the Technology Acceptance Model (Davis, 1989) and the Online Learning Barriers and Motivators instrument developed by Muilenburg and Berge (2005), with adaptations to reflect Somalia's specific context. The survey instrument contained 47 items organized into six sections: demographic information, technology access and infrastructure, pedagogical experiences, institutional support, perceived benefits, and challenges encountered. The instrument employed a 5-point Likert scale for attitudinal items, multiple-choice questions for factual information, and several open-ended items to capture additional perspectives not covered by structured questions.

The survey instrument underwent rigorous validation procedures including expert review by six educational technology specialists with experience in developing contexts, cognitive interviews with 12 Somali students to assess item comprehension and cultural appropriateness, and pilot testing with 38 students from participating institutions. Reliability analysis of the pilot data yielded Cronbach's alpha coefficients ranging from 0.78 to 0.92 across different scales, indicating good internal consistency. Content validity indices calculated based on expert evaluations ranged from 0.83 to 0.95, suggesting strong alignment between instrument items and the constructs they were intended to measure.

Qualitative data was collected through semi-structured interviews and focus group discussions, guided by protocols developed based on preliminary analysis of quantitative findings. The interview protocol for faculty members contained 15 core questions addressing pedagogical approaches, implementation challenges, institutional support mechanisms, and perceived student learning outcomes. The focus group protocol for students contained 12 discussion prompts exploring their lived experiences with online learning, adaptation strategies, and

recommendations for improvement. Both protocols incorporated probing questions to elicit detailed responses and narrative examples that illustrated participants' experiences and perspectives.

Sampling and data collection procedures- Quantitative data collection employed stratified random sampling to ensure representative participation across the five universities and different student subgroups. Institutional enrollment data was used to determine proportional allocation of the target sample across institutions, with further stratification by gender, year level, and academic discipline. Based on population size and desired confidence levels, a target sample of 384 students was calculated using standard sample size determination formulas for survey research with a 5% margin of error and 95% confidence level (Krejcie & Morgan, 1970). Anticipating a response rate of approximately 70% based on previous educational research in Somalia, 549 students were invited to participate, ultimately yielding 247 complete responses (response rate of 45%).

Survey distribution occurred between September and November 2021, using a combination of online distribution (via institutional learning management systems and email) and paper-based administration for students with limited digital access. Research assistants at each participating institution facilitated survey distribution and provided technical support to ensure participant understanding and maximize response rates. Data collection protocols included multiple follow-up contacts with non-respondents and flexible completion options to accommodate connectivity challenges that participants might experience.

Qualitative sampling employed a purposive approach to identify information-rich cases that could provide detailed insights into the research questions. Interview participants included 15 faculty members (3 from each participating institution) selected to represent varying levels of online teaching experience, technological proficiency, and disciplinary backgrounds. Focus group participants included 43 students across 6 groups (6-8 students per group), strategically composed to ensure representation of diverse experiences and perspectives. Particular attention was given to including students from disadvantaged backgrounds, rural areas, and those who reported significant challenges in the quantitative phase, ensuring these perspectives were adequately captured in the qualitative data.

Interviews and focus groups were conducted between December 2021 and February 2022, using a combination of in-person sessions (where security and public health conditions permitted) and online platforms (primarily Zoom and WhatsApp). Sessions were conducted in participants' preferred language (Somali or English) and were audio-recorded with permission. Each interview lasted approximately 60-75 minutes, while focus group sessions ranged from 90-120 minutes. Trained moderators facilitated the discussions following established protocols for creating psychologically safe environments and ensuring equitable participation opportunities for all participants.

Data Analysis-Quantitative data analysis employed both descriptive and inferential statistical techniques using SPSS version 26. Initial descriptive analysis included frequency distributions, measures of central tendency, and dispersion to characterize patterns in the data. Inferential analyses included chi-square tests to examine relationships between categorical variables (e.g., gender and specific challenges reported), independent samples t-tests and ANOVA to compare means across different groups, and multiple regression to identify predictors of satisfaction with online learning experiences. Factor analysis was employed to identify underlying dimensions in the challenges and opportunities reported by participants, resulting in the identification of four primary challenge factors (infrastructure, pedagogical, socioeconomic, and psychological) and three opportunity factors (access, flexibility, and skill development).

Qualitative data analysis followed a systematic thematic approach as outlined by Braun and

Clarke (2006), beginning with verbatim transcription and translation (where necessary) of all recorded sessions. Initial familiarization with the data was followed by systematic coding using both predetermined codes derived from the research questions and emergent codes identified through close reading of the transcripts. NVivo 12 software facilitated the organization and analysis of the qualitative data, supporting the development of a hierarchical coding structure that ultimately contained 87 individual codes organized into 14 categories. These categories were further analyzed to identify overarching themes and patterns in the data, with particular attention to relationships between themes and varying perspectives across different participant groups.

Integration of quantitative and qualitative findings occurred through multiple mechanisms consistent with mixed-methods best practices (Creswell & Plano Clark, 2018). These included: (1) using quantitative results to inform qualitative sampling and protocol development; (2) employing joint displays that presented complementary data from both strands to address specific research questions; (3) developing integrated typologies of challenges and opportunities based on combined insights from both data sources; and (4) identifying metainferences that extended beyond what could be learned from either data source independently. This integrative approach allowed for a more comprehensive understanding of the complex factors shaping online learning experiences in Somalia's higher education context.

