Primary school learning in sub-Saharan Africa during COVID-19: a scoping review of responses and recovery initiatives induced

Dr. Brenda Wawire
African Population and Health Research Center

Dr. Adrienne Barnes-Story
Florida State University

Dr. Elisheba Kiru
African Population and Health Research Center

Sungkyum Kim
Florida State University

Globally, the COVID-19 pandemic caused unprecedented disruptions in education. School closures quickly followed the onset of the pandemic to contain the spread of the virus, forcing millions of students out of their regular academic calendars. Countries put in place interventions aimed to reduce the deleterious effects of school closures and disruptions in learning. For instance, many countries used various mediums to provide students with distance learning. This scoping review examines the interventions that education systems in low- and middle-income Sub-Saharan African (SSA) countries (LMIC) implemented to mitigate learning loss in reading and writing skills among early grade learners (i.e., children attending primary schools) and discusses the reach of those programs. This review highlights the proportion of students reached by the targeted mitigation measures, revealing that LMIC countries in SSA provided students with remote learning opportunities through radio and television programming, provided teachers with professional development on the use of novel tools, and provided parents and families with support to help learners at home. However, these disruptions affected the traditional assessment methods. Various assessment methods were implemented to measure student progress, but there is a need for appropriate progress monitoring tools and accurate data to measure the effectiveness of the interventions. Many LMIC implemented Return-to-School policy frameworks, processes, and principles that ensured safe learning continuity.

Keywords: learning loss, COVID-19, interventions, responses, literacy, early grades

Primary school learning in sub-Saharan Africa during COVID-19: a scoping review of responses and recovery initiatives induced during school closures

The early years of education represent a critical period during which children acquire a range of core competencies correlated with reading comprehension, literacy achievements, and academic outcomes (Shanahan & Lonigan, 2010). Providing all early grade learners with a strong literacy foundation is vital for reaching Sustainable Development Goal 4, which focuses on ensuring inclusive and equitable high-quality education and promoting lifelong learning opportunities (United Nations, 2015). In the early phases of reading development, children acquire code-focused skills such as letter knowledge, phonics, and word recognition - all of which are instrumental in developing text reading fluency and comprehension skills (Foorman et al., 2020; Petscher et al., 2020). Foundational literacy is a building block for education attainment and civic engagement in the 21st century. Some skills that contribute to literacy acquisition, specifically those that are not code-focused (oral language and vocabulary knowledge), begin to develop before children enter school. Code-focused skills are efficiently acquired through explicit, systematic instruction (Archer & Hughes, 2011). Code-focused intervention is critical for both monolingual and bilingual children from low- and middle-income country (LMIC) contexts such as many sub-Saharan African (SSA) countries (August & Shanahan, 2006; Kim et al., 2020). In these contexts, foundational literacy skills learning has been predominantly limited to school settings where students and teachers interact as a whole class, or where learners work in small groups.

Mass school closures caused by the COVID-19 pandemic disrupted the education of more than 1.6 billion children globally (World Bank, 2020), with particularly large impacts on education systems and Ministries of General Education [MOGE] in developing country contexts. In SSA, more than 127 million vulnerable school-going children were forced out of classrooms (UNESCO, 2021a). The present study focuses on Sub-Saharan African LMICs, based on the World Bank classifications. We included data available at the time of publication for all countries on the African continent excluding South Africa, Egypt, and Morocco. School shutdowns exacerbated the dismal pre-pandemic learning poverty levels in the region, wherein the percent of students who were unable to read and understand simple texts by age ten already stood at 87% and is currently at 89% (World Bank, 2021). Prior to the pandemic, SSA faced persistent challenges in the education sector related to large class sizes, deficiencies in teachers' content and pedagogical content knowledge, poor pedagogical approaches, lack of home literacy support, inadequate teacher training and professional development (PD), inadequate supplies of teaching and learning materials, learning in unfamiliar instructional languages, and high rates of teacher and student absenteeism (Uwezo, 2016). An in-depth examination of interventions that might mitigate learning loss for students living in low-resource contexts of SSA is crucial, given the learning lag that existed before the pandemic. Considering the current and long-term impact of learning loss on literacy development, this scoping review analyzes evidence on the instructional and policy interventions implemented in SSA LMICs to mitigate learning loss among early grade readers (Joanna Briggs Institute, 2015). The findings provide examples from which low-resource countries around the globe can draw lessons as they build back resilient education systems and recover from the detrimental effects of COVID-19.

The Present Study

This paper provides a review of the available evidence on policy responses and interventions that SSA LMIC countries implemented during and after COVID-19 school closures to reduce and compensate for the loss of literacy skills for early grade learners (i.e., children attending primary school). In order to ensure future pandemic preparedness and to make SSA education systems resilient and better prepared to ensure learning continuity and access to education for the vulnerable populations, it is critical to review the available literature that sheds light on mitigation measures, their reach, response, and recovery mechanisms. The present study addresses the following research questions:

(1) What interventions were taken by governments and various education stakeholders across Sub-Saharan Africa LMICs to support primary literacy skill development during and after COVID-19 school shutdowns?
(2) What was the reach of these interventions?

Rationale for the Study

Given the risk of children being left behind in education, it is critical to document the intervention and mitigation measures implemented in various SSA LMIC countries to ensure learning continuity among vulnerable early grade children who are at risk of being left further behind. The evidence generated from the current review can inform policy frameworks that can be tested, validated, adapted for institutionalization by governments and Ministries of General Education as part of efforts to ensure future pandemic preparedness and promote access to education and learning continuity. In addition, the lessons of effective and ineffective intervention implementation can be adapted to strengthen education systems, curbing the loss of foundational literacy skills.

