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DELIVERING DISTANCE LEARNING IN EMERGENCIES:

A REVIEW OF EVIDENCE AND BEST PRACTICE

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ACRONYMS

ADSL	Asymmetric Digital Subscriber Line
BEC	Basic Education Coalition
DBE, RSA	Department of Basic Education, Republic of South Africa
ECACP	Early Childhood Advancement Certification Program
ECD	Early Childhood Development
EDC	Education Development Center, Inc
GPE	Global Partnership for Education
HSDPA	High-Speed Downlink Packet Access
IAI	Interactive Audio Instruction
ICT	Information Communications Technology
INEE	Inter-agency Network for Education in Emergencies
IRI	Interactive Radio Instruction
LMS	Learning Management System
MOOC	Massive Open Online Course
M&E	Monitoring and Evaluation
NGO	Non-Governmental Organization
OER	Open Educational Resources
SES	Socioeconomic Status
SOA	Schools of the Air
STS	School-to-School International
SMS	Short Message Service
TV	Television
UDL	Universal Design for Learning
USAID	United States Agency for International Development

KEY TERMS

Asynchronous teaching and learning	Teaching and learning that happens at different times AND in different places (e.g., recording lectures and having students respond with questions and comments on a discussion board on their own time).
Complementary learning	Reinforcing what is taught through a formal or non-formal curriculum (e.g., short video programs that depict a historical figure or demonstrate a science experiment to explain a topic).
Gender responsive teaching and learning	“Teaching methods and learning materials that take into account the specific learning needs of female and male students” (USAID, 2018a, p. 3).
Inclusive education	“Having one system of education for all students, at all levels (early childhood, primary, secondary, and post-secondary), with the provision of supports to meet the individual needs of students. Inclusive education focuses on the full and effective participation, accessibility, attendance, and achievement of all students, especially those who, for different reasons, are excluded or at risk of being marginalized” (USAID, 2018b, p. 45).
Learning management system	Learning management system is the software programs used for facilitating all aspects of online learning.
Learning outcomes	While learning outcomes can include cognitive and subject learning measures (e.g., literacy and numeracy test scores) ¹ alongside non-cognitive measures (e.g., socioemotional learning), the evidence found for this review was heavily focused on cognitive and subject learning outcomes.
Non-formal education	“Non-formal education takes place both within and outside educational institutions and caters to individuals of all ages. It does not always lead to certification. Non-formal education programs are characterized by their variety, flexibility, and ability to respond quickly to new educational needs of children or adults. They are often designed for specific groups of learners such as those who are too old for their grade level, those who do not attend formal school, or adults. Curricula may be based on formal education or on new approaches. Examples include accelerated ‘catch-up’

¹ While education research may encompass greater outcomes beyond these two measures, in the context of distance learning, there were no studies identified for this review that looked at retention, attendance, and other performance measures. There is also a dearth of studies on socioemotional outcomes as a result of distance learning.

learning, after-school programs, literacy, and numeracy. Non-formal education may lead to late entry into formal education programs. This is sometimes called ‘second-chance education’” (USAID, 2018a, p. 46).

Supplementary learning

Adding to learning formal or non-formal curriculum (e.g., educational TV programs and educational app games).

Synchronous teaching and learning

Teaching and learning that occurs simultaneously, but not in the same place. It often refers to online learning that happens in real time via digital, video, audio, or online forums.

Two-way audio

“A voice-only communication system that allows for two-way communication—listening and speaking. Audio can be transmitted via phone, satellite, the Internet, or high-frequency radio. The best-known example of two-way audio instruction for distance learning is Australia’s Schools of the Air” (Burns 2011, p. 293).

Universal Design for Learning (UDL)

“UDL is an approach to instruction that prioritizes meeting the needs of learners with disabilities” (Hayes, Moran, and Turnbull 2019, p. ix)

EXECUTIVE SUMMARY

The purpose of this review is to provide evidence on four effective distance learning modalities that can be implemented in USAID-recipient countries during and beyond emergencies. These four distance learning modalities—radio/audio, video/television, mobile phone programming, and online learning—are examined alongside the technologies used to access distance learning (radios, mobile phones, televisions, tablets, and, to a lesser extent, computers). While these modalities can be implemented in conflict settings and during crises, such as the COVID-19 pandemic when learning institutions are closed, their utility also extends beyond these extreme circumstances in order to promote inclusion and to increase access to quality teaching and learning. Distance learning has a rich history around the world providing teaching and learning opportunities for communities that have been historically excluded from formal learning, such as ethnic, indigenous, and linguistic minority groups; women; people with disabilities; rural residents; families and individuals living in poverty; and communities in crisis and conflict areas. Likewise, distance learning offers new methods and modes of learning to nontraditional learners, such as working adults, educators, or homeschooled children and youth (Burns 2011).

This review responds to three primary questions: What distance learning modalities are shown to be most effective in the Global South for providing continuity in learning amid temporary or permanent school closures? What distance learning modalities are promising but lack evidence? What are the required considerations when planning for and implementing distance learning? To the extent possible, evaluations, academic research, and implementing partners' experiences ("gray" literature) are used to show which aspects of the different modalities have been effective and how they have been effective, whether increasing literacy and numeracy acquisition, addressing learners' wellbeing, or in meeting other curricular and non-curricular goals.

This review also presents important considerations for the teams planning, creating, and implementing distance learning programming, and for educators and learners using the various modalities. These considerations are analyzed across different contexts—the education system, learning environment, and home and community environment—to provide evidence and findings for stakeholders working on different aspects of distance learning. Equity factors, which must be acknowledged when planning distance learning, are also highlighted. Factors include geography, gender, socioeconomic status (SES), disability, and minority and language group. As distance learning can often amplify educational divides (Harris 2020; OECD 2015; Picton and Clark 2015), planning for equity at every step of the way is critical. Finally, this review provides snapshots of the different distance learning initiatives and programs that have been implemented around the world, including both the promises they offer and the challenges they pose.

