



in partnership with



E-LEARNING WORKING PAPER SERIES

Implementing e-Learning in Low-Resourced University Settings: Institutional Experiences and Perspectives at the University of Gondar (UoG) and University of Rwanda (UR)

Mikyas Abera
Jean Claude Byungura
Raymond Ndikumana
Solomon Mekonnen Abebe
Pierre Celestin Bimenyimana
Rediet Gizaw
Mustofa Worku Jemal

Joint research between

University of Gondar
and
University of Rwanda

November 2023

Implementing e-Learning in Low-Resourced University Settings: Institutional Experiences and Perspectives at the University of Gondar (UoG) and University of Rwanda (UR)

Mikyasa ABERA,¹ Jean Claude BYUNGURA,² Raymond NDIKUMANA,³ Solomon Mekonnen
ABEBE,⁴ Pierre Celestin BIMENYIMANA,⁵ Rediet GIZAW,⁶ Mustofa Worku JEMAL⁷

¹ Ph.D., Assist. Professor, Dept of Sociology, UoG, Ethiopia.

² Ph.D., Lecturer, Dept of Business Information Technology, E-learning Focal Point, UR,
Rwanda.

³ Ph.D., Lecturer, Depart of Accounting, Deputy VC for Strategic Planning & Administration,
UR, Rwanda.

⁴ Ph.D., Professor, Institute of Public Health, UoG, Ethiopia.

⁵ Ph.D. Student, UR, Rwanda.

⁶ LLB, Mastercard Foundation Scholar, UoG, Ethiopia.

⁷ Ph.D. Student, Queen's University, Canada; Assist. Professor, Dept of Journalism &
Communications, E-learning Champion, UoG, Ethiopia.

Suggested citation:

Abera, M., Byungura, J.C., Ndikumana, R., Abebe, S.M., Bimenyimana, P.C., Gizaw, R.,
Jemal, M.W. (2023). *Implementing e-Learning in Low-Resourced University Settings:
Institutional Experiences and Perspectives at the University of Gondar (UoG) and University
of Rwanda (UR)*. Mastercard Foundation e-Learning Initiative Working Paper Series 1.0.
<https://doi.org/10.14507/MCF-eLi.J11>

This working paper was produced through a Small Research Grant program under the
Mastercard Foundation e-Learning Initiative. The e-Learning Initiative aims to support
institutions in the Scholars Program network to develop capabilities and resilience to deliver
high-quality and inclusive e-Learning and related supports so as to enable all students,
including those who face additional barriers, to successfully pursue their studies from
anywhere.

Use and dissemination of this working paper is encouraged. Further usage is permitted
under the terms of the Creative Commons License. The findings, interpretations, and
conclusions expressed in this Working Paper are entirely those of the author(s) and do not
necessarily represent those of the Mastercard Foundation, its Staff or Board of Directors, the
e-Learning Initiative, or the authors' respective organizations.

This work is licensed under a [Creative Commons Attribution-ShareAlike
4.0 International License](https://creativecommons.org/licenses/by-sa/4.0/).

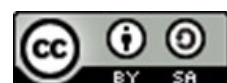


Table of Contents

Contents	Page No.
Table of Contents	3
Executive Summary	5
1. Background and Problem Statement	7
1.1. Research Context	9
1.2. Objectives of the Study	10
1.3. Research Questions	10
2. Literature Review: Conceptual Framework of the Study	11
3. Methods and Tools	15
3.1. Research Design	15
3.2. Study Participants	15
3.3. Methods of Data Collection	16
3.4. Procedures of Data Analysis	16
3.5. Ethical Considerations	17
4. Results and Findings	18
4.1. Ethiopia: University of Gondar	18
I. The start of e-learning in Ethiopia	18
II. The academic community's perception of e-learning	19
III. Level of awareness on e-learning	19
IV. The status, practices, and experiences of e-learning	22
V. E-learning opportunities	24
VI. National plan for e-learning	26
VII. Leadership – key to successful e-learning initiative	28
VIII. E-learning, education quality, and learning experience	28
IX. E-learning and equity in access	29
X. Challenges of e-learning	31
XI. What needs to change?	32
XII. Where change should start?	33
4.2. Rwanda: University of Rwanda	34
5. Discussion	41
6. Conclusion	42
7. Recommendations	44
8. Limitations of the Study	45
9. Contributions of the Study: Scientific and Programmatic	45
References	47
Annexes	51

Acknowledgments

We, the researchers, would like to acknowledge the time and contributions of individuals in leadership and management positions at the University of Gondar and the Ministry of Education - who should remain anonymous for confidentiality – for supporting the research team with interviews, providing access to secondary resources, etc. We are also grateful to faculty and students of social sciences, humanities, sciences, information technology, medicine, and health sciences for their engaging and genuine participation in the two focus group discussions.

Our special thanks also to all the participants from the University of Rwanda, in their capacities, who participated in the interviews for this research. We acknowledge the Directorate of Research & Innovation, Center of Postgraduate Studies, Division of Resource Mobilization, Planning, Chief Information Office, Center for Online, Distance and E-learning, Campus Headship, Directorate of Teaching and Learning Enhancement, and College Principals. It has been our pleasure to interact with you regarding this research.

Executive Summary

The COVID-19 pandemic outbreak affected most universities, and it severely disrupted their face-to-face teaching and learning processes. The University of Gondar (UoG) and the University of Rwanda (UR) were no exceptions. Before the pandemic, E-learning was not an education norm in both institutions. Education was mainly face-to-face, inside a four-wall classroom experience. As COVID-19 restricted such experience, the two universities adopted a range of online platforms to support teaching, learning, and access to learning resources. Across the globe, E-learning solutions promise institutional resilience and innovative teaching and learning activities in tertiary education – but only if their development is embedded within enabling institutional culture, structure, policy, and processes. Against this backdrop, we designed a study to explore leadership and policy perspectives, institutional contexts, potentials/prospects, challenges, and best practices of educational digital solutions. In this exploratory study, we used accessibility and inclusivity as key motifs to frame discussions of results. We used a cross-sectional design and employed qualitative methods to collect data, i.e., document reviews, key informant interviews, and focus group discussions. We adopted a descriptive thematic analysis procedure to organize, analyze, and interpret the data.

Overall, the results indicate that education leaders, faculty, and students were not equipped to smoothly transition from face-to-face learning to e-learning in the aftermath of the COVID-19 pandemic. Not only meeting technological requirements, the accelerated deployment of E-learning tools implied a change in pedagogy. We found that institutional policies were not designed to fully accommodate the change (except for some guidelines proposed during COVID-19). The lack of an e-learning strategy and resource limitations have hindered and continue to impact e-learning uptake in both institutions. We also found that poor internet connectivity, lack of tech devices and software, inadequate leadership commitment, power interruptions or outages, inadequate pedagogical training, low community perception, and poor administrative and technical skills are the challenges of the two institutions to effectively manage full-fledged e-learning programs. These challenges were usually amplified by the nature of national, local, and institutional contexts (e.g., a multi-campus, multi-college setting of UR and a war outbreak in northern Ethiopia). Noting that face-to-face education is still seen as premium, there is a need for a blended approach to e-learning and policies that would improve accessibility to and affordability of E-resources to diverse groups of staff and students. With varying degrees, we found that the two institutions are engaging in activities to promote e-learning. For instance, groups of e-learning Champions are advocating in both institutions for engagements in accelerated change efforts (be it on an e-learning platform, capacity building, access devices, and

strategy). Both institutions have units that coordinate e-learning uptake and ensure its inclusivity. Both institutions could also benefit from increased governmental and development partners' attention to the possibility and support of digital education. However, the issue of social equity and e-learning ecosystem management remains paramount in launching e-learning programs. In sum, we observed that e-learning is still in its nascent stages at both institutions although not at the same level. Their respective e-learning initiatives must integrate global best practices and specific local contexts and priorities. This requires that state and institutional leaders embrace and encourage co-creation, knowledge, and expertise sharing among institutions in low-resource and similar settings.

Keywords: e-learning, policy, challenges, opportunities, Ethiopia, Rwanda

1. Background and Problem Statement

E-learning positions technology at the heart of education to leverage its benefits vis-à-vis face-to-face instruction (Abdelaziz, 2022; Muhie, Tesfay & Tamirat 2020, Waight & Oldreive 2020). It improves learning outcomes for all students, including students with disabilities (Waight & Oldreive, 2020). But despite its benefits, there are some preconditions for learners to benefit from technology-based learning, especially in developing countries, i.e., e-learning can only build on the set of learners' basic computer literacy skills and the specific skills to use technology in a learning environment (Gunawardana, 2005). This scenario explains why the initiation and development of e-learning have been on shaky ground in developing countries (Eke 2011). Furthermore, effective and inclusive e-learning must be embedded in systemic and institutional structures – structures that should equip, harness, and support faculty, ICT staff, and students (Babeley, 2016).

Progress in e-learning has gathered significant momentum since early 2020 following the Covid-10 pandemic. The pandemic affected all aspects of the global community. Millions died. Many more live with its long-lasting impacts on their health and well-being. It also disrupted the activities of institutions of higher learning (IHLs) in teaching, research, and community engagement for much of 2020. It forced them to close campuses and send students home as a precaution against its deadly spread. IHLs ventured into the virtual world to continue classes online or engage their students (Chen & Aytnew, 2021).

Several world-renowned IHLs have been successfully and progressively migrating their courses online and shifting away from the traditional class-based course delivery (Bao, 2020; Picciano, 2017). During the pandemic, they were better prepared to resolve its implications for their teaching and learning processes. On the other hand, the COVID-19 pandemic disrupted studies for around 10 million African youth, but the IHLs on the continent were not prepared for the radical shift to online learning. And, most IHLs on the continent performed underwhelmingly. Similarly, Ethiopian and Rwandan IHLs faced several challenges, including inadequate technological infrastructure, trained manpower, and a system for implementation (Almahasees, Mohsen & Amin 2021; Bao, 2020). A study, for instance, reported that the smooth and effective transition from class-based to online learning faced significant challenges on the continent “where merely 24% of the population has access to the internet, and poor connectivity, exorbitant prices, and regular power outages” (Chen & Aytnew, 2021:62).

The University of Gondar (UoG), Ethiopia, and the University of Rwanda (UR), Rwanda, are among the IHLs that, when face-to-face instruction becomes restricted due to the COVID-19 pandemic, have tried to shift to virtual platforms such as e-learning to reach and engage students and their clientele. However, their inadequate systemic and

technological infrastructure, as well as limited human resources, restricted their effectiveness and success (Muhie, Tesfay & Tamirat 2020, Saintika et al., 2021).

With or without the COVID-19 pandemic, e-learning will be the dominant feature of higher education in the 21st century (Pittard, 2004), and it is more accessible, inclusive, and efficient than face-to-face learning (Muhie, Tesfay & Tamirat 2020). Nonetheless, e-learning is not the norm in either the UoG or the UR. However, education and institution leaders profess their commitment to e-learning integration in teaching, learning, and student assessment and support. Both institutions have also taken practical steps to implement hybrid models (blended models).

However, designing and implementing an innovative approach to education, such as e-learning, requires adequate policy frameworks and supportive institutional contexts. Specifically, inclusive, robust, and flexible policies on communications, intellectual property, online interactions, etc., are relevant to governing e-learning courses and degree/certificate programs and promote their acceptability (Waterhouse & Rogers 2004).

On the other hand, for e-learning policies to be effective, they require strong support from institutional leaders and the academic community, as well as their acceptance that it is central to making IHLs resilient to significant disruptions such as COVID-19 (Ali, 2021). Ideally, e-learning needs to be embedded in the institutional culture, processes, and structures as well as daily operational practices while at the same time avoiding increasing the relatively high digital divide and exclusion across communities. Whenever such a policy is absent, the benefits of e-learning have been minimal, with consequential effects on the quality of education (Powell & Barbour, 2011).

The UoG and the UR are public IHLs. With some variation, they experience similar limitations with IHLs in low-resource settings, including limited capabilities to implement robust e-learning programs, provide faculty and students with tech devices, or ensure stable connectivity for instruction. Limited headways have been made in designing course and program content to meet the required standards of e-learning modalities. Digital literacy to effectively manage and use e-learning platforms is limited among a significant portion of teachers and most students. Their resources and institutional commitment to developing the ICT infrastructure, awareness, and capacity are also questionable. Consequently, inadequate ICT infrastructure, poor digital skills, etc., affected the implementation of e-learning programs.

However, not all students and faculty experience these challenges similarly. Students of rural or remote villages face connectivity issues, while faculty and students with disabilities have unique problems with accessibility (Catalano, Torff & Anderson 2021; Tonks, Kimmons & Mason 2021). They, for instance, lack access to resources for adequate e-learning, lack

sufficient support from mentors, teachers, and administrators, and lack of skill set for e-learning.

On the other hand, UR has been implementing its policy on open, distance, and e-learning since 2017 policy (UR, 2017). The UR has several colleges located on different campuses across Kigali, which resulted in varied uptake of the policy. And, when governments started taking precautionary measures to ward off the varied impacts of the COVID-19 pandemic in 2020, it was yet to mature enough to ensure things fit just right and support the smooth transition from face-to-face learning. The UoG, however, has only introduced the issue of e-learning in its 2020 Strategic Plan. In the same year, the ICT Policy was approved with brief policy statements on virtual learning environments (UoG, 2020). The two universities are not only operating in different policy environments; they are also in different stages of appreciating the significance of e-learning or implementing it. After an uneven use of virtual platforms in its various campuses and programs, the UoG entirely reverted to face-to-face instructions as soon as the government lessened its COVID-19-related restrictions and could recall students back on campus.