Global Mitigation of Learning Loss

Learning loss is the deterioration of learned skills and missed learning opportunities that students would have benefitted from without interruptions to schooling (Angrist et al., 2021; Slade et al., 2017). The Organization for Economic Co-operation and Development (OECD) and Harvard Graduate School of Education's (2020) survey of 98 countries reveals salient education challenges in mitigating learning loss during COVID-19 converge to, among others: (1) ensuring the continuity of academic learning; (2) supporting students who lack skills for independent or online study; (3) ensuring continuity and integrity of the learning assessments; and (4) defining new priorities. Against this backdrop, various forms of remote learning solutions have been implemented worldwide –for both instruction and assessment. In Brazil, daily educational video broadcasting on state television was initiated following the National Council of Education's recommendation to make families the direct audience or early childhood education content (Piedra & Reimers, 2020). This augmented the

distribution of free digital children's books targeted for low-educational-level families.

Distance learning solutions were implemented globally across nations during the school closures in response to the COVID-19 pandemic to limit disruption in learning and access to basic education (Barron Rodriguez et al., 2021). The global reliance upon remote learning interventions calls for immediate and long-term assessment of their effectiveness and efficacy. The development of more inclusive forms of remote learning through diverse delivery channels, as well as strengthening communication between teachers, families, and learners, should be synchronized with national educational contexts that consider available resources, policy stakeholders, and the needs of learners, families, and teachers (Conto et al., 2020).

SSA Mitigation of Learning Loss

In SSA contexts, other irregular school closures caused by teachers' strikes, natural disasters, conflicts, and other viruses such as Ebola, have regularly amplified learning loss. However, the pandemic introduced additional challenges such as loss of income, food insecurity, adverse health impacts, grief, sexual and gender-based violence, socioemotional and well-being challenges, and lack of psychosocial and mental health support (Buonsenso et al., 2020; Mudiriza & De Lannoy, 2020). School closures also have negative effects on vulnerable learners living in poverty, particularly in lower-middle-income countries, as they may not have learning resources and literacy support at home to augment their skills instruction (Moscoviz & Evans, 2022). Additionally, the amalgam of complications in the SSA region may cause students to be left even further behind due to curriculum challenges wherein the instruction, curriculum content, and textbooks are often not aligned with the students' learning levels and needs (Abdazi, 2006; Glewwe et al., 2009; UNICEF, 2019).

It is difficult to measure learning loss induced by COVID-19 due to (1) different periods of school closures; (2) varying units of analysis utilized across studies; (3) general lack of post-pandemic data; and (4) challenges related to the administration of assessments to monitor learning progress during remote learning (ADEA[1], AU/CIEFFA[2] & APHRC[3], 2022; Angrist et al. 2021; Ardington et al., 2021; Azevedo et al., 2020; Kaffenberger, 2021; Soudien et al., 2021).

Measuring Learning Loss in SSA.

Education stakeholders have attempted to project and estimate learning loss across several LMICs. For instance, by using pre-pandemic data from Pakistan, classified as a lower-middle-income country, Kaffenberger (2021) projects that a school closure of up to

[1] Association for Development of Education in Africa
[2] African Union's International Centre for Girls' and Women's Education in Africa
[3] African Population and Health Research Center

one-third of the school year might incur learning loss of one Learning-Adjusted-School-Year (LASY) of grade 3 students by the time they reach grade 10. Similarly, a study using pre-pandemic SSA data from five African countries – Kenya, Ethiopia, Liberia, Tanzania, and Uganda – suggests that short-term learning loss of half to one year can incur up to 2.8 years of learning loss to grade 3 students by the time they reach grade 10 (Angrist et al. 2021; Sabates et al., 2021). Globally, projections show a 10% increase in learning poverty due to COVID-19-induced school closures, which may lead to significant long-term effects (Azevedo et al., 2020).

While it may be too early to compare the actual long-term learning loss to projections, emerging data reveal snapshots from several SSA contexts. From a voluntary survey in South Africa - a middle income country, it was reported that learners in grades one to five lost approximately 60% of their schooling days in 2020, resulting in an estimated reading 76% loss in the rate of their literacy development in the home language and 48% in English for grade four learners (Shepherd et al., 2021). In another study, Conto and colleagues (2021) examined the extent to which disrupted schooling and instances of dropout impact the acquisition of foundational literacy and numeracy skills, and the extent to which remote learning policies mitigated the learning crisis across seven SSA countries (Central African Republic, Chad, Congo Democratic Republic [D.R.C.], Ghana, Guinea Bissau, Lesotho, Madagascar, and Zimbabwe). The same study reports that children who were out of school tended to score from four to 51 percentage points lower in foundational literacy skills compared to their peers whose instruction was continuous. These findings suggest the school closures due to COVID-19 negatively influenced the ability of young children to continue their numeracy and literacy skills development.

Synthesis of evidence on learning loss also indicates that prolonged school closures and alternative schooling methods have contributed to a widening of the learning gap both within and across countries, furthering domestic and cross-national learning inequalities (Moscoviz & Evans, 2022; Wolf et al., 2021). In Ghana, the transition to distance learning has shown a disparaging effect on lower socio-economic status (SES) kindergarten students who have more difficulty engaging in remote learning. These young learners performed significantly worse in literacy and mathematics than their peers in higher SES contexts by 0.2–0.3 standard deviations (Wolf et al., 2021). Evidently, the degree of learning loss is context-dependent. LMICs with socioeconomic inequalities are more vulnerable to lasting educational impacts should interventions not take place (Soudien et al., 2021).

Challenges reported in the SSA Context

The pandemic presented several challenges in the education systems of many SSA countries. The significant challenges include lack of adequate resources to support continuity of learning and preparations for school reopening, government over-reliance on external financial resources, budget reallocations prioritizing public health, competition for national priorities, and pre-existing challenges that impeded financing education (ADEA, AU/CIEFFA, & APHRC, 2021). As a result, unequal access to education widened learning inequalities and threatened to leave the most vulnerable student populations even further behind. As of September 2022, learning in many regions had not resumed to the pre-pandemic pace and level. Throughout this time,

many parents were not able to adequately support at-home learning due to a lack of teaching and learning resources, their own lack of expertise to teach literacy, illiteracy challenges, limited or lack of internet connectivity, multiple children in a household needing support, limited devices in the family for connecting to the internet, parental unavailability, and lack of assessments to monitor the learning progress associated with radio and TV programs (Akinrinmade et al., 2021). Moreover, SSA countries have faced numerous challenges in assessment, including (1) poor preparation for assessment beyond classroom settings; (2) limited technology, unclear policies, and guidelines for assessing learning in the early grades; (3) limited capacities of teachers and students to manage distance learning and adopt technology in learning and assessment; and (4) the absence of baseline data from which to gauge learning loss (ADEA, AU/CIEFFA & APHRC, 2022).