While this review is meant to guide distance learning planning efforts beyond a crisis response, it was prompted by the COVID-19 outbreak and therefore concentrates on four modalities that can be used during crises when physical contact is limited. As this pandemic has already had a severe impact on education systems around the world, an emphasis is placed on balancing recommendations for planning, both fast and slow (Burns 2020b). In the context of COVID-19, learning institutions have closed in most countries and learners are likely to be at home for months, according to projections from Global Partners in Education, the Brookings Institution, the World Bank, UNESCO, and UNICEF. Caregivers and families are having to quickly step into the role of educators, adding to the economic, psychosocial, and other challenges they are already facing. Serving multiple purposes, distance learning helps provide normalcy for educators and learners during sudden disruptions, continued teaching and learning opportunities, contact with peers, mentoring and tutoring, important public health information, and

psychosocial care (Boisvert 2017). However, unless distance learning has been designed as an intentional stand-alone program from the start, it is unlikely to meet the educational needs and learning outcomes demanded in curriculum and standards in the long-term.

Looking beyond crises and emergency contexts, intentional and evidence-based distance learning is critical in promoting greater access in education. Increasingly, the different modalities are being implemented for different ages of learners, from preschool learners to pre-service adult teachers, in different urban and rural contexts, and through formal and non-formal institutions. More and more, learners are exposed to distance learning at different points of their education for four main purposes: (1) teaching lessons based on formal or non-formal curricula as the *primary means of instruction* (e.g., for learners not in school or learning online); (2) teaching lessons based on formal or non-formal curricula to *complement (reinforce) learning* (e.g., short teaching demonstrations); (3) providing *additional educational support* to learners (e.g., tutoring); and (4) *supplementing learning* beyond a formal or non-formal curriculum (e.g., educational television).² As the review reiterates, no distance learning modality or program is ideal for teaching *all* skills to *all* learners in *all* contexts and, therefore, suggested audiences along with challenges and opportunities are presented within each modality. Each governing educational body overseeing distance learning has to choose the best combination of modalities based on access to technology and content, technical infrastructure, and the speed at which they can roll out distance learning.

A final objective of this review is to provide recommendations based on what has been tried and studied in distance learning around the world. These recommendations can be used to inform strategies that address teaching and learning not only during the COVID-19 crisis, but also beyond the pandemic to help shape the future of distance learning. One of the main findings of this review is that although notable innovation has gone into piloting and rolling out distance learning initiatives over the past eight decades, there is insufficient evaluation and research on what works, why, how, in what conditions, and for whom.³ In order to respond to future pandemics and other crises, it is imperative that more financial resources and expertise be allocated to evaluating different modalities and technologies, so that rapid and well-guided distance learning measures can be put in place before learning institutions are closed.

As this review emphasizes, distance learning has strong potential for increasing inequities in learning as marginalized communities are further isolated and denied access during crises (Turner Lee 2020). When well-studied, planned, and implemented, however, distance learning also has the potential to increase opportunities for the most marginalized. This will require mixed-modality approaches that tap into the different technology, resources, and experiences that learners have in distance learning, as well as careful foresight and planning. Although distance learning has often existed as a supplement or alternative to in-person education, it is increasingly becoming a critical form of education in its own right. COVID-19 is likely to impact learning institutions for years to come, but it also opens the potential for more effective and evidence-informed distance learning approaches in the future. While distance learning cannot be the *only* solution to increasing access to and quality of teaching and learning during and beyond emergencies, it is one important part of the response.

² See additional purposes in the larger policy and political economy related purposes in Hennessey et al. 2010.

³ For USAID initiatives, this may be in part because many of the radio, video, and mobile phone programs cited in this review were initiated before USAID's Evaluation Policy (2011, updated 2016) was rolled out.

INTRODUCTION

The purpose of this review is to provide evidence on effective distance learning modalities that can be implemented in USAID-recipient countries during emergencies and beyond. Distant learning modalities can be used to improve access to education, and enhance learning, as well as to provide educational continuity in response to pandemics such as COVID-19, disease outbreaks like Ebola, political or social unrest, and natural disasters. The first part of this document looks at how distance learning has been rolled out under the current crises of COVID-19, followed by a description of four distance learning modalities and the accompanying technologies. For each of the four modalities, a detailed exploration of important considerations is presented for the teams planning, creating, and implementing distance learning programming, and for educators and learners using the various modalities. These considerations are analyzed across the education system, learning environment, and home and community environment in order to provide nuanced information for implementers. Equity factors are also discussed in this review, including geographical reach, gender, SES, disability, and minority and language group. Finally, this review provides snapshots of the different distance learning initiatives and programs that have been implemented (see Annex: Programmatic Snapshots), including both the promises they offer and challenges they pose, and short-term and long-term recommendations for informing distance learning strategies.

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DISTANCE LEARNING IN EMERGENCIES

During crises and conflicts, closures of learning institutions and non-formal programs can exacerbate the vulnerability of learners and their families and have a detrimental impact on learners' wellbeing. These gaps in learning contribute to educational inequities, delay learners' progress in school, and can pose threats to safety. Children and youth not engaged in formal or non-formal learning are often more vulnerable to violence and exploitation through unsafe work, early marriages, begging for food, and other activities (Ghaffar-Kucher 2018). Moreover, teacher training institutions have closed, leaving pre-service teachers in limbo and delaying the entry of new educators into the teaching workforce.

Conversely, distance learning provides educators⁴ and learners with a sense of normalcy, routine, contact with peers and educators, and psychosocial support, all of which are critical to the wellbeing of children, youth, and educators. According to a 2015 Global Education Cluster, UNICEF, and Save the Children brief on the Ebola response, "school provides a sense of stability, hope, and helps to mitigate the psychosocial impact of a crisis." In the case of COVID-19, formal and non-formal institutions are

⁴ Note that staff and administrators are also included under the category of educators. In-service teachers can serve as educators and learners, as they are both in practice and often engaged in learning opportunities. Pre-service teachers are treated in this article as learners as they often have similar demographics to tertiary and university students that would also be classified as adult learners.

being challenged to modify not only learning calendars, curricula, and lesson plans, but also the modalities through which teaching and learning take place. Learning that until very recently occurred in person now must take place through distance learning.