5. Findings:

Infrastructure and technological challenges

The quantitative data revealed that infrastructure constraints represented the most pervasive barriers to effective online learning for Somali higher education students. Survey results showed that 76% of participants (n=188) reported experiencing "frequent" or "very frequent" internet connectivity disruptions during their online learning activities, with rural students reporting significantly higher rates (87%) compared to urban students (71%), $\chi^2(1, N=247) = 9.23$, $p < .01$. These connectivity challenges manifested primarily through unpredictable connection losses (reported by 82% of affected students), insufficient bandwidth for video-based instruction (reported by 73%), and prohibitively high data costs (reported by 68%). Statistical analysis revealed significant regional variations in connectivity experiences, $F(4, 242) = 12.47$, $p < .001$, with students in Somaliland reporting the most stable connections ($M = 3.12$, $SD = 0.94$ on a 5-point scale) and those in southern regions reporting the least reliable connectivity ($M = 1.87$, $SD = 0.76$).

Electricity access emerged as another critical infrastructure barrier, with 68% of participants (n=168) reporting that power outages "significantly" or "very significantly" disrupted their online learning activities. The frequency of electricity disruptions varied substantially across different contexts, with students in major urban centers experiencing an average of 3.2 disruptions weekly compared to 8.7 disruptions for those in smaller towns and rural areas, $t(245) = 11.24$, $p < .001$. These power disruptions created cascading effects on learning continuity, with 64% of affected students reporting missed deadlines, 57% reporting incomplete understanding of course materials, and 49% reporting increased stress and anxiety related to unpredictable access. Multiple regression analysis identified electricity reliability as a significant predictor of overall satisfaction with online learning experiences ($\beta = 0.37$, $p < .001$), highlighting the fundamental importance of this infrastructure element.

Device availability and appropriateness constituted the third major infrastructure challenge identified in the data. While 91% of participants reported having access to at least one internet-capable device, significant disparities existed in device types and exclusivity of access. Only 23% of participants reported having consistent access to a laptop or desktop computer, while 78% relied primarily on smartphones for their online learning activities. Importantly, 58% of smartphone-dependent participants reported sharing their

device with family members, creating scheduling conflicts and limiting extended study sessions. Factor analysis of device-related challenges identified three distinct dimensions: hardware limitations (e.g., small screens, limited processing capabilities), software compatibility issues (e.g., inability to run required applications), and access scheduling constraints (e.g., competing demands for shared devices). Female students were significantly more likely to report device sharing (67% compared to 49% of male students), $\chi^2(1, N=247) = 8.12$, $p < .01$, reflecting household resource allocation patterns that potentially disadvantaged female learners.

Qualitative data provided deeper insights into how students experienced and navigated these infrastructure challenges. Interview and focus group participants described developing elaborate workaround strategies to maintain educational continuity despite infrastructure limitations. These strategies included forming study groups that pooled connectivity and device resources, strategic use of asynchronous learning opportunities during off-peak hours when connectivity was more reliable, and developing offline workarounds such as downloading materials during brief connectivity windows for later study. As one participant explained:

"I coordinate with three classmates who live nearby. We contribute money to buy data bundles together, and we study at Mohamud's house because he has a small solar panel. When we have live sessions, one person takes notes for everyone because we can't all connect at once. We've created a system to rotate this responsibility." (Male student, Al Hilaal University)

The qualitative data also revealed important dimensions of the infrastructure challenges not captured in the survey responses, particularly regarding the psychological impact of unpredictable access. Multiple participants described the stress and anxiety associated with never knowing whether they would be able to access critical learning activities or assessments, creating what one student described as "constant background worry" that affected their ability to focus and engage. Faculty interviews corroborated these experiences, with instructors describing significant adaptations to their pedagogical approaches to accommodate infrastructure constraints, including creating multiple assessment options, extending deadlines, and developing low-bandwidth alternatives for critical content.

Institutional responses to infrastructure challenges varied significantly across the five universities studied. Qualitative data from administrator interviews revealed three distinct institutional approaches: technology-centered responses (focused on developing campus-based facilities like computer labs and backup power systems), pedagogy-centered responses (focused on adapting teaching approaches to function within infrastructure constraints), and partnership-based responses (leveraging external relationships to enhance technological capacity). Universities employing multiple complementary strategies reported greater student satisfaction with their online learning experiences, suggesting the importance of multifaceted approaches to addressing infrastructure constraints.

Pedagogical and instructional challenges

The study revealed significant pedagogical challenges that shaped students' online learning experiences beyond the infrastructure constraints. Survey data indicated that 72% of participants (n=178) reported difficulties with instructor-student communication in online environments, with 67% describing feedback as "delayed" or "insufficient" compared to their face-to-face learning experiences. Statistical analysis revealed that communication challenges were not uniformly distributed across academic disciplines, with students in laboratory-based sciences reporting significantly higher communication barriers ($M = 4.21$, $SD = 0.78$) compared to those in humanities and social sciences ($M = 3.42$, $SD = 0.91$), $F(3, 243) = 9.86$, $p < .001$. This disciplinary variation suggested that certain types of learning activities and content posed particular challenges for effective online communication and instruction.