Methods

We conducted a scoping review to report the types of interventions and responses to COVID-19 across SSA LMIC countries during and after school closures. A scoping review was appropriate for identifying available literature and providing a broad overview of findings and existing evidence from the field. This scoping review follows the Joanna Briggs Institute [JBI] guidelines based on the Population Concept Context (PCC) framework (Arksey & O'Malley, 2005; Joanna Briggs Institute, 2015). A JBI scoping review typically begins with the development of a priori protocol that details the inclusion and exclusion criteria that relates to the objective and review target questions, as well as relevant data extraction methods. The inclusion criteria are based on PCC framework where population refers to details of age, gender, race, and other qualifying criteria of the population. The concept is the main idea being examined by the scoping review and is articulated in the scope and breath of the inquiry. Lastly, context includes cultural factor's geographic location, and/or specific gender-based interests. This methodological approach is suitable and aligns with the objective of the study, which is to map available evidence and provide a broad overview of COVID-19 responses to strengthen early literacy skills in the SSA LMIC context. Our analysis methodology followed the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews sequencing (PRISMA-ScR) (Tricco et al., 2018). The PRISMA-ScR was developed to improve the methodological and reporting guidance of scoping reviews. PRISMA-ScR is a checklist of 20 essential items plus two optional items and includes the rationale for including each in the checklist. Our scoping review includes all the essential elements of the checklist.

Data Sources and Search Strategy

We utilized an open search strategy to locate relevant peer-reviewed published research as well as literature published by organizations outside academic journals (e.g., reports, working papers, white papers, etc.), often called grey literature. Four researchers searched on databases and organizational websites for relevant literature. The databases and publishers searched were Africa Bibliography, Africa Education Research Database, African Journals Online, ERIC, Evidence Hub, International Literacy Association, Open Knowledge Repository, Open Science, PsycINFO, Science Direct, Reading and Writing, and Web of Science. We also searched websites of funding agencies and development organizations, including American Institutes for Research; Creative Associates; Deutsche

Gesellschaft für Internationale Zusammenarbeit; Foreign, Commonwealth and Development Office; FHI 360; Global Reading Network; Research Triangle Institute International; Room to Read; Save the Children; UNESCO; UNICEF; United States Agency for International Development; and World Bank. We also reviewed the reference lists of relevant peer-reviewed articles and grey literature to locate additional relevant studies. Lastly, we requested manuscripts under review from academics in the field. The following sets of keywords were used: 1) emergent literacy, intervention, and COVID-19; 2) reading, learning loss, and COVID-19; 3) reading and writing and COVID-19; 4) recovery in learning and COVID-19; and 5) early grade literacy and COVID-19. We conducted manual searches for studies and gray literature on the listed topics. The initial search included the title and abstracts only and a second search used keywords and index terms within the full document texts.

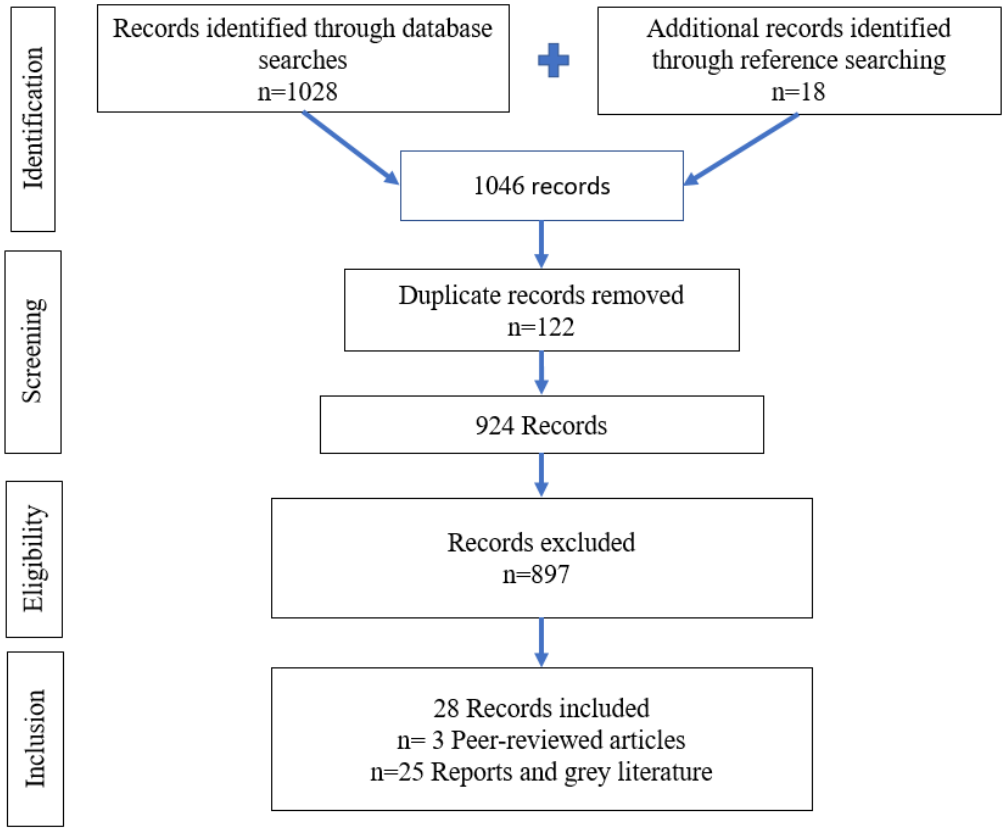
Inclusion Criteria

The criteria established for the selection of the articles required that resources: 1) were published in English; 2) were peer-reviewed articles or grey literature; 3) examined the impact of COVID-19 responses/interventions for reading/writing; 4) were conducted in Low Income or Middle Income Countries (LMICs) in SSA; 5) were conducted with preprimary and/or primary grade learners; and 6) were published between March 2020 and September 2022. We focused on the early grades because these learners are most vulnerable to losing foundational literacy skills during extensive school closures. We excluded findings on learners in upper primary, secondary schools, and higher education institutions.