Ministries and departments of education around the world have rolled out strategies for quick transitions to distance learning (see Cobo, Hawkins, and Rovner 2020; Trucano 2020). To name a few, UNICEF and UNESCO have shared publications, data, strategic thinking on mitigating the effects, and curated list of educational applications, platforms, and resources (see below). The Inter-agency Network for Education in Emergencies (INEE) has published and shared guidance for educators, learners, caregivers, policymakers, ministries, and community members on how to support learning and wellbeing during crises such as COVID-19 as well as how to rollout ICT in learning (see checklist below). The Brookings Institution has presented research, strategies, and implications for learning in the United States and globally (see Anderson 2020; Harris 2020; Turner Lee 2020). Implementing organizations have shared their experiences, challenges, and successes as technical experts leading distance learning efforts (see AIR 2015; BEC 2020; Bosch, Hartenberger, and Alhamzy 2017; Burns 2011; Corlazzoli 2014; Ho and Thurkal 2009). The private sector has also shared data and guidance on technology use (see Google Classroom, Zoom, and other sites). The World Bank continues to publish blog posts on broadening technological reach and distance learning, and the Global Partnership on Education's (GPE) blog covers different distance learning approaches that have shown promise and success (see Trucano 2020 for World Bank Group and Bangay 2020; Burns 2020a, 2020b for GPE)

- [*Checklist for Information and Communications Technologies \(ICT\) Interventions to Support Education in Crises and Conflict Settings*](#) (INEE 2018a).
- [*Distance learning solutions*](#) (UNESCO, 2020b)
- [*How ministries of education are working with mobile, telecom providers, ISPs, and others to increase access to digital resources during COVID-19-drive school closures*](#) (Trucano 2020)
- [*How countries across Latin America use technology during COVID-19-drive school closures*](#) (Cobo, Hawkins, and Rovner 2020)
- [*How countries are using edtech \(including online learning, radio, television, texting\) to support access to remote learning during the COVID-19 pandemic*](#) (World Bank Group 2020)
- [*Emergency teaching online: 7 steps to get started*](#) (Burns 2020a)
- [*School, interrupted: 4 options for distance education to continue teaching during COVID-19*](#) (Burns 2020b)
- [*Coronavirus: What education ministers can learn from Ebola*](#) (Werner and Skidmore 2020)
- [*How can Sierra Leone's education response after Ebola help with the COVID-19 response?*](#) (Bangay 2020)
- [*COVID-19 Response Pivot Stories*](#) (Basic Education Coalition 2020).

CONSEQUENCES OF THE COVID-19 PANDEMIC

COVID-19's impending impact on education is large—and growing. As of March 31, 2020, most countries had implemented nationwide or localized school closures, affecting more than 1.5 billion learners (UNESCO 2020a). For educators, this likely means loss of income alongside overwhelming responsibilities at home, expectations to quickly roll out and master distance learning modalities, health concerns, and additional stress and emotional demands for those who already teach and live in challenging conditions. For learners, effects take the form of lost routine and social contact, learning setbacks, expectations to adapt to new modalities of learning, emotional and psychological stress, and fear and threats to their physical and psychosocial well-being.

For the majority of caregivers, the pandemic could result in loss of income, increased food and shelter insecurity, greater expectations for facilitating learning of their children, additional stress and emotional demands, health concerns, and heightened safety and security concerns for those living in crisis contexts and difficult environments (Inter-Agency Standing Committee 2020; INEE 2018b). The effects will be the grimmest for children, youth, and adults living in poverty, existing crisis and conflict contexts, those who have disabilities, those who are exposed to violence and oppressive conditions, minority and indigenous groups who are already marginalized, and girls and women in contexts where they are expected to take on additional caregiving roles. Educational inequities for those most adversely affected will continue to deepen and new ones will emerge (Turner Lee 2020). Although this pandemic differs from outbreaks such as Ebola in that it reaches every corner of the world, learning from past crises and conflicts can help agencies anticipate and plan for the effects.

REVIEWING THE EVIDENCE ON DISTANCE LEARNING

The evidence in this review, which is illustrative and not exhaustive, is drawn from implementing partners’ experiences (“gray” literature), program evaluations, and research from sub-Saharan Africa, Asia, Latin America, and to a lesser extent evidence from North American and Europe. This literature presents important considerations for the teams planning, creating, and implementing distance learning programming, and for educators and learners using the various modalities. This review responds to three questions:

- What distance learning modalities are shown to be most effective in the Global South for providing continuity in learning amid temporary or permanent school closures?
- What distance learning modalities are promising but lack evidence?
- What are the required considerations when planning for and implementing distance learning?

The four distance learning modalities —audio/radio, video/television, mobile phone, online teaching and learning— are outlined in Exhibit I. While these modalities are separated into four groups, a combination of modalities has the greatest potential for reaching the most learners (e.g., different ages, geographical locations, education levels, learners with disabilities, gender) and for maximizing learning outcomes, which can be cognitive (e.g., literacy, numeracy) and non-cognitive measures (e.g., openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability), or defined as socioemotional learning skills. Although the evidence is heavily skewed toward cognitive measures, non-cognitive skills are critical to predicting later schooling and life outcomes such as health (see Heckman 2012). As an ICT expert in northern Nigeria Anthony Udeh advises, “using multiple and different approaches and building on technology that people have access to and responds to the environments in which people live will ensure the greatest impact” (personal communication, 4-2020).

Exhibit I: Distance learning modalities, by technology and programming⁵

MODALITY*	TECHNOLOGY	CATEGORIES
Audio/Radio	<ul style="list-style-type: none"> • Mobile phones (feature) • Tablets (Mp3 players) • Radio broadcasting 	A. Interactive audio/radio instruction programs ^c B. Audiobooks, podcasts, radio dramas, two-way programs ^{primarily nc}
Video/Television <i>Digital and analog</i>	<ul style="list-style-type: none"> • Mobile phones (smart) • Tablets (Mp4 players) • Television broadcasting 	A. Video instruction programming ^{c, nc} B. Educational television broadcasting ^{nc}
Mobile Phone <i>Voice, text (SMS), web-based</i>	<ul style="list-style-type: none"> • Mobile phones (feature phones and smartphones) 	A. Electronic teaching and learning materials (e.g., learning packs, M-novels, mobile storybooks) ^{c, nc} B. Educational apps and games ^{nc} C. Distance tutoring and coaching ^{c, nc} D. Virtual teaching and learning groups ^c
Online Teaching and Learning <i>Cloud-based or Internet dependent</i>	<ul style="list-style-type: none"> • Mobile phones (smart) • Computers • Tablets 	A. Virtual Classrooms, ScreenCasting, and MOOCs ^c B. Open Educational Resources (OER) ^{nc}

⁵ Paper based materials (e.g., books and packets) may be distributed for distance learning if that is appropriate to the context. This may, however, not be feasible in crisis and conflict situations.