The UR, on the other hand, has had success stories with e-learning and continues to conduct hybrid classes, i.e., blended learning for a few programs. Though the overall organization and functioning of e-learning are still in the early stages in both universities, their different policy environments and institutional structures warrant a closer look – at how this impacts the design and implementation of an effective, inclusive, and improved learning environment for faculty and students.

1.1. Research Context

The University of Gondar (UoG) and the University of Rwanda (UR) are tertiary-sector partners in the Mastercard Foundation (MCF) global network. Since early 2020, the COVID-19 pandemic – and the civil war in northern Ethiopia - severely disrupted their teaching, research, and community engagement activities. As face-to-face instruction becomes restricted, they have worked to shift to online platforms to reach and engage students and clientele. However, inadequate systemic and technological infrastructure, as well as limited human resources, restricted their institutional impact. It was in this context that they enthusiastically accepted the invitation from the MCF to participate in the co-creation of quality and inclusive e-learning platforms. We also understand that e-learning is going to be the dominant feature of higher education in the 21st century (Pittard, 2004). Through a co-creation approach, it is highly relevant that collaborative engagements are harnessed at institutional levels to boost their resilience to similar challenges of quality, inclusivity, and face-to-face instruction.

Currently, dozens of e-learning Champions from each university are undergoing training on online pedagogy and instructional design to spearhead the launch of a locally relevant, high-quality, and inclusive e-learning ecosystem that supports the diverse needs of faculty and students.

This study will feed into the existing system and e-learning activities that the University of Gondar, the University of Rwanda, and similar institutions in low-resource settings are planning to create. It highlights the systemic interdependencies among the university units and outlines their relevance to harnessing e-learning with the involvement of students, faculty, university leaders, education policymakers, and education sector partners like the MCF.

1.2. Objectives of the Study

This study aimed to comparatively explore and understand the state-of-the-art of e-learning uptake at both the University of Rwanda and the University of Gondar from the perspectives of leadership and the academic community (faculty, students, IT staff).

Specifically, this study aims at:

- Investigating the challenges and opportunities of e-learning;
- Exploring the needs of students and faculty with disabilities in e-learning programs;
- Examining education and institutional leaders' commitment to the e-learning agenda;
- Describing the institutional practices and policy frameworks on e-learning; and,
- Highlighting lessons for e-learning adoption and co-creation processes.

1.3. Research Questions

This study aims at providing answers to the following research questions:

- What are the challenges and opportunities of e-learning digital solutions?
- How are the needs of students and faculty with disabilities considered in the institutional e-learning digital solutions?
- How do education leaders practically commit to the e-learning agenda?
- Are there best institutional practices and policy frameworks for e-learning?
- How can UoG and UR adapt and co-create locally relevant, accessible, and inclusive e-learning platforms?

2. Literature Review: Conceptual Framework of the Study

Education, especially research, and innovation, is a necessary prerequisite to sustainable and inclusive development. In many developed countries, education technology has advanced rapidly to benefit from richer, diverse, customizable content (El-Sabagh, 2021). However, the inadequate adaptation and integration of technology into education undercut the benefits of quality education to social development and economic progress in African countries (Bekele, 2021). The reluctance among educational institutions to integrate technology into their pedagogy has been due to its capital-intensive nature, poor infrastructure, inadequate awareness, or technical competency (Atanga et al., 2020, Tallvid, 2016).

E-learning refers to “the fields of online learning, web-based training, and technology-delivered instruction” that involve synchronous or asynchronous modes of delivery (Seale, 2014). E-learning, or digitalization of teaching and learning in general, has a relatively long history in developed countries, and these countries managed to create resilient and accessible educational institutions and increase their enrollment and inclusivity. Arguably, e-learning provides institutions with an efficient way to reach their target populations through improved interactions, communications, working, and learning (Nicoleta & Maria-Loredana 2012). During the Covid-10 pandemic, they were better positioned to transition smoothly from classroom-based learning to e-learning. Developing countries, on the other hand, were leaps and bounds behind in integrating technology into education, and the pandemic disrupted their programs and activities (Kabir et al., 2022).

With the growing threat of the COVID-19 pandemic, African governments followed the WHO’s recommendations and closed educational institutions. Despite limited readiness or awareness, they explored technological possibilities, including the Internet to resume learning. There have been mixed results for these endeavors in Africa as well as the developing world due to the state of basic computer literacy skills, awareness, device availability and affordability, internet connectivity, and overall readiness (Eke 2011, Johnson et al., 2021; Kabir et al., 2022).

Globally, the COVID-19 pandemic provided an extra impetus, and IHLs, primarily those in developed countries, made tremendous progress in e-learning (Yavuzalp & Bahcivan 2021). In contrast, African IHLs had to grapple with challenges including poor awareness, lack of policy initiative, lack of resources and skills, etc. (Balaraman, Berhe & Kamalakannan 201; Osubor & Chiemeké 2015). Studies also reported people could refuse the use of technology or the adoption of e-learning due to cultural factors that include “the fear of the unknown.” Consequently, the attempts of African IHLs at transitioning from class-based learning to e-learning were usually poorly designed quick fixes that did not mature to

their potential due to structural, institutional, attitudinal, and personal factors. Policies on e-learning were either non-existent or in development; institutions lacked technical and manpower capabilities to implement e-learning programs; awareness and attitude toward e-learning were poor; staff and students lacked technological devices and skills to utilize e-learning resources. Consequently, e-learning became synonymous with using any internet-based communication media. Ethiopian IHLs use social media and networking platforms such as Facebook, WhatsApp, Telegram, and Google+ as well as Zoom, Microsoft Teams, Gmail, etc., to share lecture materials with students (Balaraman, Berhe & Kamalakannan 2018). The course materials were not designed for e-learning either.

Before COVID-19, there were limited experiences in broad-based e-learning programming and implementation in Ethiopia. Studies identified several challenges, prospects, and opportunities for the expanded adoption of technology in the education sector, specifically e-learning (Abdelaziz, 2022; Jacob et al., 2022). Among the few exceptions in Ethiopia are ASTU and AAU. The Medical Education Partnership Initiative (MEPI) eLearning Technical Working Group involved Addis Ababa University as a focal institution for the MEPI-Ethiopia consortium that involved 3 additional schools countrywide. The MEPI-Africa involved five medical schools from Botswana, Ethiopia, South Africa, Tanzania, and Zimbabwe (Vovides et al., 2014). In Ethiopia, the government's full endorsement of a drastic increase in medical school enrolment ensured institutional support and created an opportunity for "implementing robust e-learning solutions" (Vovides et al. 2014:102). With most of the activities focusing on AAU, the initiative faced "challenges to scaling up the eLearning program within the MEPI-Ethiopia consortium schools." The challenges include institutional variations in "infrastructure and ICT expertise, faculty resistance to committing more time to the development of course content, and the absence of institutional eLearning policies" (Vovides et al., 2014:103).

Similarly, the Adama Science and Technology University (ASTU) launched its e-learning center in 2009 to promote e-learning and deliver training at ASTU. Its challenges closely replicate those reported for Addis Ababa University (Ketema & Nirmala 2015). There have been experiences on how several IHLs or governments tried to mitigate this challenge with training, support, and technical and financial assistance (Tusiime, Johannesen & Gudmundsdottir 2020).

On the other hand, with ICT becoming central to the teaching and learning process in IHLs globally (Bhuasiri et al., 2012), it is important to ensure equitable access to students with special needs, disabilities, low socioeconomic backgrounds, and geographically remote residences (Graham, 2019). In gross terms, the use of ICT and e-learning tools improves access and quality of education, but there are formidable challenges to ensuring its fairness (Lim et al., 2020; Yang, Zhu & MacLeod 2018). In low-resource settings like Ethiopia and

Rwanda, students from remote villages and low socioeconomic families may not have access to internet connectivity with sufficient bandwidth, appropriate devices like computers or smartphones, conducive workspaces, or other resources to effectively engage in e-learning (Reddy, Sharma & Chandra 2020; Reddy, Sharma & Chaudhary 2020; Sharma et al. 2018).

Without external assistance, governments in developing countries do not usually prioritize providing or funding laptops, tablets, or data plans for students, let alone for teachers, to support their engagement in e-learning. Only a few developing countries' governments provided students with devices and adequate internet connectivity and ICT materials (Reddy, Sharma & Chandra 2020; Sharma et al.; 2020). And, even while taking care of material aspects, the gaping digital divide in developing countries favors students of middle and high socioeconomic and urban origins (Scherer & Siddiq 2019). The poorer ICT literacy of students of low socioeconomic and rural origin is likely due to their low access to e-technology at home or in rural schools.

Another challenge with e-learning is education quality and student experience. Compared to traditional face-to-face learning, e-learning platforms make it difficult and time-consuming for students to ask questions (Heirdsfield et al., 2011), or for lecturers to explain complex topics where they cannot capture students' non-verbal expressions (Arasaratnam-Smith & Northcote 2017; Phirangee & Hewitt, 2016). Since teachers lack access to real-time feedback from learners on e-learning platforms, educators cannot easily customize their course content to fit the learning style, needs, etc., of students. Academic communities have also been concerned with the challenges of designing effective activities and assessments on e-learning platforms, which contributed to low student engagement and academic indiscretions (Kebritchi, Lipschuetz & Santiago 2017; Olt, 2002). The low student online engagement also meant e-learning platforms were poor in equipping students with good verbal and non-written communication skills (Lalande, 1995). All this amounts to a poor online learning experience for students, which reduces their performance as well as their sense of community, belongingness, or loyalty to the school (Pham et al., 2019).

The fact that e-learning requires educators to adopt a new teaching style and content delivery that differs from the traditional mode explains part of the faculty's resistance to e-learning (Kebritchi, Lipschuetz & Santiago 2017). Other reasons why educators have been reportedly wary of e-learning include a lack of time and resources, fear of inadequacy, and diminishing authority (Atanga et al., 2020, Tallvid, 2016).

To balance the requirements and undesirable offshoots of e-learning, many institutions have tried to combine online learning for theoretical or introductory courses with compulsory residential programs for advanced or practice-based courses (Chandra & Sharma 2018; Naiker & Wakeling, 2015).

However, e-learning comes with a range of benefits (Chandra & Sharma 2018). It enables great flexibility (Hollenbeck, Zinkhan & French 2005, Kilburn, Kilburn & Cates 2014) for learners to engage in self-paced (Bhuasiri et al. 2012), self-directed, and personalized learning. Learners could also benefit from peer feedback and mentoring (Fayram et al. 2018, Van-Popta et al. 2017). With increased internationalization, students can access high-quality course resources that their host institution may not necessarily have from such sources as OERs (open educational resources), and MOOCs (massive open online courses) that would improve their academic and educational experiences (Gardner & Brooks 2018; Littlejohn et al., 2016; Sharma et al., 2020).



At the UoG and the UR – IHLs that emerged with face-to-face and campus-based as their prevalent mode of study – the reluctance to fully adopt e-learning could be related to the prevalent perception that training based on face-to-face instruction is superior to e-

learning. This perception spilled into a labor policy in Ethiopia whereby employers discriminated against candidates with academic qualifications earned through modalities other than traditional, regular, and classroom-based instruction. Hence, an e-learning initiative must be designed to ensure its physical, institutional, infrastructural, normative, policy, perception, etc. barriers are removed, and it is accessible to diverse groups of learners, including students with disabilities. A systemic level of understanding and intervention is required to ensure e-learning promotes better knowledge creation, dissemination, and preservation, as well as learners' progression, retention, and completion (Gierdowski & Galanek 2020).

In light of this, this study adopts the systemic framework to understand the adoption and management of e-learning in higher education (Russell, 2009). An understanding of e-learning usually involves assessing three dimensions: user, technology, and services (Aparicio, Bacao & Oliveira 2016). In other words, a theoretical understanding of e-learning needs to consider individual factors, ICT capabilities, access to technology, motivation, and attitude as well as success probability (Adewole-Odeshi, 2014, Ilgaz & Gülbahar 2015; Judit, 2018). Furthermore, perception and attitude towards technology (Mbengo, 2014) and institutional or leadership support (Al-Haderi 2014; Maina & Nzuki 2015) are found to be relevant to e-learning programming and implementation.

The systemic framework proposes that changes in institutions like a university require coordinated interventions in their different sectors. Several studies also indicated that if coordination is not enabled, it generally leads to the failure of organizational change whereby the older, traditional way of learning i.e., face-to-face instruction, reasserts itself

and undermines the benefits of the new learning technologies to faculty, students, and universities (Babeley 2016; Powell & Barbour, 2011). From this framework, this study explores the institutional realities as well as the policy and structural contexts of the two universities that bear on their teaching and learning practices. It assesses e-learning policies, normative frameworks, institutional leadership and capabilities, and the perception and values of the academic community to highlight the challenges and prospects of e-learning in Ethiopia and Rwanda – low-resource settings. Specifically, a system theory is an effective theoretical framework to understand contexts where some form of an e-learning program is being implemented. Here, the most relevant components that need exploration include institutional support, faculty engagement, student engagement, technical expertise, and infrastructure and support systems (Vovides et al.; 2014).

3. Methods and Tools

This study is exploratory with comparative aspects of the two case study institutions to understand the E-learning development and update. Qualitative approaches have been used to collect and analyze the data.

3.1. Research Design

This study employed a cross-sectional design to collect empirical data and relevant documents – policies, program reports, and institutional strategies related to e-learning between August and September 2022. As the study is descriptive-exploratory research, the data collected reflect the state of things at or around the time of data collection. Nonetheless, based on study participants' reflections on past lessons and experiences as well as plans in policy and institutional practices, this report contains assessments and remarks on potential and upcoming changes in the two institutions.