Charting the Data

Our database search resulted in the identification of 1,028 records (see Figure 1). An additional 18 records were identified through reference searching, bringing the total number of records to 1,046. Records were screened for duplicates and 122 records were removed, leaving 924 records for possible inclusion. We applied the inclusion criteria described above and excluded 897 documents. A total of 27 records: three peer-reviewed articles and 25 reports and grey literature were included in this scoping review.

Figure 1.
Flowchart of Record Identification and Screening



Summarizing and reporting results

We utilized a thematic content analysis with a narrative description of the extracted data. The team of researchers reviewed each resource and entered the following information into a shared Excel spreadsheet for analysis: sample/population, intervention/practice/policy recommendations, research methods, and findings. Inductive analysis consisted of identifying common themes from the data, reviewing data for patterns of themes, and identifying key themes related to critical aspects of responses, practices, and interventions used to mitigate early grade learning loss.

Strengths and Limitations

The present scoping review provides an SSA LMIC-focused comprehensive review of responses and interventions to mitigate learning losses and enhance the literacy skills of early grade students. One notable strength of the review is that it is informed by evidence from qualitative and quantitative studies as well as grey literature - providing multiple dimensions and perspectives of strategies implemented to mitigate learning loss. The focus of this scoping review is to provide a map of available evidence; however, we did not perform a quality appraisal of the evidence (Munn et al., 2018). Despite using rigorous search strategies, this review may have omitted studies that were

not captured in the databases and websites that were searched, or studies published in languages other than English. The review only highlights resources that were published from March 2020 to September 2022. Therefore, more evidence may be published after September 2022 that could critically inform this review. The evidence that highlights the mitigation measures for early grade reading and writing is drawn from select countries in SSA, although other reports and syntheses indicate that remote learning solutions were administered in 41 GPE countries in SSA (ADEA et al., 2021). It is not clear how all countries in SSA supported early grade reading during school closures since in many countries remote learning solutions prioritized examination classes (grades or classes eight through 12). It is important for future research to review extensively the mitigation measures implemented in the countries not highlighted in this study. These findings provide in-depth evidence that can inform policy guidelines on how to build back stronger and more resilient education programs across sub-Saharan Africa.

Results

The aim of the present scoping review is to examine types of policy responses and interventions implemented (and their reach) in SSA LMICs and aimed to mitigate negative impacts of learning loss on reading and writing skills among early grade learners due to COVID-19 school shutdowns. The conceptual categories for our studies are (a) resource type, (b) population, and (c) interventions. For the resource type, we included peer-reviewed articles and grey literature. For the population category, we focused on lower primary school children. Interventions focused on early grade literacy. Notably, Nigeria was overrepresented in 25% of the sources. The results are presented in Table 1.

Table 1. ***Charting Table of Results***

Source	Country	Population	Responses to improve early literacy
ADEA, AU/CIEFFA, & APHRC, 2021	Select GPE Partner countries in SSA – Ghana South Sudan, Kenya, Zambia, Burkina Faso, Cabo Verde, Eritrea, Central African Republic, Sierra Leonne, Mozambique, Malawi, Senegal, and Republic of Congo	All ages	Distance learning solutions – radio, TV, tablets, digital library services/platforms, ICT educational programs, capacity development for teachers, development of teaching materials, audiovisual assistive devices for families, provision of student textbooks, posters, stickers pamphlets of education, radio-based learning kits,
ADEA, AU/CIEFFA & APHRC, 2022	Select GPE partner countries in SSA	All ages	Distance learning solutions such as Khan Academy, Seesaw, Edo-best, Zoom and Google meet, homework, quizzes, take home assignment packages, phone based assessments, live or pre-recorded lessons on Radio and TV, social media (WhatsApp)
Barron Rodriguez et al. (2021)	Nigeria, Malawi, Rwanda, Kenya, Zambia	All ages	Teacher training, radio instruction, TV, printed materials, diagnostic assessments, targeted remedial instruction, SMS, and social media
Conto et al. (2021)	Central African Republic, Chad, Congo D.R., Ghana, Guinea Bissau, Lesotho, Madagascar, and Zimbabwe.	Early and middle-grade students	Remote learning strategies: provision of online platforms to some learners; supply of a combination of online and other modalities (paper-based take-home materials, TV, Radio instruction)
Dang et al. (2021)	Burkina Faso, Mali, Nigeria, Ethiopia, Uganda, Malawi	All ages	Teacher assignments, radio instruction, television programs
FHI 360 (n.d. a)	Democratic Republic of Congo, Nigeria, Ghana	Grades 1 – 4	Interactive Radio Instruction
FHI 360 (n.d. b)	Ghana	Early grades	Delivery of high-quality training and instructional materials in 11 Ghanaian languages and English, Radio instruction
FHI 360. (2021a)	Ghana, Senegal	Grade 3-4	Remediation programs, after-school community-driven remediation programs, scripted reading, writing, math, and socio-emotional learning activities for trainers
FHI 360. (2021b)	Djibouti, DRC, Ghana, Madagascar, Nigeria, and Senegal	Early grades	Large-scale early learning interventions; early grade reading, writing, and mathematics assessments; highly structured classroom observation tools