Notes: ^c denotes content that can follow a curriculum, ^{nc} denotes content that does not follow a curriculum.

These distance learning modalities can be used for different purposes, such as:

- Teaching lessons based on formal or non-formal curricula as the *primary means of instruction* (e.g., interactive audio/radio programs where there are no formal schools or when schools are closed; online education for nontraditional learners or during school closures)
- Teaching lessons based on formal or non-formal curricula to *complement* (reinforce) *learning* (e.g., short video programs that depict a historical figure or demonstrate a science experiment to explain content)
- Providing *additional educational support* to learners (e.g., phone-based or virtual tutoring)
- *Supplementing learning* beyond a formal or non-formal curriculum (e.g., educational TV programs, educational app games, or audio books)

These modalities can also be combined or blended into a multiple-modality approach⁶ as both primary and supplemental instruction. The relevance and effectiveness of each modality will vary greatly by context and between and within countries, as well as by availability of and access to technology (Silver and Johnson 2018; UNESCO 2020d).

Exhibit 2 illustrates how access to technology varies greatly by country and region. Although Internet and computer access has increased, radio and mobile phones are far more accessible across regions and within countries than computers, tablets, and the Internet. Radio and television are also generally easier for younger children and adults with low literacy and technology literacy to operate than devices such as tablets. Furthermore, special attention should be paid to providing technological and learning support to marginalized learners, such as those who do not speak the primary language of instruction, do not have literate caregivers, are living with housing or food insecurity, and those with disabilities. Thus, a country's technology must be carefully assessed when determining the most appropriate modalities and technologies to be used.

⁶ Note the term approach is used to capture a way of combining modalities and technologies, or a pedagogical approach to teaching.

Exhibit 2: Global access to radio, television, and Internet (and charging capabilities)

TECHNOLOGY	ACCESS IN GLOBAL SOUTH (LOW- AND MIDDLE-INCOME COUNTRIES)
<p>Radio <i>Wind-up, solar, electricity, and battery operated</i></p>	<ul style="list-style-type: none"> • An estimated 75% of households in the Global South have access to radio, in sub-Saharan Africa 80-90% have access to a working radio (EFA Global Monitoring Report 2012, p.248). • There are about 44,000 radio stations worldwide (CIA World Factbook 2010). While some countries have state platforms, private and community radios are also common. The total number of community radio stations in Latin America is around 10,000 (Myers 2011, p. 9). • Of 11 African countries surveyed, local commercial radio grew by an average of 360% between 2000 and 2006, and community radio grew by 1,386% (da Costa 2012). • Most countries, no matter the level of development, broadcast radio using terrestrial transmission platforms. 37 out of 51 countries (73%) surveyed by UNESCO have channels available through these platforms (UNESCO 2013). • Radio is increasingly being accessed via mobile phones. For instance, 30% of male listeners in Pakistan said they had listened to radio using their mobile device. In Zambia, 33% of radio listeners said they listen on their phone on a weekly basis, with 25% listening daily (UNESCO 2013). • Radio is increasingly becoming interactive. 83% of Tanzanians reported that they get their news and other information from the radio, making radio the leader for both media and non-media sources. Additionally, 76% of listeners in Tanzania listen to interactive radio call-in shows (UNESCO 2013). • Radio is more reliable in rugged and remote regions, as information is able to travel to areas where television signals might be blocked by mountains or other physical barriers. In the mountainous interior of the Philippines, radio reaches 85% of households in the country, whereas television reaches just under 60% (UNESCO 2013). • Radio listenership can be boosted (up to 20%) through weekly SMS alerts sent to listeners' phones 30 minutes prior to broadcasts (Sullivan 2011, p. 5). • Radio is critical in crisis and conflict contexts. In South Sudan, in addition to the popularity of community radio stations, international (BBC) short wave radio became critical during the war of independence and thereafter (BBC Media Action 2012. p. 16). • Radio listening is more evenly spread across urban and rural users, which differs from Internet usage. In rural areas, radio is also more accessible than television. In Zambia, the difference is significant (68% for radio and only 26% for television) (UNESCO 2013).
<p>Television <i>Primarily electricity charged (can run on rechargeable battery or solar power)</i></p>	<ul style="list-style-type: none"> • As of 2018, 1.67 billion households globally had access to television (including 75 million households in sub-Saharan Africa) (Burns 2020b; Statista 2018). • In Africa, television is gaining a greater audience share than radio. Still, there is a limited proportion of households that have access to television, as shown here (World Bank 2018b). • In the 2016 Arab Youth Survey, 63% of respondents regularly accessed television. This includes data from 16 countries, with the largest (by population) being Egypt, Algeria, Morocco, Iraq and Saudi Arabia. • Television is gaining a greater audience share in Africa than radio (although still has a lower usage) (2018 UNESCO Global Report). However, that is not indicative of the entire region. In a 2016 study, only 12% of primary caregivers in Tanzania (n = 5,000) owned a television, while 47% owned a radio (Alexander et al. 2019).