3.2. Study Participants

Participants in this study include faculty staff, students, and managers at different levels from the two case study institutions. Considering that the study aimed to get a deeper understanding of e-learning design, implementation, best practices, challenges, and opportunities, we used a purposive sampling technique to identify and select the study participants. We focused on departments and their personnel with knowledge or significance to the e-learning initiative and its implementation in the respective institutions. A detailed description of the study participants is described in each section of the findings for both the University of Gondar and the University of Rwanda – and as annexes 1 and 2. In brief, we interviewed 9 key informants in Ethiopia (2 from the Ministry of Education and 7 from the UoG) and 14 key informants in Rwanda. In addition, we conducted two focus group discussions – one with teachers and another with students (6) and teachers (8) – in Ethiopia.

3.3. Methods of Data Collection

The study combined qualitative methods with document analysis to collect relevant and contextual information about the challenges, prospects, and opportunities of e-learning.

- **Document review:** We conducted a critical reading of key institutional and policy documents to appreciate the higher education policy, distance education and e-learning policies, higher education strategic plan, and institutional and sectoral documents on ICT and quality and access to higher education.
- **Key informant interview:** We conducted interviews with key informants that included policymakers at the Ministry of Education (MoE) and top leadership, deans, directors, and ICT/e-learning experts at the UoG. In Ethiopia, we conducted 8 key informant interviews. In Rwanda, we conducted 14 key informant interviews with the people with senior management roles in line with E-learning development and initiatives. We attached the redacted versions of the study participants' profiles as annexes.
- **Focus Group Discussion.** Based on literature and document review, we designed two FGD guides to conduct a deep dive into institutional contexts and experiences with e-learning nationally and institutionally in Ethiopia. We conducted the first FGD with teaching staff and administrative staff (8). The staff included those teaching or working in various units of the two universities: (science and technology (applicable to Rwanda) sociology, law, physiotherapy, communication, special needs, quality of education, ICT, and registrar. We conducted the second FGD with a diverse group of male and female students from the various programs of the UoG (6). In both FGDs, participants with visual impairment took part in their respective FGDs. We moderated both FGDs and encouraged a genuine and active sharing of views, experiences, and assessments regarding e-learning.

3.4. Procedures of Data Analysis

The data collected through critical document review and transcripts of key informant interviews (KII) and focus group discussion (FGD) were uploaded to Atlas.ti (9) for the Ethiopia case. For the Rwanda case, the interview transcripts were narratively analyzed to understand the participants' perceptions vis-a-vis the e-learning development at the institution. After careful coding of all KII and FGD transcripts, we developed a codebook, which we constantly reviewed and updated as transcripts were being coded. We then grouped similar or related codes into themes. We used thematic and narrative analysis techniques to explore and analyze the data and draw insights into research questions. We also employed content analysis to review and appraise relevant policy and institutional documents relevant to the e-learning agenda. We used narratives to report findings.

3.5. Ethical Considerations

We observed necessary ethical considerations in designing and conducting the study. We followed standard principles to guide the study about ensuring voluntary participation, defining the terms of dissemination of results, obtaining informed consent, avoiding the potential for harm to participants or researchers, and ensuring confidentiality, and anonymity (Christensen, Horn & Johnson 2011).

We obtained ethical approvals from the respective institutional research ethics boards. In addition, all participants approved their consent to participate in the study before their involvement. We also informed them that their personal information would be kept anonymous, and confidential. During the data analysis and reporting, we created codes for each participant to keep their personal information confidential.

4. Results and Findings

The study findings are reported following a case study approach. Nonetheless, the sections on discussion and conclusions will aim at drawing similarities and differences between the cases in Ethiopia and Rwanda to draw lessons that could be relevant across the two countries in particular and low-resourced settings in general.

4.1. Ethiopia: University of Gondar

At the University of Gondar, the sample of participants in this study includes teachers, students, administrative staff, and institutional and education leaders (see Annex 1-3 for details).

I. The start of e-learning in Ethiopia

E-learning started with the outbreak of COVID-19 in 2020, which forced Ethiopian institutions of higher learning (IHL) to suspend classroom-based teaching as a precaution against the spread of the virus. However, none of the IHLs could meet the demands of the drastic shift. A CEO at MoE reports: *"No university had a complete or standard LMS with students and teachers having accounts and engaging with content"* (MoE, KII-1). Some IHLs had pilot Moodle and other resources, which were insufficient for the task. Thus, the MoE promoted Microsoft Teams and provided basic online learning training to selected university staff. However, internet-based learning during COVID-19 was full of problems *"since the focus was on email communications and making video conferences for virtual classes"* (MoE, KII-1).

A coordinator at the UoG-ICT Directorate noted that *"even if we taught online courses to graduate students [when face-to-face classes cease during COVID-19], our data center was not well equipped with necessary resources and facilities"* (UoG, KII-9). Nevertheless, a top leadership (UoG) claims, *"E-learning is on our agenda.... We believe we should not lag behind the rest of the world. Significant leaps have been achieved in virtual learning since the COVID-19 era"* (UOG, KII-3). A student concurs that it was COVID-19 – and the extended war in northern Ethiopia – that forced the shutting down of higher educational institutions and introduced students to virtual learning:

"Most of my friends did not know what Zoom was. It was only after COVID-19 that we started using them frequently, which became the trend, especially for graduate students, and when there is a shortage of teaching staff for courses. I enrolled for two courses the current semester that teachers based in other universities manage virtually" (P5, FGD-2).

Though forced, activities and programs during COVID-19 did not only lead to improved online digital skills but also attitudes towards e-learning: *"My views about e-learning were not good. I never had an e-learning experience in my schooling years. I learned some after COVID-19"* (P4, FGD-1).

II. The academic community's perception of e-learning

Participants acknowledged the importance of e-learning; however, there were mixed attitudes toward its adoption. One of the challenges is "resistance to e-learning" (MoE, KII-1) due to such factors as *"instructors' preference for traditional methods or their syllabi being practice-based"* (UoG, KII-7), *"lack of training or capacity or skills or awareness of benefits and expectations"* (MoE, KII-2), or *"a lack of interest in attending training sessions or embracing online platforms"* (UoG, KII-4).

Participants perceived the quality of e-learning at UoG to be poor due to a *"lack of tech skills and devices as well as frequent power interruptions, lack of connectivity, and instances of cheating"* (P7, FGD-1). However, a UoG director believes that there is an awareness problem, and *"people do not think they are learning well if it were not face-to-face"* (UoG, KII-8). Moreover, a faculty reported that teachers are concerned about sharing with students course content that is not *"standardized or suitable for online learning"* (P2, FGD-1).

Participants identified several limitations in UoG's e-learning infrastructure, including *"lack of well-equipped skill labs, power interruptions, internet connectivity issues, time difference [courses that are offered from a different country virtually]"* (UoG, KII-7), and *"restricted access to certain apps such as Zoom and limited smartboards"* (UoG, KII-9).

Overall, the findings suggest that while there is recognition of the importance of e-learning, the academic community at UoG faces several challenges and limitations in its adoption and implementation.

III. Level of awareness on e-learning

FGDs with students and teachers at the UoG revealed a diverse level of awareness about e-learning depending on the study stream and campuses. A health science student, for instance, reports that *"In our campus [College of Medicine and Health Sciences [CMHS]], there is awareness about e-learning.... But I don't think the university has worked to help students and teachers understand the benefits of e-learning"* (P2, FGD-2). A student in the same college agrees: *"My friends are well informed about e-learning due to their involvement in virtual learning during COVID-19."* She adds, *"There is knowledge; there is awareness. But there is no access"* (P3, FGD-2).

In the Maraki campus – where business, social sciences, and humanities programs are based – study participants noted the experience with virtual learning during COVID-19, contributing to improved awareness of learning in the academic community. P5, for instance, commented that:

“Students are becoming more aware of e-learning since our off-campus months when the university closed due to COVID-19 and the war in northern Ethiopia. Several of my friends did not even know what the Zoom app was. Now students’ understanding of e-learning is improving. They believe it has been used” (P5, FGD-2).

Other participants had different views: *“Everyone is aware of e-learning. However, people think that e-learning is more of an additional or add-on platform than a fully functional alternative to regular classroom-based learning”* (P4, FGD-2). For a faculty, unfavorable views towards e-learning reflect cultural and institutional contexts: *“E-learning is new, and our community is resistant to new ideas. Besides, most staff believe that institutional readiness is not at the level needed to start e-learning”* (P1, FGD-1). On the other hand, *“most staff don’t know that the UoG has an online instructional platform or LMS. UoG has Moodle”* (P1, FGD-2). The participant concludes, *“We all agree on the benefits of e-learning, although we have different views on e-learning”* (P1, FGD-1). And, top leadership underlines, *“Thanks to COVID-19, everyone is aware of e-learning. We will strengthen the existing and new initiatives to create a well-organized e-learning program”* (UoG. KII-3).

The acceptability of e-learning also differed based on the nature of the study program, with theoretical courses or programs perceived to be more conducive to e-learning than technical and practical sessions. A participant reports, *“Most of our [Sociology] lessons are classroom-based – about 80%. We only undergo 20% of our education outside classrooms. I think technical and vocational students are better advanced in practical education than us [university students]. Unless the curricula changes, e-learning is useful to us”* (P6, FGD-2). Though e-learning can be a primary teaching modality for some departments, says a faculty, it may not suit others: *“For instance, it is difficult to teach medicine online. Students need physical contact with patients during training, diagnosis, or treatment. But e-learning can be supplementary to classroom teaching - e.g., on advanced techniques and expensive procedures”* (P2, FGD-1). A health science student agrees, *“You must do clinical trials and procedures. It won’t be useful in real life if you have not felt it with your hands”* (P2; FGD-2). A medicine student suggests both, *“even if e-learning is available, there need to be practical sessions. We are talking about human lives. We have to pursue both”* (P4, FGD-2). Nonetheless, a faculty of medicine had reservations:

“Most of our courses are demonstration-based. I didn’t think e-learning was usable in a practical course. However, during the pandemic, when we could not provide face-to-face teaching, we tried online training and understood that it was possible to conduct demonstrations. Currently, we can get YouTube training videos and integrate them with our syllabus for an advanced laboratory where we do not have experts and resources. The videos allow students to view content repeatedly, and I believe it can be applicable even for demonstration-based training” (P4, FGD-1).

As *“the level of awareness on e-learning in the community including me is very low”* (P4, FGD-1), the UoG has *“to start small and expand in time”* (P2, FGD-1). This, the participant continues, means,

“We should assess conditions, including the curricula. Do existing curricula allow the integration of online education? Or, do we need to change it? This should be discussed at the department level. If the top management dumps it on the faculty, they will resist. The management should not prescribe but support and encourage faculty” (P2, FGD-1).

On a related note, students, faculty, and educational leaders appreciate the benefits of e-learning to the academic community and higher education institutions. A participant at MoE, for instance, says, *“Online learning improves the quality [of education], in addition to creating access”* (UoG, KII-2). It, through the use of advanced technology, a CEO at MoE *“enables more interactions amongst students and faculty than traditional classroom-based course delivery”* (MoE, KII-1). Specifically, a full-fledged LMS *“has support and discussion forum involving teachers and students. The discussion forum promotes active engagement among introverted or shy students. They can post their questions or views, which their peers or teachers respond to”* (MoE, KII-1). For the CEO, e-learning will enable students to *“learn, download/view content, submit assignments, etc. from anywhere.”* Students can *“also access information on their academic progress. It supports students in ways teachers cannot – as it is an AI-enabled data system”* (MoE, KII-1).

Students agree: *“E-learning has many benefits. It enables continuity in learning during emergencies like COVID-19 and war. It would also enable working people to pursue their advanced training from wherever they are”* (P5, FGD-2). Another student adds,

“E-learning would have enabled us to continue our studies instead of missing several months due to COVID-19 and the war in the north. To compensate for the lost time, we rushed through content without much understanding or mastery. If e-learning was available, we could have completed our studies within the timeline set in the curriculum” (P6, FGD-2).

On the other hand, students believed that e-learning would create access to higher education for individuals who want to study for an advanced degree without leaving their work or residing on university campuses. For instance, a student remarks that the “*cost of living is through the roofs. E-learning will be a blessing for people to pursue their studies while working. It will have flexible hours that enable them to work on their studies whenever they get the time*” (P5, FGD-2).

Ultimately, e-learning could expand access and increase university enrollment – particularly in fields of studies that students wanted, as it removes space requirements (P5, FGD-2). A student remarked that e-learning will enable students to even pursue double majors (P4, FGD-2).

Though more cautious than students, faculty at UoG also identified advantages to e-learning:

“E-learning will improve educational quality as it replaces the ‘chalk-and-talk’ pedagogy with a smart multi-modality (video, images, texts, etc.) that can be accessed remotely. Soon internet may not be an issue even in rural communities, learning can expand educational access [to members of hitherto marginalized communities] as well” (P1, FGD-1).

A coordinator at UoG-ICT Directorate claims that e-learning will enable students or teachers who are ill or traveling for personal or official reasons to access educational resources like lectures and meet academic requirements. It also reduces the need to move about exam rooms during invigilation to ensure the integrity of examinations (UoG, KII-9).

IV. The status, practices, and experiences of e-learning

The MoE acknowledges that public universities have invested in ICT infrastructures, but e-learning projects are underdeveloped. The MoE is taking steps to “*identify all the necessary policies and guidelines to support the e-learning project.... We also have the necessary resources to support these activities*” (MoE, KII-1).