FHI 360. (2021c)	Nigeria	Grades 4, 5 and 6	Hausa-language teacher training, early literacy material development, community mobilization, and government partnerships, Hausa literacy and math instruction in Integrated Qur'anic Schools.
FHI 360. (2021d)	Nigeria	Early grades	Teacher Professional Development, on-site teacher coaching, and local language materials development
FHI 360. (2022)	Sub-Saharan Africa	Adolescent girls	Developing instructional materials for literacy, enhancing teacher pedagogy, creating safe learning spaces, and strengthening accountability systems and education policies
Heaner, et al., (2021)	Nigeria, Zambia	Government officials/donors/teachers/stakeholders; Learners/donors/teachers/stakeholders from Zambia	Nigeria: Mobile App classrooms, Khan Academy, Radio & TV, WhatsApp for outreach; Policy guidelines on digitalization of learning, remedial/catch-up/accelerated learning, and extension of school terms; Zambia: Distance learning, radio instruction, TV programming, homework packets, catch up lessons, rotational school schedules, condensed curriculum
Kiendrebeogo et al. (2021)	Sierra Leone	All ages	Radio instruction
Save the children (2020a)	Rwanda, Malawi	Early grades	Literacy Boost approach, empowering children with disabilities to practice reading, home-directed interactive radio instruction
Save the Children (2020b)	Rwanda, Malawi	Not specified	Broadcast of radio drama series
UNESCO, UNICEF, World Bank. (2021)	Djibouti, Morocco, Libya, Sudan, and Tunisia	All ages	Radio instruction, TV, paper-based take-home packages, parental support, acceleration programs, teacher training
UNESCO, UNICEF, the World Bank, and OECD (2021)	Burkina Faso, Guinea, Kenya, Liberia, Madagascar, Sierra Leone, Zambia, Zimbabwe	All ages	Paper-based take-home materials, TV and radio, interactive mobile-based modalities using SMS or phone calls.
UNICEF (2021)	Uganda	Refugee hosting districts/early grade learners	Accelerated Education Programmes (AEP); Teaching at the Right Level in mother tongue (foundational literacy and numeracy skills)

The World Bank, UNESCO, and UNICEF (2021)	Botswana, Nigeria, Kenya, Rwanda, Zimbabwe	All ages	Texts and phone calls, re-enrolment campaigns, teacher training, provision of culturally and linguistically appropriate books, dialogic reading training for caregivers
UNICEF (2020)	multiple	149 Ministries of education	Policies on distance learning strategies, boost access to online learning, provide support for teachers, parents, and caregivers
UNESCO (2021) a	Congo, Mauritius, Gabon	Ministries of education	Recommended considerations for remediating learning loss 1. Assessing learning needs: diagnostic assessment to determine which skills and content need to be (re)taught 2. Adjusting pedagogy: (a) adaptive teaching; (b) condensed curriculum 3. Prioritizing, training, and supporting teachers 4. Emphasizing socio-emotional learning (SEL): (a) whole-school approach; (b) should target specific, clearly defined competencies; (c) incorporation of 4 elements 5. Ensuring gender equality
UNESCO (2021) b	Egypt, Djibouti, Libya, Tunisia, Morocco, Algeria, Sudan	All ages	Face-to-face learning for early grade learners, hybrid learning, and full remote learning for all grades. Television and radio, providing caregivers with materials to support home-based learning, regular follow-up phone calls
UNOCHA (2020)	Zambia		Literacy lessons aired on community radios, reading camps, teaching and learning materials (student packets), emergent literacy and math at home, digital library educational resources,
Zizi Afrique Foundation (2020)	Kenya	Grades 1 – 3	Radio instruction, reading packet, teaching assistants training
World Bank. (2020)	Ghana, Kenya, Nigeria, Tanzania	All ages	Radio instruction, TV, smartphones, YouTube channels, electronic books, accelerated learning programs
World Bank. (2021)	Rwanda	All ages	Radio instruction, TV, YouTube channel, and e-learning portals.

Our findings indicate that education stakeholders in various SSA countries (including MoGE, governments, and development partners), instituted a range of policy and practice responses during and after COVID-19 school closures (see Table 1). According to the World Bank, the predetermined policy categorizations include coping, managing and continuity, and improving and accelerating learning (World Bank, 2020). Education funding priorities for Global Partnership for Education (GPE) partner countries focused on distance learning solutions including radio instruction and television (TV) programming; teacher training on the use of distance learning solutions; effective practical approaches for using distance learning and assessing student skills; remedial teaching; and provision of water, sanitation, and hygiene (WASH) materials; personal protective equipment; resources to support school reopening; and support to vulnerable children (ADEA, et al., 2021). The policy responses and interventions were financed through within-government budget reallocations, adjustments to development partner programming (i.e., GPE, the World Bank, UNICEF, USAID, Family Health International 360 [FHI], Education Cannot Wait, the private sector, civil organizations), and support from individual households (ADEA et al., 2021). A majority of SSA countries conducted needs assessments and rapid mapping of available educational content in relevant languages of instruction (ADEA et al., 2021).

In alignment with countries globally, most SSA countries emphasized multimodal distance learning solutions, as there were generally limited teacher-student interactions during lengthy school closures to curb the spread of the COVID-19 virus (Dang et al., 2021). Evidence indicates that during school closures, an essential education response was the use of technology and remote learning disseminated through modalities such as radio instruction, television programs, smartphones (using short messaging services and phone calls), electronic textbooks, mobile apps, e-learning portals, social media, Khan Academy, National Open University, and UNESCO's School Meets Learner Approach (ADEA et al., 2021; Conto et al., 2021; Heaner et al., 2021; Kiendrebeogo et. al., 2021; UNESCO, 2020; World Bank, 2020, 2021).