TECHNOLOGY**ACCESS IN GLOBAL SOUTH (LOW- AND MIDDLE-INCOME COUNTRIES)**

Mobile Phones

Electricity and solar charging

- In 2016, there were 4.83 billion unique mobile cellular subscriptions globally. This number accounts for two-thirds of the world's population. The metric "mobile cellular subscriptions per 100 people" indicates regional disparities in ownership, however. In 2018, there were 82 mobile cellular subscriptions for every 100 people in Sub-Saharan Africa and 120 mobile cellular subscriptions per every 100 people in East Asia and the Pacific, excluding high-income countries (World Bank 2018b).
- Smartphone adoption is modest, as the most common type of mobile device owned by users in sub-Saharan Africa is a basic (feature) phone. In 12 of 22 emerging and developing nations surveyed, less than 50% of the population reported owning a smartphone. Ownership is lowest in Tanzania (13%), India (22%), and Indonesia (27%) (Silver and Johnson 2018).
- Smartphone ownership, similar to Internet use, varies with different factors, including educational attainment, age, individual income, and gender. In Mexico, India, Ghana, Kenya, and Chile, men are 10 percentage points more likely than women to own a smartphone (Silver and Johnson 2018).
- In Africa, 3G/HSDPA was the main mobile data connectivity method in the region. However, a growing number of users are connecting through Wi-Fi at home or work (e.g., 30 %of users in Kenya; 60% of users in South Africa) (Deloitte 2016).
- The percentage of mobile-broadband subscribers has grown significantly in the last five years; however, there are twice as many subscriptions per 100 people in developed countries as in developing countries. There are four times as many subscriptions in the developed countries as than there are in the Least Developed Countries (International Telecommunication Union 2017).

Computers and Tablets

Primarily electricity charged (can run on rechargeable battery or solar power)

- Computer access is low among countries in the Global South, as the majority of households are without a computer. See additional data [here](#). 53 countries report that less than 30% of households own a personal computer (World Bank 2018b).
- While the ratio of computers to teacher and student have increased dramatically across the Global South, there are few countries that collect ratios at a national level to indicate the extent of access and use (Hennessey et al., 2010). For many teachers across the Gobal South, and East Africa, "computer and the Internet are still a mystery. This situation is even worse in the rural areas" (Hennessey et al. 2010) and among marginalized groups, such as learners in poverty, girls, those with disabilities (Niyigena et al. 2020).
- While many countries in the Global South have been equipped with computers, the challenge has been maintaining them, fixing them, and ensuring "associated hardware / software, provision of internet connectivity, training of teachers and teacher educators in ICT, and the development / selection of digitised pedagogical content" (Hennessey et al., 2010, p. 19).

Internet

As used through mobile phones, computers, tablets, and other devices

- In 2017, 48% of individuals regularly connected to the Internet. Additional information regarding individual countries and Internet use is included [here](#) (World Bank 2017b). In most cases, this access is via a personal computer using a cable broadband, dial-up, or ADSL access.
 - Internet use is lowest in Sub-Saharan Africa (25% of the total population) and South Asia (30% of the total population) (World Bank 2017b).
-

TECHNOLOGY

ACCESS IN GLOBAL SOUTH (LOW- AND MIDDLE-INCOME COUNTRIES)

- As of 2018, the Internet had the highest growth in users, especially in regions that have historically lagged in Internet use.
 - Africa has been the continent with the highest growth of Internet users. However, Sub-Saharan Africa continues to have the lowest rate of smartphone ownership of any geographic region, limiting regular Internet access (World Bank 2017b).
 - The proportion of youth (ages 15-24) using the Internet is higher than the total proportion of the population using the Internet (71% versus 48%). In developing countries, 67% of young people use the Internet, with 30% in least developed countries. Nearly 9 out of 10 young individuals not using the Internet live in Asia and the Pacific or Africa (International Telecommunication Union 2017).
 - Among 66% of the countries worldwide, the proportion of men using the Internet is higher than the proportion of women. In many countries, there is a connection between gender parity in education enrollment and gender parity in Internet use. For least developed countries, the gender gap in Internet use in 2017 was 33%, compared with 16.1% in developing countries, and 11.6% in the world gender gap (International Telecommunication Union 2017).
 - In the least developed countries, only 1 in 7 women is using the Internet compared with 1 out of 5 men. Additionally, the gender gap has widened in Africa since 2013, as the proportion of women using the Internet is 25% lower than the proportion of men (International Telecommunication Union 2017).
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Sources: African Media Development Initiative Research Summary Report, 2012; Deloitte 2016; Sullivan 2011; International Telecommunication Union, 2017; Silver and Johnson 2018; The World Bank 2017b; The World Bank 2018b; International. UNESCO 2013; UNESCO 2018.

In determining which modalities to use in a given country context (or in a district/province), a number of factors beyond access to technology need to be considered across three levels—the education systems level, the learning environment, and the community and home environment.⁷ Some of these key factors are outlined in Exhibit 3: Key considerations by three contexts: systems, learning environment, and home environment below and are based on education sector analysis principles (see UNESCO 2014). INEE (2018a) also offers a checklist for guiding users in making appropriate decisions about the use of technology. Modalities are also compared by disadvantages and advantages in implementation, as demonstrated in Exhibit 4: Key considerations by modality, advantages, and disadvantages.

Each modality also includes a brief analysis of equity factors and considerations (see exhibits in each modality). These include: geography (urban and rural); gender (males tend to have higher mobile phone and Internet access); household socioeconomic status (access to electricity and technology); disability (access to adaptive technology, closed captioning, and content that follows Universal Design of Learning); language and minority group (access to technology in home language and minority or indigenous groups). There may be inequities between countries; for example, 21 of the 22 low- and middle-income countries surveyed by Pew Research Center in 2017 had significant, double-digit divides in smartphone ownership between those with higher incomes and those with lower incomes. Inequities can also exist within different groups. In Ghana and Kenya, men are at least 10 percentage points more likely than women to own smartphones (Poushter, Bishop, and Chwe 2018). Where evidence permits, these factors are examined under each modality.

⁷ Note these levels are adapted from the USAID (2018) Literacy Landscape Analysis Toolkit. Washington DC.