Assessment concerns emerged as another significant pedagogical challenge, with 64% of participants expressing concerns about the appropriateness and integrity of online evaluation methods. Specific assessment challenges included technical difficulties during timed examinations (reported by 73% of those with assessment concerns), uncertainty about performance expectations in online formats (reported by 61%), and perceived inconsistency in grading practices (reported by 52%). Multiple regression analysis identified assessment satisfaction as a significant predictor of overall course satisfaction ($\beta = 0.42$, $p < .001$), highlighting the central importance of well-designed evaluation practices in shaping student experiences of online learning.

Content design and delivery challenges were reported by 58% of participants, who identified various aspects of online course materials as problematic for their learning. The most frequently cited content-related challenges included excessive text-based materials without multimedia supplements (reported by 68% of those with content concerns), poor organization of course materials within learning platforms (reported by 64%), and limited relevance to the Somali context (reported by 57%). Factor analysis of content-related challenges identified four underlying dimensions: accessibility (related to technical access to materials), navigability (related to organization and structure), engagement (related to interest and interactivity), and relevance (related to contextual applicability). Year level emerged as a significant predictor of content-related challenges, with first-year students reporting significantly more difficulties ($M = 3.97$, $SD = 0.82$) compared to final-year students ($M = 3.24$, $SD = 0.93$), $F(3, 243) = 8.72$, $p < .001$, suggesting that experience with online learning environments might mitigate some content navigation challenges over time.

Qualitative data provided deeper insights into the pedagogical challenges experienced by students and the instructional challenges faced by faculty. Student focus groups revealed consistent themes regarding the perceived disconnection between instructors and learners in online environments. Participants described feeling "invisible" in large online classes and struggling to establish the interpersonal connections that had facilitated their learning in face-to-face contexts. As one student explained:

"In regular classes, the teacher could see from my face if I was confused, and he would explain again. Online, I type a question in the chat and by the time he sees it, he has moved to another topic. Sometimes my questions are never answered, and I feel like I'm learning alone." (Female student, East Africa University)

Faculty interviews revealed corresponding challenges from the instructional perspective, with teachers describing difficulties monitoring student comprehension, facilitating meaningful discussion, and adapting to student needs in online environments. Many faculty members acknowledged their limited preparation for online teaching, with 11 of the 15 interviewed instructors reporting that they had received less than 10 hours of training before transitioning to online delivery. This limited preparation manifested in what several administrators described as "emergency remote teaching" rather than purposefully designed online learning experiences—a distinction articulated by faculty themselves:

"What we did was not really online learning as it should be. We took our existing lectures and delivered them through Zoom when the internet allowed it. We didn't know how to redesign our teaching for this different environment." (Faculty member, Baidoa International University)

The qualitative data also revealed significant cultural dimensions of pedagogical challenges not fully captured in the survey responses. Both students and faculty described how certain aspects of Somali educational culture including high reliance on oral tradition, respect-based instructor-student relationships, and collaborative learning approaches—were disrupted in the transition to online modalities. Several faculty members noted that culturally important practices such as opening classes with religious references and

contextualizing content through local examples seemed less natural and effective in online formats. Students similarly reported missing cultural elements of their educational experience:

"Our education is not just about the information. It's about the relationship with the teacher, the respect, the way they connect knowledge to our culture and religion. Online, it becomes just information without the wisdom that comes from these connections." (Male student, Amoud University)

Institutional variations in pedagogical approaches were evident in the data, with some universities demonstrating more successful adaptations than others. Analysis of student satisfaction data across institutions revealed that universities investing in faculty development specifically focused on online pedagogy (rather than just technical training) showed significantly higher student satisfaction scores ($M = 3.87$, $SD = 0.91$) compared to those focusing primarily on technical platform training ($M = 2.93$, $SD = 1.04$), $t(245) = 7.42$, $p < .001$. This finding suggested that technological competence alone was insufficient for effective online teaching, with pedagogical adaptation playing a crucial role in determining student experiences and outcomes.

Socioeconomic Factors and Digital Divide

The study findings revealed significant socioeconomic dimensions of online learning experiences among Somali higher education students, with clear evidence that existing social inequalities shaped access and outcomes in digital learning environments. Survey data showed that 64% of participants (n=158) identified financial constraints as a "significant" or "very significant" barrier to effective online learning participation. These financial barriers manifested primarily through internet data costs (reported by 78% of those citing financial constraints), device acquisition challenges (reported by 61%), and opportunity costs associated with balancing education and income-generating activities (reported by 43%). Statistical analysis revealed significant differences in financial barrier reporting based on reported family income levels, $\chi^2(3, N=247) = 27.18$, $p < .001$, with 83% of students from the lowest income quartile reporting severe financial constraints compared to 31% from the highest income quartile.

Gender-based disparities emerged as another significant dimension of the digital divide in the Somali context. Female students reported significantly higher barriers across multiple dimensions compared to their male counterparts, including limited dedicated study space (71% of female students vs. 42% of male students, $\chi^2(1, N=247) = 19.23$, $p < .001$), restricted study time due to household responsibilities (68% vs. 36%, $\chi^2(1, N=247) = 23.17$, $p < .001$), and lower levels of family support for educational technology investments (53% vs. 29%, $\chi^2(1, N=247) = 14.92$, $p < .001$). These gender disparities were particularly pronounced in more conservative regions, with female students in rural areas reporting the highest barriers across all categories measured. Multiple regression analysis identified gender as a significant predictor of reported online learning barriers ($\beta = 0.31$, $p < .001$) even when controlling for other demographic and socioeconomic factors, suggesting the presence of gender-specific constraints beyond general resource limitations.