Unfortunately, remote learning solutions were inaccessible to the majority of learners from marginalized, rural, and urban informal settlements due to lack of resources. Scarce resources included: internet connectivity, electronic devices (TV, smartphone, tablet, computer, and radio), digital content in the appropriate language of instruction, electricity coverage, funds for airtime or data, digital skills, quiet spaces for learning at home, and in-home books and learning materials (ADEA et al., 2021; ADEA et al., 2022; Heaner et al., 2021; UNESCO et al., 2021; UNOCHA, 2020). The SES and residential location were critical determinants of accessibility to remote learning opportunities. Pre-primary, lower primary, and marginalized learners (refugees, learners with disabilities, migrants, and girls) were at the highest risk of not receiving opportunities for continued exposure to learning (ADEA et al., 2021; ADEA et al., 2022). Reports indicate that more than 70% of pre-primary children could not be reached in SSA LMICs, and that this region of the world had the highest percentage of primary school children who could not access remote learning solutions that require technology: 49% in East/Southern Africa and 48% in West/Central Africa (Avanesian et al., 2021; Dang et al., 2021; UNESCO et al., 2021). Only 29% of primary school students from East/Southern Africa and 26% from West/Central Africa had access to a TV,

approximately 6% to 8% had access to the internet, and 35% to 46% had access to a working radio (UNICEF, 2020b).

Radio, Television, and Digital Programming for Literacy

During the pandemic, thousands of learners benefited from accelerated learning programs in conjunction with low-cost technologies and radio-based learning. Programs using radio instruction appeared to have reached the highest number of learners across the SSA LMIC context, particularly when pre-existing radio programs were adapted and radios were provided to learners with limited access to technology (Gondwe, 2020; Global Partnership for Education 2020; Zizi Afrique Foundation, 2020).

Findings indicate that learners across multiple countries (Burkina Faso, Kenya, Malawi, Nigeria, Rwanda, Tanzania, and Zambia) experienced government-sponsored radio and television program broadcasting that focused on all grades and parent/caregiver education (Kenya: Zizi Afrique Foundation, 2020; Tanzania: Save the Children, 2020b), existing primary school curricula (Malawi: Gondwe, 2020; Global Partnership for Education 2020; Nigeria: Fugate, n.d.a; Rwanda: Save the Children, 2020b; Zambia: MoGE, 2020a; UNESCO, 2020a), or on primary grades literacy and numeracy skills (Burkina Faso: UNICEF, 2020). Radio and television instruction was particularly powerful for Zambian children from rural areas, where MoGE partnered with UNESCO to launch a national e-learning portal for pre-primary and lower primary learners and in Kenya where the Kenya Institute of Curriculum Development provided learners with access to content using the Kenya Education Cloud such as interactive digital content, e-books, and the Edu-TV channel (MoGE, 2020a; UNESCO, 2020a). In Malawi, radio-based instruction supported early learning for more than 2 million children aged 5 years who received home-directed interactive radio instruction on early literacy and mathematics concepts (Save the Children, 2020b). Radio and home-based instruction have been more effective in developing reading skills in young children than children who did not receive intervention using either radio or home-based instruction in northern Nigeria and Ghana (FHI 360, 2021c).

Community Centers

Community learning centers were established to reach marginalized students and families without radios in many rural contexts, and these became critical for continued instruction during school shutdowns. In northern Nigeria, learners gathered at the community centers to listen to the radio lessons and receive additional support from trained teachers and facilitators (Heaner et al., 2021). Similarly, Ethiopia established reading camps with volunteers (community literacy leaders) who provided students with opportunities to practice their reading skills using books and hands-on supplementary reading materials (Ali, 2021). A local Rwandan organization, Youth Volunteers with Disabilities, ran workshops in several villages where children with disabilities were empowered to practice reading and engage in different activities with their parents (Save the Children, 2021).

Community-based programs and radio/TV-based programming also provided a platform for parental training and support, essentially creating home literacy structures. These programs exposed parents and caregivers to methods for supporting their children's reading development and home learning, life skills education, local library services where students were able to check out books for use at home with adults and

caregivers, feeding programs, teacher support, and home visits for the earliest learners (Dang et al., 2021; MoGE, 2020b; Room to Read, 2021; Save the Children, 2020b; World Bank, 2021; Zizi Afrique Foundation, 2021). By connecting parents with needed resources, community centers were able to continue providing education to school-aged children and meet the needs of the whole family (Room to Read, 2021; Save the Children, 2020b).

Teachers' Professional Development

During the pandemic shutdown, teachers needed to receive professional development training to be able to cope with the changing landscape of the classroom. Teacher professional development as provided to pre-service and in-service teachers through cascade (train the trainers) and coaching models to help teachers learn how to teach using various online modalities and how to repackage learning materials for student access through different platforms (ADEA, AU/CIEFFA, & APHRC, 2021). However, evidence indicates that only a limited number of teachers were able to benefit from the planned professional development trainings; the majority were not reached due to financial and/or logistical constraints (UNESCO, UNICEF, & World Bank, 2021). Remote professional development through cascade and coaching models as implemented in various regions to equipped teachers with knowledge and skillsets for remote learning and remedial teaching. PD focused on the use of digital technologies (Nigeria: Wafi, 2021) and on early grade reading, writing, and mathematics content, pedagogies, and assessment (Congo, D.R.C., Djibouti, Ghana, Madagascar, Nigeria, and Senegal: FHI 360, 2021a).

Assessment Methods

Monitoring student progress is critical to ensuring that learners receive a high-quality education, as assessment should inform instruction. The school closures that disrupted teaching and learning during the pandemic disrupted traditional assessment procedures as well. According to ADEA et al. (2022), the policy and response practices of assessment in GPE partner countries in SSA focused on take-home quizzes and homework, social media and web-based assessment platforms, high-stakes examinations, and evaluation of learning loss. Upper grades and examination classes were prioritized in most countries because they were either an examination class or were approaching the national assessments and needed support to prepare these high-stakes exit examinations. Assessments for the distance learning modalities were built into the lessons in the form of quizzes and tasks assigned at the end of the radio or TV lesson (ADEA et al., 2022).