Exhibit 3: Key considerations by three contexts: systems, learning environment, and home environment

CONSIDERATION	SYSTEMS LEVEL	LEARNING ENVIRONMENT	HOME ENVIRONMENT
Access to Technology (and means of charging technology)	<ul style="list-style-type: none"> • Internet infrastructure • Mobile phone network • Electricity access (for charging) • Agreements with radio and TV stations (affordability to broadcast) • ICT policy and foundations (access provided) • System for distributing technology (hardware) and software • Collaboration between government institutions, international agencies, schools, community groups, and families 	<ul style="list-style-type: none"> • Access to hardware through school (e.g., windup radios, tablets, phones) and policies to allow learners to take technology home • Educators’ access to technology 	<ul style="list-style-type: none"> • Access to hardware at home (e.g., radios, computer) • Access to adaptive technology for learners with disabilities
Learning Content and Pedagogy (availability and quality)	<ul style="list-style-type: none"> • Government distance learning unit capacity • Access to learning content and programming (e.g., audio, video, digital materials in language(s) of instruction) • Age-differentiated content (different modalities for different age levels) 	<ul style="list-style-type: none"> • Educators’ familiarity with using technology for instruction (e.g., training and capacity) and distance learning pedagogies • Age-differentiated and responsive instruction (different modalities for different age levels) 	<ul style="list-style-type: none"> • Families’ abilities to support distance modalities in the home (e.g., family member with basic literacy, numeracy, and/or technological literacy)
Wellbeing of Educators and Learners	<ul style="list-style-type: none"> • Plans for mentorship and coaching of educators and learners • Plans/programs for guidance and counselling of educators and learners 	<ul style="list-style-type: none"> • Educators have the time and resources to support learners while caring for their own families • Food security and safe spaces to teach 	<ul style="list-style-type: none"> • Food security (e.g., children are not pressured to earn money over learning) • Safe space to learn (e.g., sufficient light, minimized distraction, physically safe) • Time to learn (learners have time amid caregiving, cooking, and other responsibilities)

Below are key considerations to be used in planning that show advantages and disadvantages by modality.

Exhibit 4: Key considerations by modality, advantages, and disadvantages

CONSIDERATION	AUDIO/RADIO	VIDEO/TELEVISION	MOBILE PHONE (VOICE, TEXT, WEB)	ONLINE TEACHING & LEARNING
Access to Technology (and means of charging technology)	<ul style="list-style-type: none"> • Most accessible in reach/access and across age groups (especially for marginalized groups) • Usually non-electricity dependent • Low-tech requirements for user, usually no extra costs 	<ul style="list-style-type: none"> • Access across household and age group varies (less accessible to households without electricity) • Dependent on electricity/charging • Low-tech requirements, if household owns TV may not require extra cost 	<ul style="list-style-type: none"> • More accessible to older users (varies in accessibility for marginalized groups) • Can be non-electricity dependent • Low-tech requirements, if household owns phone may not require extra cost 	<ul style="list-style-type: none"> • Least accessible in reach, access, and age of users (and most inequitable access). • Dependent on electricity/charging • May require smartphone, tablet, or computer at a cost
Infrastructure	<ul style="list-style-type: none"> • Require radio broadcast agreements • Reception available in most remote settings • Does not require any cost beyond technology 	<ul style="list-style-type: none"> • Requires TV broadcast agreements • Less coverage in remote settings • May require cable access; when sending over phone or Internet, files need to be smaller and require Internet data (extra cost) 	<ul style="list-style-type: none"> • Can be used on multiple phone networks • Reception can be limited in remote settings • Requires phone and/or Internet data (extra cost); Universal Fund Agreements may mitigate or reduce costs 	<ul style="list-style-type: none"> • Requires online program capabilities • Internet access/bandwidth problem in many settings • Requires Internet data (extra cost)
Learning Content and Pedagogy (availability and quality)	<ul style="list-style-type: none"> • Can be interactive and engaging • Easy to facilitate after basic training • Requires another means for monitoring learning (e.g., phone follow up/caregiver check) 	<ul style="list-style-type: none"> • Can be interactive/engaging • Easy to facilitate after basic training • Requires another means for monitoring learning (e.g., phone follow up/ caregiver check) 	<ul style="list-style-type: none"> • Can be engaging but often limited to two-way conversations/texting • Easy to facilitate after basic training • Can integrate monitoring of learning 	<ul style="list-style-type: none"> • Most emulative of a classroom (asynchronous and synchronous potential) • Requires significant technology literacy/training • Integrates monitoring of learning
Accessibility to learners with disabilities	<ul style="list-style-type: none"> • Not accessible for people who are deaf, hard of hearing, deafblind, and some people with auditory processing disorders and autism 	<ul style="list-style-type: none"> • Can be designed to be accessible to learners with hearing, sight, or other impairments 	<ul style="list-style-type: none"> • Can be designed to be accessible to learners with hearing, sight, or other impairments 	<ul style="list-style-type: none"> • Can be designed to be accessible to learners with hearing, sight, or other impairments

MODALITIES FOR CONTINUITY OF EDUCATION AND KEY CONSIDERATIONS

To best compare access and functionality of each modality for the given context(s), factors must be considered at different levels—the education system, learning environment, and community and home—and across different equity factors. This section starts with a description of each of these modalities with examples, existing evidence on their effectiveness, and different considerations.

MODALITY 1: AUDIO AND RADIO

SUMMARY

- Target learners: All ages and educational levels
- Particularly useful for young children, pre-literate learners, visually impaired learners, non-dominant language speakers (especially those whose home languages are primarily oral)
- Major categories include interactive audio/radio instruction, audiobooks, podcasts, radio dramas, and two-way audio
- Advantages
 - Most accessible in geographic reach/access and across age groups (especially for marginalized groups)
 - Low-tech requirements for users, usually no extra cost
 - Easy to facilitate after basic training
- Disadvantages
 - Requires another means for monitoring learning (e.g., phone follow up/caregiver check)
 - Not accessible for people who are deaf, hard of hearing, deafblind and some people with auditory processing disorders and autism

A. INTERACTIVE AUDIO/RADIO INSTRUCTION (IAI AND IRI)

Interactive audio instruction (IAI) is an educational approach that uses interactive pedagogies to record educational content in audio segments that can either be digitized (IAI) or broadcast on radio (IRI). IAI is designed to solicit audience involvement and interactions, which makes this approach different from other audio and radio programming that emphasizes passive listenership. Emerging in the early 1970s, some educators across the US began to look at radio as “a possible inexpensive and universal means of redressing mounting educational problems worldwide: too few trained teachers, too many people with no access to education, and too few resources” (de Fossard 1994, p 7). In 1974, IRI mathematics programs were developed and used in Nicaragua—among the first attempts to implement IRI (de Fossard 1994). While IRI was developed and disseminated at first, in the past decades digitized audio material has been increasingly distributed via mobile phones and tablets.