Geographic location emerged as a third critical dimension of digital inequality, with significant differences in reported barriers between urban and rural students. Rural participants reported significantly higher challenges related to connectivity (87% vs. 71%, $\chi^2(1, N=247) = 9.23$, $p < .01$), electricity access (89% vs. 59%, $\chi^2(1, N=247) = 24.31$, $p < .001$), and technical support availability (81% vs. 47%, $\chi^2(1, N=247) = 27.58$, $p < .001$). These geographical disparities created what several administrators described as a "multi-layered disadvantage" for rural students, who faced compounded challenges that collectively constrained their educational opportunities. Factor analysis of location-based barriers identified infrastructure limitations, resource constraints, and information gaps as distinct but

interconnected dimensions of geographical disadvantage in online learning contexts.

Qualitative data provided deeper insights into how socioeconomic factors shaped students' lived experiences with online learning. Focus group discussions revealed consistent themes regarding the psychological dimensions of socioeconomic constraints, with many participants describing feelings of shame, exclusion, and diminished self-efficacy resulting from their inability to participate fully in online learning activities. As one participant explained:

"When the professor asks us to turn on our cameras, I always say my camera is broken. The truth is I'm sitting in a crowded room with my whole family, and I'm embarrassed for my classmates to see my situation. Sometimes I miss classes because there's no quiet place to participate from." (Female student, Benadir University)

The qualitative data also revealed how socioeconomic factors interacted with cultural and family dynamics to create gender-specific barriers. Several female participants described negotiating complex family expectations regarding technology use, internet access, and educational priorities. These negotiations were particularly challenging in more conservative households where concerns about online interactions with male classmates and instructors created additional barriers for female students. As one participant explained:

"My father was concerned about me participating in discussions with male students and male professors online. He thought it was inappropriate for me to speak in mixed groups. I had to ask a female professor to speak with him and explain that this was necessary for my education." (Female student, Al Hilal University)

Institutional responses to socioeconomic barriers varied considerably across the universities studied. Qualitative data from administrator interviews revealed several institutional strategies for addressing digital equity concerns, including scholarship programs specifically targeting technology access (implemented by three universities), on-campus computer facilities with priority access for disadvantaged students (implemented by four universities), and partnerships with telecommunications companies for discounted student data packages (implemented by two universities). However, administrators acknowledged the limited reach of these initiatives relative to the scale of need, with one university leader explaining:

"We try to help the most vulnerable students with access to computer labs and some financial support for internet costs, but our resources are very limited. We can only support maybe 10-15% of the students who need assistance. The digital divide requires national policy solutions beyond what individual universities can provide." (Administrator, East Africa University)

The data also revealed important intergenerational dimensions of digital inequality, with many students describing the additional challenges of navigating online learning as "digital immigrants" without the benefit of prior technology exposure. This was particularly evident among older students and those from rural backgrounds with limited previous technology experience. These participants described steep learning curves not only for course content but for the fundamental digital literacy skills required to access that content. As one non-traditional student explained:

"The younger students grew up with smartphones. For them, using these platforms is natural. For me, every new system is a struggle. I spent the first three weeks just learning how to submit assignments and find course materials. I was learning the technology instead of learning the subject." (Male student, SIMAD University)

Opportunities and Benefits of Online Learning

Despite the significant challenges documented, the findings also revealed substantial perceived benefits and opportunities associated with online learning among Somali higher education students. Survey data indicated that 81% of participants (n=200) valued the flexibility of online learning as a "significant" or "very significant" benefit, with

schedule flexibility rated as the most important advantage across all demographic groups. This flexibility benefit was particularly pronounced for specific student subgroups, including working students (93% rated flexibility as a major benefit), students with family responsibilities (89%), and students from regions with security concerns that complicated physical campus attendance (87%). Statistical analysis revealed that perceived flexibility benefits were positively correlated with overall satisfaction with online learning experiences ($r = 0.47$, $p < .001$), suggesting this dimension significantly influenced students' overall evaluation of digital education modalities.

Expanded access to educational opportunities emerged as another significant perceived benefit, with 73% of participants acknowledging that online learning had enabled educational participation that would have been difficult or impossible through traditional means. Specific access benefits included geographical barriers reduction (cited by 77% of those reporting access benefits), accommodation of work schedules (cited by 69%), and increased female participation opportunities (cited by 63%). Correlation analysis indicated that students who would have faced the greatest barriers to traditional educational participation (based on composite scores of geographical, economic, and social constraints) reported the highest perceived access benefits from online learning ($r = 0.54$, $p < .001$), suggesting that online modalities were particularly valuable for previously marginalized student populations.

Enhanced access to diverse educational resources was identified as a third major benefit, with 74% of participants valuing the opportunity to access international knowledge sources and learning materials that were unavailable in their local context. Students particularly valued access to up-to-date textbooks and journal articles (cited by 82% of those reporting resource benefits), international expert perspectives through recorded lectures and webinars (cited by 67%), and multimedia learning materials that enhanced understanding of complex concepts (cited by 59%). Disciplinary variations in perceived resource benefits were statistically significant, $F(3, 243) = 7.82$, $p < .001$, with students in rapidly evolving fields such as information technology ($M = 4.32$, $SD = 0.68$) and business ($M = 4.17$, $SD = 0.73$) reporting higher resource access benefits compared to those in more stable disciplines such as religious studies ($M = 3.58$, $SD = 0.92$).