At the UoG, teachers believed that the status of e-learning was very poor. A director reports that “*UoG does not offer e-learning. Using Zoom is not e-learning. Due to problems or situations, we started using technologies (telegram, zoom, and social media). But that is not online learning*” (UoG, KII-4). A faculty explains,

“We do not have online course content. There is no promoting e-learning at an institutional level, either.... We can say UoG is at zero level in e-learning implementation. At best, UoG is an interested or motivated institution to start e-learning. If the university makes it a priority, I think it may not be beyond its capacity in terms of budget, or logistics” (P1, FGD-1).

Another faculty concurs:

“... My department changed office and we do not have access to Wi-Fi or internet for more than a year and a half. We repeatedly requested the university but the answer is no resource to connect Wi-Fi routers.... We repeatedly requested smartboards. But even maintaining the existing ones is becoming a challenge.... I believe UoG’s stance is weak. It is so weak. It is tested with basic things like acquiring a laptop, Wi-Fi, cable, etc.” (P2, FGD-1).

A coordinator at UoG-ICT Directorate, on the other hand, reports that “some e-learning activities are being implemented. We have an e-learning platform [Moodle] and a high-capacity data center” (UoG, KII-9). He adds, *“The data center needs [a few inputs] to be up-to-date and fully functional.”* Nonetheless, study participants, including the coordinator, confirmed and agreed with other study participants’ claim that none of the virtual lessons offered during the COVID-19 shutdown were integrated with the Moodle platform (UoG, KII-9, KII-4, KII-5, KII-6, KII-7, KII-8).

A faculty also raised the lack of training, support, and inclusion in e-learning tried at UoG during COVID-19: *“When we are requested to use online teaching during COVID-19, no one gave us any training. We are personally trying to access and use [adaptive] technologies. There is no inclusiveness in training on tech and e-learning”* (P7, FGD-1). To illustrate his case, the faculty mentioned an instance involving specialized skill training for teachers with visual impairment:

“We requested the top management to receive JAWS training in Addis Ababa, for there was no qualified trainer at UoG. We were granted permission. But then the ICT department claimed to provide us with the training to save time and money. But when we started the training, the trainers didn’t have proper knowledge of the JAWS software” (P7, FGD-1).

Despite this, the top leadership reports that UoG is currently *“supporting the experiences of the College of Informatics that launched a system for students to write exams, submit assignments, etc. online. We are supporting other colleges to adopt this positive experience.”* In terms of policy framework, the top leadership says, *“Our ICT Policy has a section on e-learning. But it is not sufficient. We need a detailed and comprehensive guideline on e-learning implementation, resource requirements, duties and responsibilities, threats, opportunities, strategies, etc.”* (UoG, KII-3). A dean adds *“The CMHS drafted e-learning guidelines. But it is yet to be approved. It is a zero draft. It leaves many matters unaddressed. We are working to integrate feedback and make the guideline relevant to every academic unit...”* (UoG, KII-7).

Institutional adoption and successful implementation of e-learning require adequate support and visionary leadership. Nationally, the MoE has an ICT and Digital Learning Unit that coordinates and supports the integration of digital technologies both in general and higher education. The unit, a CEO reports, “*aims at creating a resilient educational system to withstand similar disruptions like COVID-19. It will also help us increase access to education*” (MoE, KII-1).

Top leadership at UoG, on the other hand, reports that the university is working to create a system that supports and strengthens e-learning initiatives at the various colleges. He communicated that the UoG has a committee, consisting of representatives from key offices operating at the university, college, and department levels. The Committee monitors and coordinates “*all e-learning-related activities and reports to the AVP. The AVP is its chairperson*” (UoG, KII-3).

Top leadership also agrees that a separate unit to launch and coordinate an e-learning initiative at UoG would be a good starting point (UoG, KII-3). A faculty commented that e-learning at UoG does not have clear rules and standards of operations, which led many to think “*e-learning is synonymous with Zoom, or Microsoft Teams*” (P6, FGD-1). For a dean, consequently, a coordinating unit is necessary to “*evaluate, facilitate, budget, pilot, report, etc. on e-learning activities,*” and prevent “*a disjointed and difficult to monitor implementation*” (UoG, KII-6).

On the other hand, with e-learning being new to the Ethiopian higher education landscape, there are fewer regulatory mechanisms and governing policies to ensure its smoother implementation and success. Faculty at UoG, for instance, was not aware of any policy or manual on e-learning: “*The UoG has not endorsed any e-learning policy. But it has an ICT Policy that contains a section on e-learning*” (UoG, KII-8). The ICT Policy “*contains provisions on e-learning – content development, use, etc.*” (UoG, KII-9). But the Policy needs implementation guidelines to be effective, according to a coordinator at the UoG-ICT Directorate: “*It has been drafted, and we are waiting for the Legal Office of the UoG to review and endorse it before it becomes effective*” (UoG, KII-2). When approved, the ICT Policy implementation guidelines, according to top leadership, “*will address issues related to resources, personnel management, communications, etc.*” (UoG, KII-3).

V. E-learning opportunities

Study participants identified various opportunities for e-learning development in Ethiopia. A CEO at the MoE sees e-learning as a way to expand access to education and offer opportunities for people who want to study while working full-time (MoE, KII-1). The commitment of the MoE to promote and lead e-learning initiatives is an added advantage. The MoE has launched a collaborative project with the support of MCF to facilitate this

engagement (MoE, KII-1), which a director thinks is a great opportunity for the successful implementation of e-learning at UoG. For him, the training that the MoE has been providing to ICT personnel is relevant to upgrading their capabilities as well (UoG, KII-4). The government's commitment to supporting institutions with resources, policies, and strategies has also created an enabling environment for e-learning implementation (UoG, KII-9).

According to a CEO at the MoE, *"all public universities have internal capacities to establish digital multimedia resource centers with minimal support"* (MoE, KII-1). Hence, the MoE focuses on *"supporting them with training, policy instruments, etc."* (MoE, KII-1). Furthermore, as key partners to the e-learning initiative, MoE is embracing universities and their leadership and engaging them productively:

"We informed top leadership in public universities about the e-learning initiative. We will make e-learning obligatory for all public universities, and the system will be accredited. E-learning will be part of the higher learning system – just like HDP and English language training programs. We will be working on the preparatory and capacity-building activities. We will advocate for e-learning and promote positive awareness via workshops and meetings with university leadership and the community" (MoE, KII-1).

In terms of the organization and communication channels of the e-learning initiative, the MoE has "a coordinating office," and directly "connects with public universities via their AVPs who participate in a national forum to discuss challenges and progress on the e-learning initiative. The AVPs will commit their institutions to the initiative, and we will provide sustained support (MoE, KII-1).

At the university level, faculty and students recognize the potential of e-learning to fit the needs of the new generation to be creative, much better than classroom-based learning. A student reported *"We are accessible to creative stuff – and ready to be creative. It is not for everyone, but accepting technologies is much better now. E-learning will fit the needs of the new generation to be creative – much better than classroom-based learning"* (P6, FGD-2). The 2015 Education plan (2022/23) and the MoE 10-year Strategic Plan emphasize the relevance of expanding access through increased use of technology (P2, FGD-1). The ICT infrastructure and personnel willingness at UoG are also conducive to the implementation of e-learning programs. *"I don't think it would be challenging to start now. Once we start, the number of experts might be an issue. We have an adequate data center. We can also migrate course contents from other universities"* (UoG, KII-9). Despite e-learning requiring a "special or additional budget," a faculty thinks that "the UoG can fill the gaps" (P9, FGD-1).

Moreover, COVID-19 has increased technology use and positive interactions between instructors and technology. Faculty members are receiving training on ICT, and there is progress in improving media use skills (P6, FGD-1). *“Now we [15 staff] are attending training on e-learning [that ASU provides] and I understand what that brings to the UoG”* (P6, FGD-1).

VI. National plan for e-learning

In the Ethiopian higher education environment, e-learning is a relatively new concept. It was introduced during the COVID-19 pandemic. *“Our universities were not ready for the challenge”* of switching from class-based teaching to online learning. And, *“COVID-19 taught us we do not have [a resilient] educational system”* (MoE, KII-2). A CEO at the MoE also noted that *“Though there were a few activities in the area, they have not been effective”* (MoE, KII-1). This explains why the e-learning initiative in Ethiopia has adopted the top-to-bottom approach with the MoE taking the lead and defining its trajectory.

In addition to creating a resilient higher education system, the MoE promoted e-learning to promote access and quality education to Ethiopian youth. *“COVID-19 is not necessarily the only pressing challenge to start e-learning,”* the CEO claims:

“The need for better access and quality education are good rationales on their own to start e-learning. Technology can essentially improve the quality of education.

Teachers can provide supportive resources to their students – even when students are on campus. They could adopt a blended approach to teaching” (MoE, KII-1).

In addition,

“Pedagogy has evolved. Students do not need to sit through hours of lectures or be spoon-fed. Relevant educational resources will be stored online, which they can access and read in advance, and come to classrooms ready to discuss contents. Technology can improve the quality of education” (MoE, KII-2).

There is also a national program goal that justifies investment in e-learning as a strategy: the CEO highlights the 8-percentile deficit in the higher education GER as envisaged in GTP-2 and argued the impossibility of increasing university enrollment and meeting the goal *“relying on the conventional model whereby universities provide on-campus residence and services to students.”* The CEO adds that launching *“evening, summer, etc. programs won't do much to create the level of access we are aiming at either”* (MoE, KII-1).

Consequently, the MoE vigorously promotes e-learning. When the government started taking precautionary measures to tackle the COVID-19 pandemic, the MoE identified e-learning as a platform for educational institutions to continue the teaching-learning

process. A CEO recalled, *“We collaborated with HERQA and approved a guideline on e-learning that private universities adopted subsequently. But we target public universities to launch e-learning and expedite their accreditation process”* (MoE, KII-1).

And, to ensure universities fulfill all the requirements and provide good quality e-learning, “universities and ETA (the Education and Training Authority) will strictly monitor and regulate the system and its functioning.” The MoE is also working towards mainstreaming e-learning and credentials obtained through e-learning. E-learning is a new thing. It is a challenge as “The Civil Service Authority does not know it” (MoE, KII-1). The public and policymakers may think e-learning is similar to distance learning, a platform that has lost credibility due to a long run of poor-quality performances. Another leader at the MoE reported,

“Distance education is no longer used internationally; it is only practiced in Ethiopia. With the availability of technology, the internet, etc., you do not opt for distance education. It has become an outdated system to send educational materials via the post office and conduct education and learning effectively. We are working towards eliminating distance learning in Ethiopia as well – and replacing it with online learning” (MoE, KII-2).

On the other hand, the e-learning initiative has two components: pilot and expansion programs. A CEO explained, “We will provide universities with one of the best open-sourced and indexed online learning platforms, tech resources, training, and policies and regulations” related to e-learning (MoE, KII-1). In terms of a timeline, the CEO reports

“This year [2015], the objective is to start the training of personnel from 10 universities – including first-generation universities – TOT – which will be cascaded at the university level. The MOE – in partnership with MCF (and we also have other support from the World Bank – Digital Foundation Project) – will provide the TOT. The WB project is not exclusively on e-learning but on general technology support for ICT infrastructure. The MCF supports the software – the training – part of the online learning project.... The government has also budgeted for this project” (MoE, KII-1).

The overall plan of the country regarding e-learning is to “enable all 50 public universities to have LMS within the next 5 years” (MoE, KII-1). This will be realized through the five-year 22 million USD e-learning initiative between MoE and MCF. The initiative starts with five universities – Bahir Dar, Jimma, Addis Ababa, Dire Dawa, and Hawassa – that “represent clusters of public universities [North, West, Center, East, and South].” The MoE will support them by establishing multimedia resource centers/studios to develop digital course content. The pilot will be replicated at all public universities and within 5 years “the

five universities will receive e-learning accreditation, their experiences will be scaled up in the remaining 45 universities and own their program, and the MoE will relegate itself to a coordinating role” (MoE, KII-1).

VII. Leadership – key to successful e-learning initiative

The importance of leadership in e-learning initiatives cannot be overstated. The success of these initiatives heavily relies on the commitment and support of university leadership. However, there have been observed variations in leadership commitment at UoG over the years, with declining commitment leading to a loss of early initiatives (UoG, KII-9). Routine leadership changes and shuffles have also disrupted organizational and leadership priorities, further weakening support for ICT development (UoG, KII-4).

One of the main challenges facing the e-learning initiative would be a lack of leadership commitment and willingness – more than a lack of finance. As to a coordinator, funds could be identified to purchase necessary equipment, but the leadership has repeatedly declined such requests, leading to a lack of progress in promoting e-learning at the institutional level (UoG, KII-2). UoG faculty agree with this assessment of the university leadership’s commitment: *“There is no progress taken to promote e-learning at the institutional level”* (P1, FGD1). Another faculty adds “I believe that the university stance is weak. It is so weak. It is tested with simple and minimum things like acquiring a laptop, Wi-Fi, cable and resource mobilization” (UoG, KII-5). Contrastingly, a CEO at MoE observes that *“They [university leaders] want the e-learning system as well. I think the problem is not their commitment but the knowledge/skills required to run it – this is the gap we have seen among university leadership”* (MoE, KII-1).

Effective leadership also involves soliciting and galvanizing the support of internal and external partners to successfully implement programs. In the case of e-learning initiatives in Ethiopian higher education, key partners and stakeholders operate at the national and institutional level, including the government, MoE, Universities, HERQA, Mastercard Foundation, World Bank, Arizona State University, EthioTelecom, Ethiopian Electric Power Corporation (MoE, KII-1). These partners and stakeholders are involved in various capacities, such as training human resources, creating/acquiring content, providing technical and financial assistance, ensuring a reliable supply of internet and power, and managing waste (MoE, KII-1).