IAI and IRI programs serve several different purposes. The first being to create access to non-formal education content and curricula in areas where there are no formal schools (see South Sudan Interactive

Radio Instruction). A second purpose is to improve the quality of teaching and learning in formal schools through complementary programs (see Zambia Quality Education Services Through Technology Project in Zambia). Third, IAI and IRI have been used to support teacher training and mental health counselors training programs through distance learning (see Zanzibar Early Childhood Advancement Certification Program Case Study below and Zambia Training of Lay Mental Health Counselors under mixed modalities). Fourth, IRI and IAI programs have been used to quickly deliver programming during crises such as Ebola (see USAID/Liberia Advancing Youth Project).

CASE STUDY | MULTIPLE-MODALITY DISTANCE LEARNING APPROACH— PROVIDING IN-SERVICE PRIMARY SCHOOL TEACHERS WITH EARLY CHILDHOOD DEVELOPMENT (ECD) TRAINING

The Early Childhood Advancement Certification Program (ECACP) provides an example of how distance learning can be used to train in-service teachers. In 2010, the Ministry of Education and Vocational Training in Zanzibar received funding from USAID (and later support by UNICEF and GPE) to design and implement a distance learning program for equipping primary school teachers to teach in preschool classes (instructional design was provided by EDC). The content of the ECACP training is delivered through a combination of video, audio, and print materials. In-service teacher trainees participate in interactive video instruction on brain and cognitive development of young learners, language development, and socioemotional support, among other topics. They watch a video trainer and children in a preschool classroom, as well as in-home and community contexts, and participate in activities and brainstorming through the 30-minute videos. Trainees are given guidebooks and materials to read lessons, and they complete assignments individually and in teacher cluster groups. Teachers also use IAI/IRI programs in their classrooms to practice ECD activities with their students and reinforce pedagogical approaches viewed in the videos. The ECACP is being implemented across Zanzibar in collaboration with the Ministry's distance learning division. According to a study of the program (Masoud 2020) distance learning was found to be effective in supporting in-service teachers with subject content, pedagogical content, and understanding of how students learn. "The results of this study show that [336] trainees gained knowledge, skills, and positive attitude towards preschool teaching. They were able to successfully apply the knowledge and skills acquired during the training in their classroom teaching. For example, all observed teachers used play as a main method in guiding preschool children" (p. 68-69).

EXAMPLES AND EVIDENCE

In the past four decades, there have been a number of leaders in IRI and IAI development, Education Development Center, Inc. is among the largest, with USAID, World Bank, and GPE serving as leading donors and development partners. According to Bosch, Hartenberger, and Alhamzy 2017,⁸ Christina and Louge (2015), Ho and Thukral 2009, Morris et al. 2009, Murphy, Anzalone, Bosch, and Moulton 2002, Trucano 2010b, and Vinogradova and Morris 2014, IAI/IRI programs have enhanced learning outcomes for marginalized and vulnerable communities in many contexts, including those in crises and conflict

⁸ See also Bell, Bosch, and Dabla 2006; Anzalone and Bosch 2009; Bosch 2005, 2003, 2001, 1997; Murphy, Anzalone, Bosch, and Moulton 2002

fragile. According to a 2005 evaluation supported by The World Bank, IAI/IRI “can be effective on a large scale at a low cost. IRI programs require teachers and learners to react verbally and physically to questions and exercises posed by radio characters and to participate in group work, experiments, and other activities suggested by the radio program” (Trucano 2010b).

Exhibit 10 (in [the annex](#)) shows examples and evidence from some of these programs. (A full table from the 1970s to 2009 can be found in Ho and Thukral 2009).

CASE STUDY | OPEN LEARNING SYSTEMS EDUCATIONAL TRUST, SOUTH AFRICA

The Open Learning Systems Educational Trust is a non-governmental organization that runs English in Action, a project that uses interactive radio programs to support English learning for both students and teachers. These 30-minute radio lessons are designed to promote learning through structured curriculum and active learning approaches, and the students complete activities led by teachers who have been given print materials to assist such as instructor manuals, student workbooks, and classroom posters. As this program is focused on radio broadcasting, a possible limitation is acquiring the necessary airtime. In some areas, the programs are broadcast by the national radio organization while in others the broadcast occurs through community stations, which can lead to inconsistent implementation. In some cases where reception is unavailable or the broadcasting schedules are unpredictable, students are able to access the lessons using provided tape recorders with taped lessons; while this method is useful, it does add financial costs. This approach is also beneficial in its engagement of teachers, as they are able to learn alongside their students.

B. AUDIO BOOKS, PODCASTS, RADIO DRAMA, TWO-WAY PROGRAMS

In addition to IAI/IRI programs, there are a number of different audio programs that can help enhance and support learning as complementary or supplementary resources. These include audio books, podcasts, radio dramas, and two-way programs as detailed below. Most of these programs do not follow formal (national) or non-formal curricula, but rather provide the educator with important resources for teaching literacy, numeracy, life skills, social studies, and other content knowledge.

AUDIO BOOKS

Studies have shown that audiobooks, or recorded readings of books, help learners cognitively in the development of literacy skills (e.g., develop grade-level appropriate content knowledge, increase comprehension and word exposure, improve vocabulary, reduce working-memory deficit, remove printed word decoding anxiety for learners with learning disabilities, foster educational independence, and build background knowledge) in ways similar to reading printed text (Sachs 2019). Learners also can relate emotionally to audio readings like they do with storylines in print, and they can be especially valuable for visually impaired learners who cannot access print texts. Furthermore, audio books have been shown to motivate some listeners to seek out print text (Godsey 2016). Finally, audio books are critical for learners and educators with disabilities that affect reading or processing text in print.

Audiobooks are available for learners of all ages and education levels, as such appropriate content selection is critical (Brightly 2020). Because learners who are not exposed to grade-level literature are at higher risk of falling behind in all areas of their studies, using audiobooks alongside other reading intervention approaches has proven successful in catching learners up to their peers (Ali 2017). Audiobooks may also serve as a way of engaging pre-service and in-service teaching learners in theory, content, and critical issues in their field of teaching to supplement learning.