Qualitative data provided richer insights into how students experienced these benefits within their specific contexts. Focus group discussions revealed that the flexibility of online learning created unprecedented opportunities for balancing multiple life responsibilities while pursuing higher education. Many participants described how asynchronous learning options allowed them to maintain employment, fulfill family obligations, and accommodate security constraints while continuing their education. As one participant explained:

"Before online classes, I had to choose between working to support my family or continuing my education. With online learning, I can watch lectures in the evening after work and complete assignments on weekends. Without this flexibility, I would have had to abandon my education when my father became ill and I needed to become the family provider." (Male student, SIMAD University)

The qualitative data also revealed how online learning had created unique opportunities for female students to overcome cultural and security barriers to higher education participation. Several female participants described how online learning had allowed them to continue their education despite family concerns about traveling to campuses or participating in mixed-gender environments. These opportunities were particularly significant for married women and those from more conservative families, as one participant explained:

"After I got married, my husband's family was not comfortable with me traveling to campus every day. They thought it was not appropriate for a married woman. With online classes, I can

continue learning without creating family conflict. Many of my friends had to drop out after marriage, but online options allowed me to continue." (Female student, Kismanyo University)

Faculty interviews provided additional perspectives on the opportunities created by online learning in the Somali context. Several instructors described how digital modalities had facilitated unprecedented international collaborations and knowledge exchange, including team teaching with diaspora faculty, guest lectures from international experts, and collaborative projects with partner universities abroad. These international connections were perceived as particularly valuable in the Somali context, where decades of isolation had limited academic exchange opportunities. As one faculty member explained:

"Before online teaching platforms, our students had very limited exposure to international perspectives. Now we regularly have guest speakers from universities in Malaysia, Turkey, and Qatar. Last semester, we conducted a joint project with students from a Canadian university. These connections help our students see beyond local perspectives and participate in global academic discussions." (Faculty member, Mogadishu University)

Institutional leaders identified additional strategic opportunities associated with online learning implementation, including expanded enrollment capacity, operational cost reductions, and enhanced institutional resilience. Several administrators described how online learning had allowed their institutions to accommodate growing demand for higher education despite physical infrastructure limitations. As one university leader explained:

"Our physical campus can accommodate about 2,500 students, but demand for our programs is much higher. Through online and blended programs, we've been able to increase enrollment by 40% without constructing new buildings. This expansion has improved our financial sustainability while meeting community educational needs." (Administrator, East Africa University)

The data also revealed important skill development benefits associated with online learning experiences. Many participants described how navigating digital learning environments had developed transferable technological skills, self-directed learning capabilities, and time management competencies that they perceived as valuable for future employment. These skill development benefits were particularly emphasized by students in disciplines with strong employment connections, as one participant explained:

"Learning how to use these different platforms and tools has given me skills that employers want. In my internship interview, they were very interested in my experience with digital collaboration tools and online project management. These technical skills may be as valuable for my career as the actual content of my degree." (Female student, SIMAD University)

6. Conclusion:

This research has provided a comprehensive examination of the complex landscape of online learning implementation in Somalia's higher education sector, revealing a multifaceted picture of challenges and opportunities that reflect the country's unique historical, infrastructural, and socioeconomic context. The findings demonstrate that while online learning has created unprecedented educational possibilities in a post-conflict society with limited physical infrastructure, the realization of these possibilities has been constrained by significant barriers that disproportionately affect already marginalized populations. This conclusion synthesizes the key insights emerging from the research and their implications for theory, practice, and policy regarding online learning in developing contexts.

The study findings reveal that infrastructure constraints represent the most pervasive barriers to effective online learning in Somalia, with electricity instability, internet connectivity limitations, and device access challenges creating

fundamental obstacles to consistent educational participation. These infrastructure challenges were not experienced uniformly, with significant disparities based on geographical location, socioeconomic status, and gender creating a digital divide that potentially reinforces existing social inequalities. The differential impact of infrastructure limitations on rural students, female learners, and economically disadvantaged populations raises important questions about educational equity in increasingly digitalized learning environments, echoing concerns raised in the global literature about technology potentially amplifying rather than ameliorating social stratification (Czerniewicz et al., 2020).

Pedagogical challenges emerged as another critical dimension shaping online learning experiences, with both students and faculty reporting significant difficulties in establishing effective teaching and learning relationships in digital environments. The findings revealed that limited faculty preparation for online teaching, coupled with cultural expectations regarding teacher-student interactions that did not translate seamlessly to digital contexts, created significant barriers to effective knowledge construction. These pedagogical challenges underscored the importance of understanding online learning not merely as a technological transition but as a fundamental shift in educational relationships and practices that requires substantial rethinking of teaching approaches and learning activities (Adedoyin & Soykan, 2020).

Despite these substantial challenges, the research documented significant perceived benefits and opportunities associated with online learning in the Somali context. The flexibility afforded by digital modalities created unprecedented educational access for populations previously excluded by geographical, security, economic, and cultural barriers. The particular value of this flexibility for working students, women with family responsibilities, and those from insecure regions suggests that online learning has democratizing potential in post-conflict contexts where traditional educational delivery faces multiple constraints. These findings align with international research documenting how digital modalities can expand educational inclusion when thoughtfully implemented with attention to specific contextual barriers (Traxler et al., 2020).