VIII. E-learning, education quality, and learning experience

Different stakeholders responded alternatively to the perceived impacts of e-learning on higher education quality and students’ learning experiences were received variously by different stakeholders. A participant at MoE argues that e-learning improves both the quality

of education and students' learning experience (MoE, KII-2). He explains that the academic community's fear of e-learning stems from the challenges and poor implementation of e-learning during the COVID-19 pandemic. A CEO at MoE adds that the e-learning initiative currently being implemented will utilize an advanced LMS platform that would enable superior quality of education and learners' experience compared to the traditional, physical, and face-to-face learning sessions (MoE, KII-1).

However, students at the UoG expressed reservations. Students argued that e-learning reduces opportunities for physical and interpersonal contact, eliminates different ways of human engagement (P6, FGD-2), and undercuts teachers' ability to assess whether students understand their lectures (P3, FGD-2). One student suggested that e-learning could create a distance between teachers and students, reduce participation in discussion, create a challenge for teachers to teach certain courses, and undermine social and cultural exchanges that usually happen in university settings (P1, FGD-2). Other students expressed a concern that e-learning could be easily manipulated by students to fake their attendance without actively attending classes or cheating during exams (P1, FGD-2; P5, FGD-2).

The faculty reported that infrastructural factors could affect the quality of learning and students' experience of e-learning:

“Students living in Woredas [rural or semi-urban localities] with no network and frequent internet interruptions complain about their experiences with e-learning. UoG has good connectivity, but what about places where students live or work? There are also Woredas where there is no electricity.... Because of this, students complain about the poor quality of e-learning. Students also complained about peers writing exams in groups [cheating]. Several students made similar complaints to me” (P6, FGD-1).

A director was upbeat about the prospects of e-learning in promoting educational equality and access: “The type of [educational] tech we choose will be accessible from remote areas” (UoG, KII-8). Another key informant commented on successful e-learning as a real possibility in the future, for “internet may not be the issue (in 3 to 4 years) even to rural communities. It is also possible to use them with weak bandwidth and access and share resources offline” (UoG, KII-4).

IX. E-learning and equity in access

The Ethiopian higher education system has always had problems with equity, relevance, and efficiency (Abera & Murugan 2018). Study participants also raised issues that underline the challenges of using technology in a society with significant digital divides along the lines of socioeconomic status, residence (rural-urban), gender, etc. For instance, a

faculty reports, *“Students are complaining ... that they cannot attend online classes, for they live in rural areas, or that they do not have computer skills and resources, or that they experience frequent power outages and internet interruptions, etc.”* (P6, FGD-1). The challenges are more profound for girls than boys in rural areas due to the burden of unbalanced and gendered roles in household and community activities (P3, FGD-2).

According to a participant, *“Online courses did not consider students with disabilities. For instance, if you send pictures for blind students, it is not useful [accessible to them]”* (P6, FGD-1). Another participant (P2) agrees: *“If such technologies are not sufficiently accessible, it will be difficult to start e-learning”* (P2, FGD-1). A participant with visual impairment complained about the lack of JAWS software application and training for students and faculty with visual impairment as an important challenge to implementing e-learning at UoG. He complained that even faculty with visual impairment *“don’t have original JAWS software. We use a cracked version we obtained via our networks and people living abroad. No Ethiopian with a disability knows the software well still”* (P7, FGD-1).

According to a CEO at MoE, the e-learning initiative intends to create an LMS platform with assistive technologies that support students with disabilities. By default, it will integrate technologies that support learners’ individual needs. The CEO explains, *“The LMS supports accessible content. We do not, however, provide end-user devices to students with disabilities. They have to get the support they may need to access and use the LMS on their own”* (MoE, KII-1).

The MoE-led e-learning initiative aims at creating “access for those who can afford it.” The MoE does not “offer extra support like scholarships.” Nonetheless, the CEO remarks, *“Universities can award scholarships or assistance to students who may need it but not at a national/government level – like the partial scholarship of cost sharing”* (MoE, KII-1). However, students with disabilities and those from rural areas who cannot afford laptops or reliable internet connectivity may face challenges.

Furthermore, economic differences among students also present a challenge in accessing technological devices and facilities (P2, FGD-1). E-learning synchronously or asynchronously will create an imbalance, and *“the poor may become poorer while those with access may have more accessible resources”* (P2, FGD-1). As to the CEO at the MoE, however,

“The digital divide is already created nationally and globally. It is related to our poverty.... The digital divide, poor access to the internet, low coverage of EthioTelecom, expensive internet costs, etc. are our national problems. But it won’t compromise the quality of e-learning. These factors may disadvantage some students but we cannot do anything about it. It is only those who can afford it could enroll in e-learning” (MoE, KII-1).

X. Challenges of e-learning

E-learning is an increasingly popular alternative to traditional classroom-based learning, especially due to the COVID-19 pandemic. However, the successful implementation of e-learning initiatives faces many challenges. At Ethiopian higher education institutions, challenges have been identified by various stakeholders, including university leadership, faculty, and students.

The first and primary challenge of e-learning is inadequate ICT infrastructure and personnel. Although many universities have invested in ICT infrastructure, they do not have a well-developed digital center, advanced LMS, or other resources necessary to start e-learning (P1, FGD-1). Technical factors are a significant concern, including data center capacity, processing and storage capabilities, reliable wireless and wired network systems, and support systems (UoG, KII-3). There are serious concerns about the capacity of the institutional ICT system to handle the online activities that e-learning would entail. At the UoG, *“The IT system capacity is a challenge. It gets slow when a large number of students log on to register online”* (UoG, KII-3). In terms of personnel, the current ICT staff may not be sufficient to run full-fledged learning programs, and even the available staff will need further training to calibrate their skills and competencies in e-learning (UoG, KII-2).

The second challenge of e-learning is inadequate digital literacy and staff willingness. Many faculty members lack the digital skills required to develop multimedia course content, such as videos and images, that are essential for e-learning (P1, FGD-1). Similarly, students have limited tech skills, and computer lab and library staff are not supported by training to help them improve their skills (P1, FGD-1). According to a CEO at the MoE, *“There could be resistance from the old guard in universities... due to lack of capacity, skills, or awareness of its benefits”* (MoE, KII-1). In addition, *“a small survey during COVID-19 found that teachers’ language skills might not be up to standard despite their mastery of the subject matter for, for instance, recording online course contents”* (MoE, KII-1).

The third challenge is access to affordable and necessary tech devices such as laptops, tablets, and smartphones. The current inflation may worsen this device access challenge (P5, FGD-2). A student reports, *“Most students have phones with keypads. They use desktops at libraries to access digital content”* (P1, FGD-2). For faculty, the challenge of implementing e-learning at UoG is its technology-intensive nature: *“Each student should have a computer or smartphone (P1, FGD-1). Furthermore, teachers require digital rooms fitted with necessary devices including a computer, camera, etc. to prepare digital content for their courses. But “UoG has not bought laptops and computer accessories in the past 3 years” (P1, FGD-1). As it is known, not all students have access to smartphones, laptops, or computers. The main challenge of e-learning is access to resources (UoG, KII-3).*

The fourth challenge is access to reliable electricity and internet connectivity. As to a student at UoG, *“Connectivity will be a major challenge to e-learning. Power interruptions and outages are frequent. The university has to consult with EthioTelecom and EEPCo and find solutions before starting e-learning”* (P5, FGD-2). A faculty concurs, *“Since we are not confident in internet connectivity, we submit students’ grades both online and in print”* (P6, FGD-1). The faculty adds, *“We struggle to maintain stable internet connectivity to complete simple administrative procedures like registering students, uploading students’ performance reports, etc.”* (P6, FGD-1).

The fifth challenge is the lack of an adequate and comprehensive incentive mechanism to incentivize academic and technical staff involved in e-learning. One of the repeated issues that teachers raised about e-learning – and an issue that university and ministry leadership understand – is the issue of incentives. A CEO at MoE appreciates this fact: the implementation of e-learning initiative needs to address the issue of “incentives for teachers who develop digital content for courses.... As it currently stands, developing digital content for e-learning is not in the duties of teachers. So, they ask why they invest time and energy in such demanding engagements” (MoE, KII-1). Though the MoE attempted to meet this request, the CEO adds, “teachers declined to accept the proposed incentives mechanism for being small” (MoE, KII-1). A faculty at the UoG also suggests: “Copyright and incentives for content creation may hinder effective implementation of e-learning (P1, FGD-1). A coordinator at UoG-ICT Directorate reiterates that teachers’ demand for incentives – in the form of monetary compensation or reduced teaching load – and copyright ownership may force e-learning activities to a halt as their request did not receive a satisfactory response from university leadership and MoE (UoG, KII-2). The MoE believes content should be in the public domain and is working on a policy and an incentive scheme to address the issue (MoE, KII-1).

XI. What needs to change?

Participants believe that the following are the key areas of development:

- Improve technical and language skills through *“intensive and adaptive training and a dedicated budget for a time-bound e-learning program”* (P1, FGD-1).
- Improve staff willingness and awareness through training and orientation programs on *“the importance of e-learning, the quality control features on the LMS, scenarios for e-learning application,”* (P4, FGD-1), “experiential learning” (UoG, KII-3), and “opportunities for online learning” (P2, FGD-1).
- Find solutions to power outages and poor connectivity through *“third-party communications with EthioTelecom and Ethiopian Electric Power Corporation (EEPCo) and installing backup generators in all campuses”* (UoG, KII-3).

- Resolve teachers' demand for incentives, including monetizing e-learning and using student tuition fees to compensate for content creation (P2, FGD-1).
- Conduct institutional assessment on existing "*capacity, resources, strengths, and weaknesses*" (P2, FGD-1) to implement an e-learning program.
- Institutionalize a system of coordination and participatory planning for a feasible, inclusive, and quality e-learning program, including creating a specific department tasked with designing, coordinating, implementing, and monitoring.
- Create leadership commitment, strategy, and vision that "*create a favorable system of continuous and sustained capacity building, human resources, and infrastructure development*" that are necessary for e-learning (P4, FGD-1).
- Contextualize institutional e-learning programs to the national context, agenda, and priorities with an "*e-learning roadmap that considers these systemic conditions – and informs specific policies, strategies of implementation, etc. for the coming 10 or 20 years*" (P5, FGD-1) as well as "*identify e-learning as a strategy to improve education quality and access rather than “a short-term fix for a crisis like COVID-19”*" (P2, FGD-1).
- Formulate an e-learning policy that will serve as a governing document, or standards of operations on e-learning related issues, including open-access publishing, non-commercial use of online educational materials, etc." (P2, FGD-1).

XII. Where change should start?

The successful launching and implementation of e-learning require careful consideration and planning. Study participants identified various priorities and undertakings to ensure the smooth implementation of e-learning.

One important consideration is addressing the challenges that may arise before starting e-learning. Participants noted issues such as how to assist students with disabilities, providing access to content for those living in rural areas, dealing with power interruptions, and ensuring students can acquire expensive devices (P5, FGD-2). To prevent these challenges from becoming obstacles, they recommend addressing these problems beforehand.

Additionally, most participants agree that e-learning should start small and scale up over time, drawing on the lessons learned. A blended approach to e-learning is recommended as it allows students to adjust to the requirements of e-learning, and the university can create a proper level of awareness in the academic community without risking system failure (P2, FGD1). However, for a blended approach, there needs to be a thorough exploration of institutional capacities such as personnel, ICT infrastructure, and leadership. It

is also important to pilot e-learning with students residing on campus to evaluate capacity and protect the system from significant disruption (P2, FGD-1). The assessment process should be participatory, involving faculty members' active participation, which generates support and creates proper awareness at the grassroots level. An alternative way for the university to assess its e-learning capabilities is to offer selected courses rather than entire programs through e-learning (P2, FGD-1). Course design and delivery are also essential aspects of successful e-learning implementation. Participants recommend starting with course design, identifying courses that can and cannot be given online, and developing course content (P6, FGD-1).

4.2. Rwanda: University of Rwanda

At the University of Rwanda (UR), 14 participants with different leadership roles participated in the interviews for this study. Their positions range from college principals to heads of campuses, directors of centers, and division managers. For participants' anonymity, their names and contacts are not disclosed anywhere in this report. The interviews took place from December 2022 to February 2023. The key findings from the interviews in line with this study to understand the implementation of e-learning in low-resourced university settings are presented in the sections below.

I. Leadership Perceptions on E-learning

This study was interested in understanding how leaders at different strategic levels of the university interpret e-learning. The findings indicate that most leaders understand what e-learning is and its improvement for modernizing the way universities provide education. The interview results also show that the level of leadership understanding of e-learning encompasses its technological, pedagogical/instructional, and content aspects. Reflecting on these three aspects, a respondent, for example, said

“E-learning refers to the use of electronic technologies to deliver educational content and support the learning process. This can include a wide range of tools, such as online course materials, video lectures, virtual classrooms, and interactive learning activities. E-learning allows for access to education from anywhere and at any time and can be used to supplement traditional in-person instruction” (UR, KII-12).

Reading from his statement about e-learning, it can be posited that leaders at the strategic level of the university have a clear knowledge of e-learning, which in turn could be an asset for the university to implement appropriate technologies and ensure relevant instructional design principles are established to develop effective digital contents and ensure a conducive online learning environment.

Leaders interviewed in this study have also attached a considerable level of perceived improvement of e-learning for today's higher education systems. Another extract from the responses of one interviewee can also clarify this by eliciting that:

“E-learning practices have improved at UR because of the COVID-19 pandemic. For instance, before COVID-19, we had only 5% of good uploaded modules on the UR e-learning Platform, and the UR e-learning Platform was not updated. Due to COVID-19, more than 90% of Uploaded modules are of good quality, and the lecturers, as well as students, improved in terms of blended learning skills. The UR e-learning platform has been improved, and specialized plugins have been installed and configured” (UR, KII-11).