Existing assessment tools were adapted and used in some countries during the COVID-19 pandemic. The Early Grade Reading and Mathematics Assessment was administered on a multiple-choice assessment on a virtual platform and formative assessments were delivered through a text message sent to learners or parents to measure mastery of the learning objectives for each lesson (Nigeria: UNICEF, 2021). Teachers also measured student skills through questionnaires and simple phone-based assessments in literacy and numeracy (Botswana (Angrist et al., 2020b, UNESCO, & UNICEF, 202; The World Bank, 2021). Teachers in Malawi, Namibia, Ghana, Ethiopia, and the Congo, D.R.C. utilized homework that contained quizzes and printed take-home packets (UNICEF, 2020b). In Rwanda, a national diagnostic assessment was

administered to children in primary schools to identify students from low SES backgrounds who should receive remedial learning once schools reopened. In Zambia, assessments were conducted nationally to identify learning gaps and inform remedial learning programming to enable all children to catch up at the grade level (Matwafali & Masaiti, under review). In Mauritania, teachers administered assessments in the form of take-home packets with quizzes to complement the radio and TV lessons with a focus on students from marginalized and rural areas (Dreesen et al., 2020).

Monitoring and evaluation (M&E) frameworks were designed to assess learning continuity and catch-up learning. Findings reveal that radio and home-based instruction have been more effective in developing reading skills in young children than no intervention. Those lacking access to interventions consequently exhibited a greater magnitude of learning loss and were at-risk of lagging further behind their peers. Furthermore, the cluster randomized control trial (CRCT) reveals evidence of the positive impacts of math-themed read-aloud stories and syllabic instruction for Hausa language reading (FHI 360, 2021c).

Interventions after Schools Reopened

The African Union (2020) encouraged its member states to agree on Return-to-School frameworks, processes, and principles that ensured safe learning continuity. The plan included adjusting academic calendars and instituting catch-up or remedial programs (UNESCO, 2021a, b). School reopening interventions included rotational school schedules (e.g., Heaner et al., 2021), accelerated learning programs and Teaching at the Right Level (TaRL approaches [MoGE, 2021b; UNICEF, 2021b; World Bank, 2020]), and after-school community-driven remediation programs. To make up for lost time, some governments delayed school holidays (e.g., MoGE, 2021b). The Nigerian states of Borno, Adamawa, and Sokoto changed school operations by extending the number of days children attended school (Heaner et al., 2021). Countries like Zambia designed M&E strategies to assess implementation fidelity for remote learning or accelerated learning when schools reopened (MoGE, 2020b).

Discussion

Our present scoping review presents a summary of interventions, responses, and measures implemented across several SSA LMIC countries aimed to mitigate learning loss and address the pervasive learning crisis. As a result of school closures due to the pandemic, researchers project a high magnitude of learning loss, particularly for early grade learners (Angrist et al., 2021). Learning challenges in SSA such as lack of teaching and learning resources, ineffective pedagogical approaches, overcrowded classrooms, and lack of home literacy support (Dubeck et al., 2012; Kim et al., 2016) have been exacerbated by the COVID-19 pandemic. Our findings indicate that local and international education stakeholders in many SSA LMIC countries collaborated with Ministries of General Education and attempted to use technological interventions as well as paper-based distance learning methods and exerted measures in the form of institutionalized policies to mitigate learning loss during and after school closures (UNESCO, 2020, 2021). Global trends show reduced teacher-student contact during school closures and consequently, reduced literacy instruction (Dang et al., 2021). The

policy responses and interventions discussed herein aimed to ensure access to education and enhanced equity by targeting vulnerable and marginalized learners, including those with special needs, girls, out-of-school children, refugees, and students from lower SES backgrounds.

During school closures, many countries adapted multimodal distance learning solutions to ensure continuity of learning for all the learners (ADEA et al., 2022; Conto et al., 2021; Kiendrebeogo et al., 2021; UNESCO, 2020; World Bank, 2020). Children in the early grades received instruction through mainly radio and TV programing. Technical experts from local MoGEs and development partners created content in relevant languages of instruction that was broadcasted through national and community radio stations. Despite huge efforts to disseminate content through distance learning modalities, many children in multiple countries received no instruction and were not reached due to major challenges such as access to technology, devices, poor/no internet penetration, and poor or no electricity coverage (ADEA et al., 2021; ADEA et al., 2022; Heaner et al., 2021; UNESCO et al., 2021; UNOCHA, 2020). The evidence from SSA LMIC corroborates with response mechanism in other contexts (middle and high-income settings) where the immediate response to ensure learning continuity and access to basic education was distance learning solutions (Barron Rodriguez et al., 2021). The take-up of remote learning solutions was high in middle and high-income countries with high levels of scale and scope of remote learning measures (Muñoz-Najar et al., 2021).

While the remote learning solutions programs focused on developing component skills of literacy in a variety of languages of instruction, limited evidence exists on dimensions such as engagement during learning, frequency of use, uptake, check for learning measures, and learning progress (Barron Rodriguez et al., 2021). Foundational literacy instruction should be systematic and explicit particularly for code-focused skills, oral language and vocabulary skills that are building blocks for text reading fluency and reading comprehension (Foorman et al., 2020; Petcher et al., 2020). Teaching the code-focused skills needs in many LMICs has been limited to classroom studies. Hence, in order to teach effectively, the teacher needs to possess competence in pedagogical content knowledge and the capability to adjust their teaching practices to engage students effectively in the learning process.

Many studies reviewed do not highlight the frequency and regular access of the radio and TV lessons. Learning via TV and radio modalities does not allow teacher-student interaction, which is critical for learners in early grades. Thus, it is difficult to check for learning, implement classroom management practices (i.e., monitoring time on task), evaluate whether students understand the content and have achieved the learning objectives, provide feedback, or determine whether learners have necessary supports and materials (UNESCO, 2020). Distance-learning modalities complicate attempts to differentiate instruction and cater to the individual needs of students. Crosson and Silverman (2022) reported key barriers to remote instruction such as a lack of opportunities for small group discussion (reduced support for language and vocabulary skills) and technological challenges due to learning to use new software.