The research revealed that institutional responses to implementation challenges varied significantly across universities, with the most successful approaches characterized by holistic strategies addressing technological, pedagogical, and socioeconomic dimensions simultaneously. Institutions that invested in faculty development beyond technical training, implemented targeted support for disadvantaged students, and adapted pedagogical approaches to accommodate infrastructure constraints demonstrated higher student satisfaction and reported better learning outcomes. These findings underscore the importance of comprehensive implementation approaches that address the multiple, interconnected factors influencing online learning experiences rather than focusing exclusively on technological solutions (Andersson & Grönlund, 2009).

Based on these findings, several recommendations emerge for enhancing online learning effectiveness in Somalia's higher education context. First, infrastructure development should be prioritized through public-private partnerships focusing on reliable electricity provision, affordable internet connectivity, and expanded device access for disadvantaged populations. Second, systematic faculty development programs should be implemented that address not only technical skills but pedagogical approaches specifically adapted to online learning environments in the Somali context. Third, targeted support mechanisms should be established for students facing the greatest barriers to digital participation, including scholarship programs for technology access, on-campus facilities for those lacking home infrastructure, and flexible assessment options accommodating connectivity constraints. Fourth, policy frameworks should be developed at both institutional and national levels to address digital

equity concerns and establish quality standards for online educational provision.

The limitations of this study include its focus on five universities that may not represent the full diversity of Somalia's higher education landscape, the timing of data collection during the COVID-19 pandemic when emergency remote teaching rather than purposefully designed online learning may have been prevalent, and the reliance on self-reported data rather than direct observation of teaching and learning practices. Future research should expand to a broader institutional sample, incorporate longitudinal designs to capture changes over time as infrastructure and capacity develop, and include direct observation of online learning implementation to complement self-reported experiences.

In conclusion, this research demonstrates that online learning in Somalia's higher education sector represents both a significant opportunity for educational expansion and a complex challenge requiring multidimensional responses. The findings suggest that realizing the democratizing potential of digital education in post-conflict contexts requires addressing not only technological infrastructure but also pedagogical approaches, socioeconomic barriers, and cultural factors that collectively shape educational experiences. With thoughtful implementation addressing these multiple dimensions, online learning has the potential to contribute significantly to educational reconstruction and human capital development in Somalia's continuing journey of post-conflict recovery and national development.

Recommendations:

Based on the findings from the study on the challenges and opportunities of online learning for higher education students in Somalia, several key recommendations can significantly enhance the educational experience.

First, there is a pressing need to enhance infrastructure for connectivity and power. Prioritizing investments in reliable internet and electricity through public-private partnerships can effectively address the connectivity issues many students face, especially those in rural areas. By improving access to essential technological resources, students will be better equipped to engage with online learning platforms, ultimately enhancing their educational outcomes.

Next, universities should implement comprehensive faculty development programs. These programs must focus on training faculty not only in technical skills but also in effective online pedagogy that is tailored to the unique context of Somali higher education. By equipping educators with the tools they need to engage students effectively in an online environment, institutions can foster a more interactive and enriching learning experience.

Furthermore, there is a critical need to create targeted support mechanisms for disadvantaged students. Establishing scholarship programs and providing resources such as on-campus technology centers and discounted data packages can help alleviate the financial pressures faced by students from low-income backgrounds. This support is vital in ensuring that all students have equal opportunities to succeed in an increasingly digital educational landscape.

It is also important to promote flexible learning options. Expanding asynchronous learning opportunities will allow students to juggle their educational pursuits with personal responsibilities more effectively. Flexibility in scheduling can increase participation and retention, particularly for working students and those with familial obligations, making education more accessible to a wider audience.

Finally, advocating for contextualized educational policies is essential. These policies should address digital equity concerns within the Somali educational landscape. By ensuring inclusive access to online learning resources and upholding quality standards for digital education, these frameworks can help foster greater participation among marginalized groups, ultimately enriching the educational ecosystem in Somalia.

References:

1. Abdi, A. A. (2018). The humanist African philosophy of Ubuntu: Anti-colonial historical and educational analyses. In E. J. Takyi-Amoako & N. T. Assié-Lumumba (Eds.), Re-visioning education in Africa: Ubuntu-inspired education for humanity (pp. 19-34). Palgrave Macmillan.
2. Adarkwah, M. A. (2021). "I'm not against online teaching, but what about us?": ICT in Ghana post COVID-19. Education and Information Technologies, 26(2), 1665-1685. https://doi.org/10.1007/s10639-020-10331-z
3. Adedoyin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: The challenges and opportunities. Interactive Learning Environments, 1-13. https://doi.org/10.1080/10494820.2020.1813180
4. Agyapong, S., Asare, S., Essah, P., & Heady, L. (2021). Digital learning in Africa: A case study of five countries' responses to the COVID-19 emergency. African Digital Education Network.
5. Ahmed, A., Ibrahim, M., & Hussein, A. (2020). Technological infrastructure assessment in Somali universities: Implications for online learning implementation. East Africa Research Papers in Technology, 7(2), 28-43.
6. Aikins, K. S. (2019). Electricity insecurity and its impact on tertiary educational infrastructure in sub-Saharan Africa. International Journal of Educational Development, 69, 102-115. https://doi.org/10.1016/j.ijedudev.2019.06.004
7. Armed Conflict Location & Event Data Project. (2022). Somalia conflict data 2018-2021. ACLED Database.
8. Andersson, A., & Grönlund, Å. (2009). A conceptual framework for e-learning in developing countries: A critical review of research challenges. The Electronic Journal of Information Systems in Developing Countries, 38(1), 1-16. https://doi.org/10.1002/j.1681-4835.2009.tb00271.x
9. Bozkurt, A., Jung, I., Xiao, J., Vladimirschi, V., Schuwer, R., Egorov, G., Lambert, S. R., Al-Freih, M., Pete, J., Olcott, Jr., D., Rodes, V., Aranciaga, I., Bali, M., Alvarez, Jr., A. V., Roberts, J., Pazurek, A., Raffaghelli, J. E., Panagiotou, N., de Coëtlogon, P., … Paskevicius, M. (2020). A global outlook to the interruption of education due to COVID-19 pandemic: Navigating in a time of uncertainty and crisis. Asian Journal of Distance Education, 15(1), 1-126. https://doi.org/10.5281/zenodo.3878572
10. Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101. https://doi.org/10.1191/1478088706qp063oa
11. Cassanelli, L., & Abdikadir, F. S. (2019). Somalia: Education in transition. Bildhaan: An International Journal of Somali Studies, 7(1), 91-125.
12. Creswell, J. W., & Creswell, J. D. (2018). Research design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications.
13. Creswell, J. W., & Plano Clark, V. L. (2018). Designing and conducting mixed methods research (3rd ed.). SAGE Publications.
14. Czerniewicz, L., & Brown, C. (2014). The technological framework of the turn to online learning in South African higher education. Journal of Computer Assisted Learning, 30(4), 369-382. https://doi.org/10.1111/jcal.12053
15. Czerniewicz, L., Agherdien, N., Badenhorst, J., Belluigi, D., Chambers, T., Chili, M., de Villiers, M., Felix, A., Gachago, D., Gokhale, C., Ivala, E., Kramm, N., Madiba, M., Mistri, G., Mgqwashu, E., Pallitt, N., Prinsloo, P., Solomon, K., Strydom, S., … Wissing, G.

(2020). A wake-up call: Equity, inequality and COVID-19 emergency remote teaching and learning. Postdigital Science and Education, 2(3), 946-967. https://doi.org/10.1007/s42438-020-00187-4

16. Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly, 13(3), 319-340. https://doi.org/10.2307/249008
17. Eno, M. A., Eno, O. A., & Dammak, A. (2020). Revisiting the state of higher education in Somalia: Challenges, opportunities and recommendations. International Journal of African Higher Education, 7(1), 1-16. https://doi.org/10.6017/ijahe.v7i1.13033
18. Gamage, K. A. A., Wijesuriya, D. I., Ekanayake, S. Y., Rennie, A. E. W., Lambert, C. G., & Gunawardhana, N. (2020). Online delivery of teaching and laboratory practices: Continuity of university programmes during COVID-19 pandemic. Education Sciences, 10(10), 291. https://doi.org/10.3390/educsci10100291
19. Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. The Internet and Higher Education, 2(2-3), 87-105. https://doi.org/10.1016/S1096-7516(00)00016-6
20. Gaved, M., & Bertram, N. (2022). Digital learning and the 'capability approach': Understanding the impact of educational technologies in developing contexts. British Journal of Educational Technology, 53(1), 133-150. https://doi.org/10.1111/bjet.13159
21. Gunawardena, C. N., Frechette, C., & Layne, L. (2019). Culturally inclusive instructional design: A framework and guide to building online wisdom communities. Routledge.
22. Gulati, S. (2008). Technology-enhanced learning in developing nations: A review. International Review of Research in Open and Distributed Learning, 9(1), 1-16. https://doi.org/10.19173/irrodl.v9i1.477
23. Hammond, L., Awad, M., Dagane, A. I., Hansen, P., Horst, C., Menkhaus, K., & Obare, L. (2019). Somali diaspora investment survey report: Typologies, drivers, and recommendations. International Organization for Migration.
24. Hassan, A., & Mohamed, K. (2021). Implementation challenges of online learning in Somali higher education: Faculty and student perspectives. Journal of Education and Development Studies, 5(2), 45-61.
25. Hussein, H. (2019). Language challenges in online learning: The case of universities in Somalia. East African Journal of Education Studies, 2(1), 35-47.
26. Ibrahim, M. (2020). Device-related constraints in mobile learning environments: Experiences from Nigerian universities. International Journal of Education and Development Using Information and Communication Technology, 16(2), 120-133.
27. International Telecommunication Union. (2021). Measuring digital development: Facts and figures 2021. ITU Publications.
28. Johnson, L., Adams Becker, S., Estrada, V., & Freeman, A. (2021). Technology outlook for higher education in Africa 2021-2026. Horizon Project Regional Report. The New Media Consortium.
29. Kassahun, T. (2021). The impact of COVID-19 on higher education in Ethiopia: Teleworking, online learning and the digital divide. Studies in Higher Education, 46(12), 2650-2667. https://doi.org/10.1080/03075079.2021.1973644
30. Khalid, M. S., & Quick, D. (2016). Teaching presence influencing online students' course satisfaction at an institution of higher education.