Several participants in this study at UR appreciated the efforts made by the university during COVID-19 to upgrade its e-learning management system by training staff, creating an awareness of the available technologies, and developing and uploading the learning resources, including teaching materials, soft books, lab reports, and other creative commons learning contents. However, the findings indicate a slight decline in the pace of using e-learning after COVID-19 strict measures, which may reduce the students' and teachers' momentum to keep using the available e-learning platform.

II. Perceptions of Current Status and Practices Related to E-learning Development

It was realized from the interviews, that several faculty staff have refrained from resisting the use of e-learning in their daily teaching activities, which is positive, while the university policy envisioned running its academic programs in a blended mode of teaching. However, this may vary from individual to different support systems put in place by the institution. Illustrating the above, one of the interviewees said:

“The attitude of the faculty staff towards integrating technology into their teaching can vary. In the beginning, some were hesitant or resistant to using e-learning, while others were eager to adopt e-learning. Factors that can influence a faculty member's attitude towards e-learning include their level of comfort and experience with e-learning, their perceptions of its effectiveness, and the resources and support available to them. With time, the level of resistance to using e-learning has significantly decreased, and as of now, none is resistant” (UR, KII-12).

From the above statement it is clear that the current changes in e-learning consideration are due to different factors but what is good is that some of the interviewees have reported that despite the decrease in e-learning adoption during the post-COVID-19 period, there are ongoing activities in the UR relating to e-learning and these activities can

be seen as boosting strategies towards the use of e-learning. Like, one of the respondents has reported that:

“Some initiatives would boost the use of e-learning, for instance, the multi-media studios that are being constructed in different campuses (Huye, Busogo, Rukara) and the ongoing Project of the Priority Skills for Growth (PSG) which is expected to set up 10 smart classrooms and smart labs with the possibilities of virtual labs and the Master-card foundation project which is supporting students to get laptops and other digital tools to use in e-learning, among others” (UR, KII-7).

The above confirms that despite any change in the use of e-learning at the UR, several ongoing initiatives may reboot the e-learning adoption.

III. Considerations of E-learning for People with Disability

This research went further to explore and understand the level of inclusivity for E-learning and how different categories of disabilities are taken care of. From the findings, it was reported that efforts have been made to ensure disability inclusion. This is supported by one participant who explained as follows:

“For e-learning, there are some resource rooms on the campuses where we have students with disabilities (Huye, Rukara, and Nyagatare campuses). We equipped those resource rooms with assistive technologies that help the students to learn easily. Some lecturers have also been trained to manipulate those technologies so that they provide good services to those students” (UR, KII-11).

However, another respondent clarified that there is a scarcity of tools tailored to supporting teachers and students with disability. However, some leaders at the UR are optimistic that the COVID-19 pandemic has opened more room for improvement to ensure that online education at this university is more inclusive than before the pandemic.

One interviewee, for example, had to clarify that "Faculty and students with disabilities are constrained by insufficient tools and connectivity for working at a distance" (UR, KII-7).

It was also reported by some respondents that the university, under the support of the Mastercard Foundation program, is planning to undertake an accessibility audit and the types of disabilities among the university community across all its campuses. This audit, according to the respondents, aims to provide information on the inclusivity level when it comes to both face-to-face and blended learning environments, which in turn inform strategic decisions for systems upgrades.

IV. Creation of E-learning awareness and readiness for adoption

From the interview reports, it was observed that e-learning awareness and readiness for adoption were addressed at the institutional and national levels through policies and other government documents. One of the interviewees has reported:

“Yes, e-learning is catered for at the institutional level (at UR we have a LMS that CODeL manages), there is even a Distance Training Program where Diplomas in Education are delivered via e-learning but in blended mode. (2) The UR established instruction for blended learning, (3) all programs designed at UR should ensure that the Teaching and Learning assessment will be in blended mode (e-learning is embedded), (4) UR adopted 2 tools to ensure the quality of online teaching and Learning Assessment (story Board and template to design the online module). At the National level e-learning was embedded in the Education Sector Strategic Plan 2017/18-2023/24 and in NST1, whereby integration of ICT in Education was considered as one of the strategies to have a knowledge-based society” (UR, KII-14).

The above statements of one of our interviewees show that there is a positive will toward the adoption of e-learning. The goodness of it is that the will is not only at the institutional level but there is a political will as well where the adoption of learning was captured in national documents.

V. Challenges of E-learning Development

The interviewees have a good understanding of challenges related to E-learning development at the institutional level and in Rwanda in general. The main identified challenges include but are not limited to technological, pedagogical, content-related, individual, institutional, and policy levels. This can be supported by the statement of one of our interviewees who said: "We have policies taking into consideration Teaching and learning in general. However, e-learning is not explored as deeply as new education trends. However, some guidelines give the place for e-learning but not in detail" (UR, KII-14).

While the above interviewee focused on the policy side, another interviewee reported technology-related challenges by stating that: "Some of the challenges are: issues related to network, connectivity; a limited number of computers to be used by all users; Some students who may not have an easy access to the internet if they are in remote areas" (UR, KII-9).

In short, the main identified challenges of e-learning at the UR can be summarized and presented in the table below.

Table 1: Summary of identified challenges to E-learning at the UR

Challenge	Manifestations	Impact on E-learning	Keynotes
1. Technological	<ul style="list-style-type: none"> - Low Internet - Limited access to technology - Computer Literacy 	High	Not all students and academic staff have access to the necessary technology or internet connectivity to participate in e-learning.
2. Pedagogical	<ul style="list-style-type: none"> - Lack of interaction 	High	Online learning environments sometimes lack the social interaction and sense of community present in traditional classroom settings.
3. Content-related	<ul style="list-style-type: none"> - Limited opportunity for hands-on training 	Moderate	E-learning programs may lack resource centers where students and staff receive training, access resources, etc.
4. Institutional	<ul style="list-style-type: none"> - Limited support - Monitoring of Blended learning - Limited funding for full e-learning updates at all colleges and all campus - Lack of clear e-learning strategy 	Very high	<p>Students sometimes have less access to support services such as academic advising or tutoring in an e-learning environment.</p> <p>Disparate level of support and use of e-learning from one campus to another, from one faculty to another.</p> <p>There are many eLearning initiatives, however, how they converge is still not clear. Most of the initiatives end up being implemented on a pilot or project basis</p>

Challenge	Manifestations	Impact on E-learning	Keynotes
5. Individual	<ul style="list-style-type: none"> - Distractions at home - Resistance to change 	Low	<p>Students have a harder time focusing on their studies at home environment with potential distractions and competing responsibilities</p> <p>People also view E-learning as inefficient compared to traditional teaching and learning formats.</p>

From the above table, it is clear that even though some progress was made toward the adoption of e-learning, there is a range of challenges to E-learning at the UR.

VI. Plans and strategies for the future of E-learning

It was noted that there is hope for the success of e-learning in the future and plans are in place to make sure that this will take place. The University has put in place some initiatives for the future success of e-learning. In addition, policymakers and managers of the institution are in support and have a good understanding of what is needed to be successful going forward. One of the interviewees reported that "embarking on e-learning is a journey that started and that should not be abandoned by partners or stakeholders. It needs more budget, more training, and, of course, a clear e-learning strategy for effective implementation" (UR, KII-8).

From the above report, it is clear that more investments in the area of ICT are needed for the success of e-learning. Those include, for example, financial investment and empowerment through the provision of training of faculty and administrative staff. Apart from that, it was also argued that the future of E-learning will be shaped by the collective efforts of different partners that are needed to make it happen. There is a need to raise the level of confidence and belief that the implementation of e-learning can work as an educational norm. One of the interviewees called for a collaborative approach: "To be effective, all partners need to work on reducing the constraints to an effective implementation of the e-learning policy..." (UR, KII-3).

From a large number of interview reports, it is clear that the future of online education will be shaped by augmented efforts in considering the realities of virtual learning initiatives so that the university can continue providing courses online within a blended learning

environment as approved by UR. Afterward, this could be possible through collective efforts and more investments in the sector of ICT by importantly considering public-private partnerships.

VII. Partnership for E-learning development initiatives

Interviewees' perceptions of partnership for e-learning development initiatives are centered on an optimistic point of view that all actors, partners, and stakeholders should come together for e-learning development activities. However, some interviewees have argued that it is very crucial to have a common understanding of existing policies and facilities before their use. This can be supported by one of the reports, which read "People must be aware of the policy and provide some clarification before its implementation" (UR, KII-13).

This makes it clear that there is no conflict of interest in partnering, but collective knowledge is a key factor to a successful partnership. In other words, working together has been perceived as a contributing factor for the successful creation of new initiatives in the area of E-learning, which may boost even the visibility of the University and the country as a whole. This is supported by one of the interviewees who said: "I am predicting complementarity among stakeholders where they will all converge to ensure the enactment of E-learning at the UR. A digital UR will sell the image of Rwanda, and it will do so through proper usage of e-learning best practices." (UR, KII-7).

The above perception shows how the use of e-learning may benefit people even beyond the institutional level, which makes it a good area of investment for the country to sell its image as well.

VIII. Changes toward effective E-learning uptake at UR

From the findings presented above, this study at UR has highlighted the state-of-art in terms of current practices and challenges that hinder the effective integration and adoption of e-learning at UR. Researchers mainly recommend that E-learning is here to stay and thus, it is for the UR to ensure its high-level readiness to embrace new technologies that the market has to offer and put in place an inclusive e-learning strategy that drives both technological, pedagogical, and human enablers.

In addition, participants from UR find it important to embrace e-learning following a systematic process for up-taking e-learning, starting from small units and programs over time and then moving on as per the availability of the means. Also, the university must ensure that the basic ICT infrastructure, such as internet, and computer access (to both students and teachers) are available before embarking on blended or fully online teaching and learning approaches.

The UR should also create mechanisms of staff motivation and awareness of available digital tools in the institutional e-learning environment. The leadership has a high responsibility to ensure that the operational levels, such as teachers, students, and administrators, can co-creatively take part in the entire development of e-learning across the institution. Findings from this study indicate that can be done when there is a clear top-down organizational e-learning structure.

5. Discussion

The researchers explored the level of leadership understanding of e-learning, the practices of e-learning, and the associated challenges to e-learning design and implementation at both institutions. In Table 2 below, we reported these challenges under five main categories: technology, pedagogy, content, leadership, and culture.

Table 2. Comparison of reported challenges to e-learning uptake at the UoG and UR

Themes	Challenges	UoG ²	UR
Technology	Poor internet connectivity	***	***
	Shortage of affordable, accessible devices	***	***
	Limited ICT system capacity and manpower	***	***
	Unreliable power supply	*	*
Pedagogy	Lack of interactive, adequate online learning materials	**	**
	Inadequate training for staff and students	**	***
	Poor accessibility and inclusion	**	**
Leadership and policy	Inadequate or no e-learning strategy, policy	**	***
	Lack of leadership, institutional commitment	**	*
	Inadequate or no ICT technical support	*	*
	Inadequate or no funding, budgeting	*	**
	Inadequate or no coordination, monitoring, or evaluation	**	***
	Lack of equity and fairness in access	***	**
	No copyright and incentives mechanism	*	*
Culture and skills	Fear, suspicious of e-learning or tech	**	*
	Change resistance or technophobia	*	*
	Lack of awareness, willingness to adopt	***	***
	Lack of e-learning models, champions, or experience	**	*
	Poor digital literacy	***	**

² The stars in this column reflect the relative count of mentions implying the severity of the corresponding challenge as per study participants. The stars were based on standardized scores for the counts of

mentions participants made regarding the corresponding challenge (High=3stars; Medium=2stars; Low=1star).

As can be observed from Table 2, the findings indicate that both institutions are affected primarily by challenges related to technology infrastructure and pedagogy.

Inadequate ICT infrastructure, including poor internet connectivity and devices (laptops), was the highest reported challenge that may hinder the implementation of e-learning initiatives at UR and UoG. Accordingly, most leadership-related challenges, such as lack of leadership commitment and unclear/no e-learning strategy, were reported as high or medium risk factors. Pedagogy-related challenges such as inadequate teacher training and poorly designed courses (mainly lacking inclusivity) were also revealed at a higher level at the two case study institutions. Culture-related challenges such as resistance to change and low digital and language literacy among teachers and students are also issues not to be ignored when planning for e-learning uptake.

6. Conclusion

The study participants noted that Ethiopian and Rwandan institutions of higher learning (IHL) started to seriously consider the roles of e-learning or any internet-assisted learning in their teaching and learning process only following the suspension of classroom-based teaching due to COVID-19 restrictions. At the time, most public IHLs had ICT capabilities. However, they were not prepared in such a way that the switch could be made from classroom-based learning to e-learning. They, for instance, did not have the necessary e-learning platform (in the case of UoG), digitized and standardized course content, or level of willingness, awareness, and readiness to make the switch smooth and effective. For UoG, the escalating war in the northern part of the country was an added reason to seriously think about e-learning. The UoG closed its campuses and sent students to their families for months when safety concerns arose due to the expanding war. This was an added impetus to push for the regular use of e-learning.