There were notable challenges in best approaches to teach the component skills of reading comprehension. For instance, teaching phonological awareness through video

instruction where the teacher shares their screen is considerably different from in-person contexts where teachers use visual aids and children can observe the teacher's lips. Furthermore, students need to practice models of the phonological aspects presented by the teacher in the lessons such as articulating phonemes, segmenting and blending phonemes. This is particularly impactful when teaching foundational literacy skills such as phonemic awareness and phonics, as the teacher models how to enunciate the sound. In the other component skills, the teacher needs to guide children to read the stories multiple times to help them improve their accuracy rate. Engaging learners in vocabulary and reading comprehension strategies such as introducing new vocabulary and practicing the use of new vocabulary, prediction of the story and activation of prior knowledge, engaging students in comprehension activities such as retell, sequencing, summarizing, and answer factual and inferential questions require in-depth student-teacher interactions which are limited in a one-way model of dissemination. In alignment with other low-income settings, writing instruction and practice in SSA LMICs was very limited due to a lack of technology to support writing practice, poor organizational structure, inaccessibility of writing materials, and lack of opportunities to model writing (Akinrinmade et al., 2021; Crosson & Silverman, 2022). Assessment is critical for monitoring students' learning progress and measuring reading effectiveness. There is limited evidence on policies and guidelines on learning assessment during school closures. Thus, in many regions it was difficult to measure learning loss or gains that those children made as a result of remote learning (ADEA et al., 2022). This brings into question the reach and reliability of these interventions. If children are not able to be assessed using one of the most basic and far-reaching forms of distance learning technology (radio), then education stakeholders must seriously reconsider the infrastructure of education in contexts absent of community learning centers. It is also critical for countries to track students' learning progress through standardized assessments at all grade levels stored in secured national or regional databases. Available data can be used to make comparisons of learning gains/loss over time and is critical to informing classroom instruction. Countries might also establish curriculum-based remote assessments for all grade levels with accommodations for learners with special needs, should these be required in the future.

Key Lessons for Reflection by SSA Countries as They Continue to Mitigate *Literacy-Learning Loss*

Evidence indicates that SSA countries continue to enact policies and interventions aimed to mitigate the learning crisis. These findings highlight several key lessons that SSA countries can draw from in order to build back stronger and more resilient education systems, and ultimately improve foundational literacy skills among early grade learners. UNESCO (2021) proposed several recommendations for remediating learning loss in Congo, D.R.C., Mauritius, and Gabon. The key lessons include administering a needs or diagnostic assessment to establish which skills need to be retaught, using an adaptive teaching methodology with a condensed curriculum, prioritizing teacher training, emphasizing socioemotional learning, targeting instruction for specific competencies, and focusing on gender equality. It is crucial for policymakers and educational stakeholders to emphasize pre-primary education, as this population was hardly reached during school closures (Avenasian et.al, 2021). Angrist and colleagues (2021) suggest interventions to improve learning outcomes of foundational literacy skills include providing instruction targeted to a child's level and using structured pedagogy

programs. Programs that include structured lesson plans, teacher and student books, teacher training and PD, and teacher instructional support while allocating an hour each school day to a TaRL approach may help children catch up on skills they missed during school closures. SSA countries might also use the COVID-19 pandemic as a springboard to initiate curriculum reforms that include TaRL and structured pedagogy, with an emphasis on community learning centers for supplemental learning opportunities outside the classroom. Regarding learning assessment, ADEA, AU/CIEFFA, and APHRC (2022) recommend that GPE partner countries reimagine and adopt EdTech in learning and assessment processes by expanding the use of technology beyond formative assessments (e.g., the creation of early grade reading self-evaluation tools that automatically score and provide solutions to problems). Education systems that build the teachers' and administrators' capacity to use digital technology for assessments and create awareness/build parental capacity for supporting home learning while also allocating more domestic resources to education will ultimately be able to react in a timely and effective manner during emergency responses. There is a need to prioritize SSA country investments into education technology and distance learning infrastructure, particularly in remote areas where learners may have little or no access to onsite learning during emergencies (ADEA et al., 2021).

Conclusion

The education sector in SSA was severely weakened by the COVID-19 pandemic and was unprepared to tackle the challenges presented. The efforts to respond to and mitigate the learning loss crisis were not all-inclusive, as the most vulnerable populations were not reached and continue to be at-risk of falling further behind their peers. These findings exemplify the widened achievement and inequality gap in education that affect learners from low-income contexts. There is an urgent need to support vulnerable populations of students, particularly preschool and early grade children, to acquire foundational literacy and numeracy skills. Governments may consider prioritizing TaRL pedagogical approaches, financing, technology, digital learning, different modalities of assessment, parental support and engagement, and continued teacher training in order to meet these children's needs. Further empirical evidence on the extent of learning loss is needed to inform the continued responses and interventions.

Dr. Brenda Wawire *is an Associate Research Scientist at the African Population and Health Research Centre. She has research experience in literacy acquisition across languages, second language acquisition, and pre-service and in-service reading teacher training. Dr. Wawire currently supports education stakeholders in multilingual contexts to implement structured interventions to support early grade students with reading difficulties.*

Dr. Adrienne Barnes-Story *is a Literacy, Pedagogy, and Research Specialist with Learning Systems Institute at Florida State University. She has over 20 years of experience in education research and international education and development. Dr. Barnes-Story currently supports several developing countries to design primary curricula and teacher/stakeholder professional development materials.*

Dr. Elisheba Kiru *is a Post-doctoral Research Scientist at the African Population and Health Research Center. Her research interests/scholarship include understanding innovative pedagogies using learning technologies, special education, inclusive education, and comparative and international education. She is a scholar-practitioner with experience teaching in K-12 settings, coaching pre-service and veteran teachers.*

Sungkyum Kim *is a PhD student in the International and Multicultural Education program at the College of Education, Florida State University. In support of the Learning Systems Institute at Florida State University, he is currently supporting a project for designing primary teacher curricula and faculty professional development in Malawi.*

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