International Education Studies, 9(3), 62-70. https://doi.org/10.5539/ies.v9n3p62

31. Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educational and Psychological Measurement, 30(3), 607-610. https://doi.org/10.1177/001316447003000308
32. Lwoga, E. (2018). Examining levels of job satisfaction and organizational commitment among faculty in Tanzanian universities. Journal of Education and Development, 2(1), 54-71. https://doi.org/10.20849/jed.v2i1.312
33. Mahboob, S., & Tiantian, Z. (2016). E-learning adoption in developing countries: A case of Pakistan. International Journal of Business and Social Science, 7(9), 147-157.
34. Ministry of Education, Culture and Higher Education. (2021). COVID-19 impact on higher education in Somalia: Assessment report. Federal Government of Somalia.
35. Mittelmeier, J., Rienties, B., Tempelaar, D., & Whitelock, D. (2019). Culture and design: Influences on local and global learning. In D. Burgos (Ed.), Radical solutions and open science (pp. 83-98). Springer. https://doi.org/10.1007/978-981-15-4276-3_6
36. Morgan, D. L. (2014). Pragmatism as a paradigm for social research. Qualitative Inquiry, 20(8), 1045-1053. https://doi.org/10.1177/1077800413513733
37. Mtebe, J. S., & Raphael, C. (2018). Key factors in learners' satisfaction with the e-learning system at the University of Dar es Salaam, Tanzania. Australasian Journal of Educational Technology, 34(4), 107-122. https://doi.org/10.14742/ajet.2993
38. Muhametjanova, G., & Cagiltay, K. (2019). Integrating technology into instruction at a public university in Kyrgyzstan: Barriers and enablers. Eurasia Journal of Mathematics, Science and Technology Education, 15(10), em1762. https://doi.org/10.29333/ejmste/109087
39. Mukhtar, K., Javed, K., Arooj, M., & Sethi, A. (2020). Advantages, limitations and recommendations for online learning during COVID-19 pandemic era. Pakistan Journal of Medical Sciences, 36(COVID19-S4),S27-S31. https://doi.org/10.12669/pjms.36.COVID19-S4.2785
40. Muilenburg, L. Y., & Berge, Z. L. (2005). Student barriers to online learning: A factor analytic study. Distance Education, 26(1),29-48. https://doi.org/10.1080/01587910500081269
41. Muse, A., & Abdulle, M. (2019). E-learning implementation in Somalia: The role of institutional capabilities. Journal of Online Learning Research, 3(1), 18-34.
42. Muyinda, P. B., Mayende, G., & Kizito, J. (2019). Requirements for a seamless collaborative and cooperative m-learning system. In Y.-M. Huang, H.-W. Huang, J.-J. Liu, & C.-Y. Yang (Eds.), Innovative technologies and learning (pp. 106-117). Springer. https://doi.org/10.1007/978-3-030-35343-8_12
43. Nsibirano, R., Kabonesa, C., & Madanda, A. (2022). Gender and digital technology in East Africa: Bridging the confidence gap. Journal of African Media Studies, 14(1), 97-113. https://doi.org/10.1386/jams_00049_1
44. Nyerere, J., Gravenir, F., & Mse, G. (2022). Digital inequalities in higher education: A comparative study of East African universities. International Journal of Educational Technology in Higher Education, 19(1), 1-23. https://doi.org/10.1186/s41239-022-00320-4
45. Omar, M. (2017). Overcoming the legacy of conflict: Higher education reconstruction in post-conflict societies. Journal of Peacebuilding & Development, 12(1),7-22.

https://doi.org/10.1080/15423166.2017.1281751

46. Omar, A., & Hassan, I. (2019). Technology integration planning in Somali universities: Challenges and opportunities. International Journal of Education and Development using Information and Communication Technology, 15(2), 89-103.
47. Rambe, P., & Moeti, M. (2017). Disrupting and democratising higher education provision or entrenching academic elitism: Towards a model of MOOCs adoption at African universities. Educational Technology Research and Development, 65(3), 631-651. https://doi.org/10.1007/s11423-016-9500-3
48. Selwyn, N. (2016). Education and technology: Key issues and debates (2nd ed.). Bloomsbury Academic.
49. Somali Research and Development Institute. (2021). Digital access among university students in Somalia during COVID-19. SRDI Research Brief 3/2021.
50. Teddlie, C., & Tashakkori, A. (2009). Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences. SAGE Publications.
51. Traxler, J., Smith, M., Scott, H., & Hayes, S. (2020). Learning through the crisis: Helping decision-makers around the world use digital technology to combat the educational challenges produced by the current COVID-19 pandemic. EdTech Hub. https://doi.org/10.5281/zenodo.4058352
52. UNESCO. (2020). When schools shut: Gendered impacts of COVID-19 school closures. UNESCO.
53. United Nations Population Fund. (2020). Somalia population estimation survey 2020. UNFPA Somalia.
54. Unwin, T., Kleessen, B., Hollow, D., Williams, J. B., Oloo, L. M., Alwala, J., Mutimucuio, I., Eduardo, F., & Muianga, X. (2020). Digital education in low-income contexts: The need for a critical research agenda. Educational Technology Research and Development, 68(6), 2257-2281. https://doi.org/10.1007/s11423-020-09844-8
55. Wang, T., Chen, Y., & Lu, M. (2021). Challenges of online learning in developing countries: Empirical evidence from a mass implementation in Chinese universities. IEEE Transactions on Education, 64(3), 205-213. https://doi.org/10.1109/TE.2020.3041102
56. World Bank. (2019). Somalia economic update: Building education to boost human capital. World Bank Group.