At the national level, both in Rwanda and Ethiopia, the Ministries of Education pushed for creating a digital library and making course materials available for students online. In Rwanda, the Ministry of Education issued directives to implement e-learning, and the UR being the only public university in Rwanda supported the e-learning effort across its 6 colleges and 11 campuses distributed across the country and the secondary schools' e-learning uptake. In Ethiopia, the MoE (then MoSHE) initiated and supported the adoption of e-learning in public universities. It coordinated with the public IHLs and planned to gather course materials for, ideally, all courses offered at undergraduate programs and host them on their learning platforms. But this initiative faced serious challenges from the start,

including internet connectivity issues, lack of an incentive mechanism – or, its inadequacy – specific guidelines or template for authors, etc. Consequently, though a good start, the contents hosted on the learning platforms lacked quality, structural uniformity, etc. Several studies reported similar findings for developing countries (Osubor and Chiemeka 2015). Contrastingly, a quantitative study reported incentives being insignificant to e-learning adoption in Ethiopia (Ayele and Birhanie 2018).

Regardless, the MoE and the respective public IHLs advised undergraduate students to visit the learning platform, and download and read course materials while they were away from campus. The advice, again, lacked expectations, supervision, and guidance, and the students were left to their own devices somehow.

For graduate students, IHLs employed internet-assisted learning. The Universities provided access to Microsoft Teams and other similar facilities as tools – and they also provided orientation and basic training to key ICT personnel as a start-up. The regular faculty, however, were not trained, and when training was available, it was inadequate to equip them with the skills necessary to utilize the available resources. As directed, the faculty tried to resume graduate classes using various internet-based platforms and applications like Zoom, Microsoft Teams, WhatsApp, Telegram, Facebook, Gmail, Webex, etc. They used these to share course content or conduct online classes.

The COVID-19 pandemic came with poor internet connectivity in many of the non-urban areas. Both students and faculty faced serious challenges in fulfilling course requirements. The HLI pushed forth regardless. They focused on graduating their graduating class students on time but this came at a cost, i.e., quality of education.

The challenges the academic community (faculty, students, and technical staff) experienced during this period influenced their current view towards e-learning and its adoption in HLI. They expressed their concerns about the institutional capacity, leadership commitment, and the levels of digital skills and tech savviness required of the academic community to effectively implement e-learning at the UoG and UR. They, hence, felt that several foundational and necessary activities require priority before the Universities launch any e-learning programming.

Nonetheless, the academic community has a generally positive view of e-learning. They also understand the need for both universities to invest well in key areas to build their capabilities to effectively implement e-learning programs. These areas of investment included building ICT infrastructure, training staff on digital skills, raising awareness, and ensuring reliable access to electricity, connectivity, etc. If these foundational activities are carried out effectively, they believe, e-learning has several opportunities for successfully initiating and implementing e-learning, including a receptive academic community, positive

policy environment, high-level commitment to the e-learning agenda, supportive education partnership, etc.

On the other hand, there is significant confusion about e-learning among the members of the academic community – what it is and what it is not; its benefits and risks; its implementation strategy; its requirements; etc. Many people struggle with the idea of e-learning and how it differs from any other form of technology-assisted learning such as online learning. For instance, as a participant put it, there are faculty that equate e-learning with using an internet-based application like Telegram, Facebook, etc. to share educational materials with students. Not only are there gaps in skills and awareness relevant to e-learning among the academic community, but there also seems to be an inadequate leadership commitment to drive e-learning uptake and investment in e-learning technologies as well as to mitigate existing challenges. The levels of institutional commitment and actual investment in ICT infrastructure, e-learning technologies, capacity building, awareness creation, etc. are observably inadequate, especially when compared to the scale of the variety of initiatives being planned in both the case study institutions.

To a larger extent, all these challenges are attributed to Inadequate (or no) coordination, monitoring, and evaluation of e-learning initiatives. There is still a need for the proper integration of various initiatives and practices and the development of incentive mechanisms to support both academic staff and students.

7. Recommendations

This study found that the UoG and UR must engage in various activities to ensure equitable and inclusive access to e-learning for students of diverse backgrounds. Specifically, they have a long way to go to ensure students of different sexes, disability statuses, socioeconomic statuses, and places of origin/residence, among others, have equal opportunities to join the e-learning initiative and pursue their studies. In the case of Ethiopia, the MoE designed an e-learning initiative that does not prioritize equity and social justice. In other words, any support students may need to access e-learning opportunities due to their disability status, poverty, or rurality must come from the respective IHLs implementing the specific program. The MoE is clear about this. The UoG is responsible for ensuring that the initiative is inclusive, accessible, and fair to all youth – and becomes a mechanism of intergenerational replication of structural disadvantages.

For the case of UR specifically, based on the findings of this research, it can be recommended to put much emphasis on creating an eco-system of E-learning development to ensure that the efforts made by the university during COVID-19 are left behind with no positive change. Also, UR should prioritize scaling up advanced training on pedagogical and online instructional designs and increase internet and access to digital devices for its

community. For these E-learning initiatives to be successful, UR should establish an inclusive institutional E-learning strategy that may serve as a reference for partners through the E-learning transformation journey.

There is a need for both institutions to keep investing in the use of e-learning during the post-COVID-19 lockdowns because it seems like after the pandemic, there has been a decline in the use of e-learning tools. Several teachers have taken a step back to traditional four-wall teaching settings. With this lack of mechanisms for e-learning sustainability, its continuity may be a serious issue that may result in a loss of investments.

8. Limitations of the Study

This study faced several challenges or limitations, including time constraints, financial support, and availability of key informants.

This study required time to organize visits between both universities to understand the contextual background. Then, we should have organized validation and dissemination of findings workshops of schools and government levels in charge of education either at the sector or district level. Addressing this issue, the research team tried to organize virtual meetings to optimally use the available time.

The research is always expensive since it requires some fees for transport and communication, facilitation fees to research assistants, and other planned research activities until the final report is ready. The research faced this issue in primary data collection. The research team tried its best to use available funds to complete the research tasks accurately.

9. Contributions of the Study: Scientific and Programmatic

This study was carried out in an area of e-learning and educational technology where related research is still scarce. It is therefore important that this research has contributed to the existing body of knowledge on how e-learning is being developed within the case study institutions. Once funded, this report may be upgraded to a scientific paper and published in a scientific journal, which may increase the chances of reaching a more scientific audience.

From a practical point of view, this research has revealed several aspects such as challenges and current practices of e-learning initiatives at the UR and the UoG. Hence the findings of this research could form the basis for decision-making in line with how leaders at these two institutions can improve e-learning development in the future. This report may also help other stakeholders and partners on how to strategically prioritize their financial interventions in supporting these two universities for their e-learning initiatives. For example, the e-learning partners of the two universities would benefit from consulting this report to plan which support they can provide in addressing the high-scale reported challenges mainly from technological, pedagogical, content, and leadership categories.

References

- Abdelaziz, S. 2022. "The Online Education in the Higher Education, a Complete System Rather Than Just a Platform." *Business and Management Studies* 8(1):1-9
<https://doi.org/10.11114/bms.v8i1.5536>
- Abera, M. and P. Murugan. 2018. "Cultural Capital and Students' Academic Performance: The Case of Ethiopian Higher Educational Institutions." *Eastern Africa Social Science Research Review* 34(1):249-76 <https://doi.org/10.1353/eas.2018.0008>
- Adewole-Odesi, E. 2014. "Attitude of Students Towards E-Learning in South-West Nigerian Universities: An Application of Technology Acceptance Model." *Library Philosophy and Practice (e-journal)* 1035:1-18.
- Al-Haderi, S. M. 2014. "The Influences of Government Support in Accepting the Information Technology in Public Organization Culture." *International Journal of Business and Social Sciences* 5(5):118-24.
- Ali, A. 2021. "E-Learning for Students with Disabilities During COVID-19: Faculty Attitude and Perception." *SAGE Open* Oct-Dec 2021:1-15.
<https://doi.org/10.1177/21582440211054494>
- Almahasees, Z., K. Mohsen and M. Amin. 2021. "Faculty's and Students' Perceptions of Online Learning During COVID-19." *Frontiers in Education* 6(Art. No. 638470):1-10
<https://doi.org/10.3389/educ.2021.638470>
- Aparicio, M., F. Bacao and T. Oliveira. 2016. "An E-Learning Theoretical Framework." *Educational Technology and Society* 19(1):292–307.
- Arasaratnam-Smith, L. and M. Northcote. 2017. "Community in Online Higher Education: Challenges and Opportunities." *Electronic Journal of e-Learning* 15(2):188–98.
- Atanga, C., B. Jones, L. Krueger and S. Lu. 2020. "Teachers of Students with Learning Disabilities: Assistive Technology Knowledge, Perceptions, Interests, and Barriers." *Journal of Special Education Technology* 35(4):236–48
<https://doi.org/10.1177/0162643419864858>
- Ayele, A. A. and W. K. Birhanie. 2018. "Acceptance and Use of E-Learning Systems: The Case of Teachers in Technology Institutes of Ethiopian Universities." *Applied Informatics* 5(1):1-11 <https://doi.org/10.1186/s40535-018-0048-7>
- Babeley, R. 2016. "Review & Critical Study of Content Management System Software." *International Journal of Contemporary Research and Review* 7(12):20205-09
<https://doi.org/10.15520/ijcrr/2016/7/12/34>
- Balaraman, P., G. Berhe and P. Kamalakannan. 2018. "E-Learning Trends, Technologies and Case Insights of Students E-Readiness from Ethiopia." *Research Explorer* 6(17):153-61.
- Bao, W. 2020. "COVID-19 and Online Teaching in Higher Education: A Case Study of Peking University." *Human Behavior and Emerging Technologies* 2(2):113-15
<https://doi.org/10.1002/hbe2.191>
- Bekele, A. 2021. "Integration of Technology and E-Learning into Medical Education in Ethiopia: The COVID-19 Silver Lining?". *Ethiopian Medical Journal* 59(4):279-80.
- Bhuasiri, W., O. Xaymoungkhoun, H. Zo, J. Rho and A. Ciganek. 2012. "Critical Success Factors for E-Learning in Developing Countries: A Comparative Analysis between Ict Experts and Faculty." *Computers & Education* 58(2):843-55
<https://doi.org/10.1016/j.compedu.2011.10.010>
- Catalano, A., B. Torff and K. Anderson. 2021. "Transitioning to Online Learning During the COVID-19 Pandemic: Differences in Access and Participation among Students in Disadvantaged School Districts." *International Journal of Information and Learning Technology* 38(2):258-70 <https://doi.org/10.1108/IJILT-06-2020-0111>
- Chandra, S. and B. Sharma. 2018. "Near, Far, Wherever You Are: Chemistry Via Distance in the South Seas." *American Journal of Distance Education* 32(2):80-95
<https://doi.org/10.1080/08923647.2018.1440106>

- Chen, C. and G. Aytenuw. 2021. "Facing Challenges of COVID-19: The Perspective of China and Ethiopia Educational Institutions." *Journal of Education, Teaching and Learning* 6(1):61-68 <https://doi.org/10.26737/jetl.v6i1.2288>
- Christensen, C. M., M. B. Horn and C. W. Johnson. 2011. *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*. New York: McGraw Hill.
- Eke, H. 2011. "Modeling Lis Students' Intention to Adopt E-Learning: A Case from University of Nigeria, Nsukka." *Library Philosophy and Practice (e-journal)* 478.
- El-Sabagh, H. 2021. "Adaptive E-Learning Environment Based on Learning Styles and Its Impact on Development Students' Engagement." *International Journal of Educational Technology in Higher Education* 18(53):1-24 <https://doi.org/10.1186/s41239-021-00289-4>
- Fayram, J., N. Boswood, Q. Kan, A. Motzo and A. Proudfoot. 2018. "Investigating the Benefits of Online Peer Mentoring for Student Confidence and Motivation." *International Journal of Mentoring and Coaching in Education* 7(4):312-28 <https://doi.org/10.1108/IJMCE-10-2017-0065>
- Gardner, J. and C. Brooks. 2018. "Student Success Prediction in Moocs." *User Modeling and User-Adapted Interaction* 28(2):127–203 <https://doi.org/10.1007/s11257-018-9203-z>
- Gierdowski, D. and J. Galanek. 2020. "Ecar Study of the Technology Needs of Students with Disabilities." Louisville, CO: ECAR.
- Graham, A. 2019. "Benefits of Online Teaching for Face-to-Face Teaching at Historically Black Colleges and Universities." *Online Learning* 23(1):144-63 <https://doi.org/10.24059/olj.v23i1.1435>
- Gunawardana, K. 2005. "An Empirical Study of Potential Challenges and Benefits of Implementing E-Learning in Sri Lanka." in *The Second International Conference on eLearning for Knowledge-Based Society*. Bangkok, Thailand <https://doi.org/10.2139/ssrn.2931993>
- Heirdsfield, A., S. Walker, M. Tambyah and D. Beutel. 2011. "Blackboard as an Online Learning Environment: What Do Teacher Education Students and Staff Think?". *Australian Journal of Teacher Education (Online)* 36(7):1-16 <https://doi.org/10.14221/ajte.2011v36n7.4>
- Hollenbeck, C., G. Zinkhan and W. French. 2005. "Distance Learning Trends and Benchmarks: Lessons from an Online Mba Program." *Marketing Education Review* 15(2):39-52 <https://doi.org/10.1080/10528008.2005.11488904>
- Ilgaz, H. and Y. Gülbahar. 2015. "A Snapshot of Online Learners: E-Readiness, E-Satisfaction and Expectations." *International Review of Research in Open and Distributed Learning* 16(2):171-87 <https://doi.org/10.19173/irrodl.v16i2.2117>
- Jacob, U., J. Pillay, B. M. Oyundoyin and J. O. Oyundoyin. 2022. "Barriers to and Benefits of Online Learning among Special Education Undergraduates." *Multicultural Education* 8(4):8-21.
- Johnson, J., P. Reddy, R. Chand and M. Naiker. 2021. "Attitudes and Awareness of Regional Pacific Island Students Towards E-Learning." *International Journal of Educational Technology in Higher Education* 18(13):1-20 <https://doi.org/10.1186/s41239-021-00248-z>
- Judit, N. 2018. "Evaluation of Online Video Usage and Learning Satisfaction: An Extension of the Technology Acceptance Model." *International Review of Research in Open and Distributed Learning* 19(1):160-85 <https://doi.org/10.19173/irrodl.v19i1.2886>
- Kabir, H., T. Tonmon, K. Hasan, L. Biswa, A. Chowdhury, M. Islam, M. Rahman and D. Mitra. 2022. "Association between Preference and E-Learning Readiness among the Bangladeshi Female Nursing Students in the COVID-19 Pandemic: A Cross-Sectional Study." *Bulletin of the National Research Centre* 46(8):1-10 <https://doi.org/10.1186/s42269-022-00697-0>
- Kebritchi, M., A. Lipschuetz and L. Santiago. 2017. "Issues and Challenges for Teaching Successful Online Courses in Higher Education: A Literature Review." *Journal of*

- Educational Technology Systems* 46(1):4-29
<https://doi.org/10.1177/0047239516661713>
- Ketema, T. and M. Nirmala. 2015. "The Impact of E-Learning to Enhance Quality of Education: The Case of Adama Science and Technology University." *African Journal of Computing and ICT* 8(1):155-62.
- Kilburn, A., B. Kilburn and T. Cates. 2014. "Drivers of Student Retention: System Availability, Privacy, Value, and Loyalty in Online Higher Education." *Academy of Educational Leadership Journal* 18(4):1-14.
- Lalande, V. 1995. "Student Support Via Audio Teleconferencing: Psycho-Educational Workshops for Post-Bachelor Nursing Students." *American Journal of Distance Education* 9(3):62-73 <https://doi.org/10.1080/08923649509526898>
- Lim, C., S. Ra, B. Chin and T. Wang. 2020. "Leveraging Information and Communication Technologies (Ict) to Enhance Education Equity, Quality, and Efficiency: Case Studies of Bangladesh and Nepal." *Educational Media International* 57(2):87-111
<https://doi.org/10.1080/09523987.2020.1786774>
- Littlejohn, A., N. Hood, C. Milligan and P. Mustain. 2016. "Learning in Moocs: Motivations and Self-Regulated Learning in Moocs." *The Internet and Higher Education* 29:40-48
<https://doi.org/10.1016/j.iheduc.2015.12.003>
- Maina, M. and D. Nzuki. 2015. "Adoption Determinants of E-Learning Management System in Institutions of Higher Learning in Kenya: A Case of Selected Universities in Nairobi Metropolitan." *International Journal of Business and Social Sciences* 6(2):223-48.
- Mbengo, P. 2014. "E-Learning Adoption by Lecturers in Selected Zimbabwe State Universities: An Application of Technology Acceptance Model." *Journal of Business Administration Education* 6(1):15-33.
- Muhie, Y. A., C. H. Tesfay and B. W. Tamirat. 2020. "Enablers, Difficulties, and Features to Implement E-Learning Technology in Conventional Higher Education: Case Study and Prototype Implication." *Journal of Software Engineering and Applications* 13:219-44 <https://doi.org/10.4236/jsea.2020.1310015>
- Naiker, M. and L. Wakeling. 2015. "Evaluation of Group-Based Inquiry-Oriented Learning in Undergraduate Chemistry Practical." *International Journal of Innovation in Science and Mathematics Education* 23(5):1-17.
- Nicoleta, G. and P. Maria-Loredana. 2012. "E-Learning Innovations in Higher Education." *Challenges of The Knowledge Society* 2:1775-87.
- Olt, M. 2002. "Ethics and Distance Education: Strategies for Minimizing Academic Dishonesty in Online Assessment." *Online Journal of Distance Learning Administration* 5(3):1-7.
- Osubor, V. O. and S. C. Chiemeké. 2015. "The Impacts of Information Culture on E-Learning Innovation Adoption in Learning Institutions in Nigeria." *African Journal of Computing and ICT* 8(1):17-26.
- Pham, L., Y. Limbu, T. Bui, H. Nguyen and H. Pham. 2019. "Does E-Learning Service Quality Influence E-Learning Student Satisfaction and Loyalty? Evidence from Vietnam." *International Journal of Educational Technology in Higher Education* 16(1):1-26 <https://doi.org/10.1186/s41239-019-0136-3>
- Phirangee, K. and J. Hewitt. 2016. "Loving This Dialogue!!!! Expressing Emotion through the Strategic Manipulation of Limited Non-Verbal Cues in Online Learning Environments." Pp. 69-85 in *Emotions, Technology, and Learning*, edited by S. Y. Tettegah and M. P. McCreery. San Diego: Academic Press
<https://doi.org/10.1016/B978-0-12-800649-8.00010-9>
- Picciano, A. 2017. "Theories and Frameworks for Online Education: Seeking an Integrated Model." *Online Learning Journal* 21(3) <https://doi.org/10.24059/olj.v21i3.1225>
- Pittard, V. 2004. "Evidence for E-Learning Policy." *Technology, Pedagogy, and Education* 13(2):181-94 <https://doi.org/10.1080/14759390400200179>
- Powell, A. and M. Barbour. 2011. "Tracing International Differences in Online Learning Development: An Examination of Government Policies." *Journal of Open, Flexible and Distance Learning* 15(1):75-89 <https://doi.org/10.61468/jofdl.v15i1.17>

- Reddy, P., B. Sharma and S. Chandra. 2020. "Student Readiness and Perception of Tablet Learning in Higher Education in the Pacific—a Case Study of Fiji and Tuvalu: Tablet Learning at Usp." *Journal of Cases on Information Technology* 22(2):52–69
<https://doi.org/10.4018/JCIT.2020040104>
- Reddy, P., B. Sharma and K. Chaudhary. 2020. "Digital Literacy: A Review of Literature." *International Journal of Technoethics* 11(2):65-94
<https://doi.org/10.4018/IJT.20200701.0a1>
- Russell, C. 2009. "A Systemic Framework for Managing E-Learning Adoption in Campus Universities: Individual Strategies in Context, Alt-J." *Research in Learning Technology* 17(1):3-19 <https://doi.org/10.1080/09687760802649871>
- Saintika, Y., S. Astiti, D. Kusuma and A. Muhammad. 2021. "Analysis of E-Learning Readiness Level of Public and Private Universities in Central Java, Indonesia". *Register: Jurnal Ilmiah Teknologi Sistem Informasi* 7(1):15-30
<https://doi.org/10.26594/register.v7i1.2042>
- Scherer, R. and F. Siddiq. 2019. "The Relation between Students' Socioeconomic Status and Ict Literacy: Findings from a Meta-Analysis." *Computers & Education* 138:13–32
<https://doi.org/10.1016/j.compedu.2019.04.011>
- Seale, J. 2014. *E-Learning and Disability in Higher Education*. London: Routledge
<https://doi.org/10.4324/9780203095942>
- Sharma, B., F. Lauano, S. Narayan, A. Anzeg, B. Kumar and J. Raj. 2018. "Science Teachers Accelerated Program Model: A Joint Partnership in the Pacific Region." *Asia-Pacific Journal of Teacher Education* 46(1):38-60
<https://doi.org/10.1080/1359866X.2017.1359820>
- Sharma, B., R. Nand, M. Naseem and E. Reddy. 2020. "Effectiveness of Online Presence in a Blended Higher Learning Environment in the Pacific." *Studies in Higher Education* 45(8):1547–156 <https://doi.org/10.1080/03075079.2019.1602756>
- Tallvid, M. 2016. "Understanding Teachers' Reluctance to the Pedagogical Use of ICT in the 1:1 Classroom." *Education and Information Technologies* 21(3):503–19
<https://doi.org/10.1007/s10639-014-9335-7>
- Tonks, D., R. Kimmons and S. Mason. 2021. "Motivations among Special Education Students and Their Parents for Switching to an Online School: Survey Responses and Emergent Themes." *Online Learning* 25(2):171–89
<https://doi.org/10.24059/olj.v25i2.2141>
- Tusiime, W., M. Johannesen and G. Gudmundsdottir. 2020. "Teaching Art and Design in a Digital Age: Challenges Facing Ugandan Teacher Educators." *Journal of Vocational Education and Training* <https://doi.org/10.1080/13636820.2020.1786439>
- UoG. 2020. "Ict Policy." Gondar, Ethiopia: UoG Printing Press.
- UR. 2017. "Open, Distance and E-Learning Policy." Kigali, Rwanda: University of Rwanda.
- Van-Popta, E., M. Kral, G. Camp, R. Martens and R.-J. Simons. 2017. "Exploring the Value of Peer Feedback in Online Learning for the Provider." *Educational Research Review* 20:24-34 <https://doi.org/10.1016/j.edurev.2016.10.003>
- Vovides, Y., S. Bedada, R. Gadhula, M. Kebaetse, N. Animut, F. Suleman, D. Tibyampansha, G. Ibrahim, M. Ntabaye, S. Frehywot and O. Nkomazana. 2014. "A Systems Approach to Implementation of Elearning in Medical Education: Five Mepi Schools' Journeys." *Academic Medicine* 89(8): S102–S06
<https://doi.org/10.1097/ACM.0000000000000347>
- Waight, M. and W. Oldreive. 2020. "Investigating Accessible Information Formats with People Who Have Learning Disabilities." *Learning Disability Practice* 23(2):23-30
<https://doi.org/10.7748/ldp.2020.e2031>
- Waterhouse, S. and R. Rogers. 2004. "The Importance of Policies in E-Learning Instruction." *Educause Quarterly* 3:28-39.
- Yang, H., S. Zhu and J. MacLeod. 2018. "Promoting Education Equity in Rural and Underdeveloped Areas: Cases on Computer-Supported Collaborative Teaching in China." *Eurasia Journal of Mathematics, Science and Technology Education* 14(6):2393–405 <https://doi.org/10.29333/ejmste/89841>

Yavuzalp, N. and E. Bahcivan. 2021. "A Structural Equation Modeling Analysis of Relationships among University Students' Readiness for E-Learning, Self-Regulation Skills, Satisfaction, and Academic Achievement." *Research and Practice in Technology Enhanced Learning* 16(15) <https://doi.org/10.1186/s41039-021-00162-y>

Annexes

Annex 1: The Profile of Key Informant Interviewees. UoG (ETH) and UR (RWN)

S.N.	Institution	Department	Code	Country, ETH
1.	MoE, ETH	CEO	KII-1	Addis Ababa, ETH
2.	MoE, ETH	Director General	KII-2	Addis Ababa, ETH
3.	UoG, ETH	Vice President	KII-3	Gondar, ETH
4.	UoG, ETH	Director	KII-4	Gondar, ETH
5.	UoG, ETH	Dean-1	KII-5	Gondar, ETH
6.	UoG, ETH	Dean-2	KII-6	Gondar, ETH
7.	UoG, ETH	Dean-3	KII-7	Gondar, ETH
8.	UoG, ETH	Director	KII-8	Gondar, ETH
9.	UoG, ETH	Coordinator	KII-9	Gondar, ETH
1.	UR, RWN	CASS	UR, KII-1	Huye, RWN
2.	UR, RWN	CAVM	UR, KII-2	Musanze, RWN
3.	UR, RWN	CBE	UR, KII-3	Huye, RWN
4.	UR, RWN	CMHS	UR, KII-4	Kigali, RWN
5.	UR, RWN	Chief Officer-1	UR, KII-5	Kigali, RWN
6.	UR, RWN	Chief Officer-2	UR, KII-6	Kigali, RWN
7.	UR, RWN	Chief Officer-3	UR, KII-7	Kigali, RWN
8.	UR, RWN	Office Head	UR, KII-8	Rusuzi, RWN
9.	UR, RWN	Center Director	UR, KII-9	Kigali, RWN
10.	UR, RWN	Director	UR, KII-10	Kigali, RWN
11.	UR, RWN	Center Director	UR, KII-11	Kayonza, RWN
12.	UR, RWN	School Head	UR, KII-12	Kigali, RWN
13.	UR, RWN	Center Head	UR, KII-13	Kayonza, RWN
14.	UR, RWN	Director	UR, KII-14	Kigali, RWN

Annex 2: The profile of FGD participants. UoG (ETH)

FGD-1: Faculty					
<i>S.N.</i>	<i>Work experience</i>	<i>Department</i>	<i>Sex</i>	<i>Code</i>	<i>Country, ETH</i>
1	10	Public Health	M	P1, FGD-1	Gondar, ETH
2	7	Biotechnology	M	P2, FGD-1	Gondar, ETH
3	5	ICT	M	P3, FGD-1	Gondar, ETH
4	15	Medicine	M	P4, FGD-1	Gondar, ETH
5	6	Law	M	P5, FGD-1	Gondar, ETH
6	9	Sociology	F	P6, FGD-1	Gondar, ETH
7	8	Faculty of Education	M	P7, FGD-1	Gondar, ETH
8	12	Public Health	M	P8, FGD-1	Gondar, ETH
FGD-2: Students					
<i>S.N.</i>	<i>Level of study</i>	<i>Department</i>	<i>Sex</i>	<i>Code</i>	<i>Country, ETH</i>
1	BA	Business Management	F	P1, FGD-2	Gondar, ETH
2	MSc.	Public Health	F	P2, FGD-2	Gondar, ETH
3	MSc.	Health Officer	F	P3, FGD-2	Gondar, ETH
4	DVM	Veterinary Medicine	F	P4, FGD-2	Gondar, ETH
5	LLM	Law	M	P5, FGD-2	Gondar, ETH
6	BA	Sociology	M	P6, FGD-2	Gondar, ETH