PODCASTS

Podcasts are digital audio files uploaded to the Internet that can be downloaded to a computer, tablet, or mobile phone (feature and smart), or accessed through servers. Podcasts are often in the form of an audio narrative series, with new installments delivered to subscribers automatically. Audio narratives use storytelling to convey information to the listener, whether facts, concepts, or experiences (Godsey 2020). They are often used to explore topics to supplement learning but are not usually directly written to a curriculum.

Appropriate for all ages and education levels, podcasts are deemed most effective for learners ages 6 and above (Gonzalez 2016). Podcasts tend to be open access, and some producers tailor them to classroom education, making them a highly accessible tool for reading and listening comprehension for users who can access the Internet. A surprising number of learners read along with the podcasts, which tends to build confidence and literacy (Godsey 2016). The broad array of narrative types and subject matter engages learners' attention and interests, providing exposure to the art of storytelling. Learning through listening offers alternatives for learners with visual or learning disabilities. The podcast format can also be used by instructors to record and even pre-record lessons themselves to ensure that learners who miss class can keep up with their class or allow instructors to provide lessons in their own absence. Like audio books, podcasts are a way for engaging pre-service and in-service teachers in theory, content, and critical issues in their field of teaching to supplement learning.

RADIO DRAMAS: SOAP OPERAS, NOVELLAS, TELENOVELAS

Radio dramas such as soap operas, novellas, and telenovelas are highly influential in developing positive public health behaviors (Chelala 2016). Radio dramas are accessible not only by radio broadcast, but on television or streaming on the Internet via a computer or smartphone. Like in IAI/IRI, learners often identify with the protagonist and other characters of the radio drama, establishing an emotional connection with their desires, dreams, and challenges, and allowing the listener to become invested in the outcome of a crisis (Chelala 2016). Radio dramas can harness this emotional connection to convey lessons or messages to teach positive public health, environmental wellbeing, and communication skills. Radio dramas tend to be used to supplement learning in the classroom or are listened to at home, and they have the potential to be curriculum-based. In Cabo Verde, radio dramas are used alongside lessons, tutoring, and other broadcasts to reach learners across the islands (Burns 2020b; Burns et al. 2019).

TWO-WAY AUDIO

Two-way audio is “a voice-only communication system that allows for two-way communication—listening and speaking. Audio can be transmitted via phone, satellite, the Internet, or high-frequency radio” (Burns 2011, p. 293). Two-way audio provides instruction, content, and resources to learners and teachers in isolated and hard-to-reach locations with little communications infrastructure. Unlike one-way audio instruction, two-way audio allows back-and-forth communication between the teacher and students. The use of two-way audio high-frequency radio transceivers to send and receive lessons and

messages to and from students was implemented in “Australia’s Schools of the Air (SOA)” in the 1950s. In some cases, learners worked alone using their high-frequency radio and printed material; sometimes they worked with a tutor face-to-face. SOA provided access to curricula and instruction in remote primary and secondary schools, where teachers may not have been certified to teach a particular content area, or where curriculum and materials may be lacking (Burns 2011, p.18).

More recently, SOA has added satellite capabilities to its two-way instruction to deliver classes via the Internet, also known as synchronous learning (Burns 2011, p.19). Synchronous learning is a general term used to describe forms of education, instruction, and learning that occur at the same time, but not in the same place (see further in Modality 4). The term is most commonly applied to various forms of televisual, digital, and online learning in which learners learn from instructors, colleagues, or peers in real time, but not in person (Education Reform 2013).

AUDIO/RADIO CONSIDERATIONS AND ADAPTATIONS

Several features of IAI/IRI and audio programs make them responsive to different educational contexts and needs. Considerations are divided by education systems level, learning environment, and community and home environment below.

Education Systems Level (Political Economy and Infrastructure)

- Broadcasting of IRI, podcasts, and radio drama programs requires affordable, allocated time on radio stations. As privatization of radio stations and the demand for radio spots by international development agencies have increased, broadcast rates have also increased and often are cost prohibitive for government education ministries and departments. Governments that have an agreement with state-sponsored radio stations or their own broadcasting capabilities have greater access to airtime (see quarterly reports for IRI projects noted in Exhibit 10).
- Political and social backing is important to building radio momentum and support. While radio programming has been used across the world for adults since the early 1930s (De Fossard 1994), as technology has shifted, there is often the perception that radio technology is outdated as a means of education (Bosh, Hartenberger, and Alhamzy 2017). As such, the call for 21st century skills by governments and donors has often replaced radio technology with calls for computers and Internet and radio programs have not been continually updated and expanded over the years. One exception is Zanzibar, Tanzania, where the Ministry of Education and Vocational Training has been broadcasting IRI programs since 2007 and has expanded their programming and reach over time (Murphy, Rawle, and Ruddle 2016).
- Conversely, distance learning technologies such as radio or telephone may also offer a bridge to newer or more robust technology systems (Bosh, Hartenberger, and Alhamzy 2017). These bridges enable expanded participation despite poor technology infrastructure. An example in Indonesia is provided by the Higher Education Leadership and Management organization (HELM), where mobile and landline phones are used to call into webinars and other live Internet-based interactive learning sessions designed for higher education courses (HELM 2014).
- Broadcasting capabilities and infrastructure affect the consistency and quality of programming. These infrastructure issues include age and type of equipment (analog versus satellite). More expensive alternatives to traditional analog broadcasts exist, such as “satellite-based audio transmitted to satellite radio receivers or as data packets to computer receivers” (Burns 2016), all of which must be delivered to learners. Solar interference and weather are also important

considerations, as well as funding to keep up stations and to protect them during crises and conflicts.

- Creating broadcast schedules that align with the school day or learners' schedules may be difficult. While it is a challenge to reserve broadcast time for countries that have school shifts (morning and afternoon student cohorts) or to accommodate working adults and youth, some countries broadcast programs multiple times a day to address this issue (Morris et al. 2009).
- IAI and audio programs, when downloaded to CDs, tablets, and cell phones, can help avoid issues such as broadcasting costs and schedules, but this brings additional challenges, such as “poorly made equipment that breaks easily, the logistical complexity of getting equipment and CDs to [communities and] schools in hard-to-reach places, storage, loss, theft, and increased marginal costs” (Burns 2016). Hardware replacement programs are critical; radios and batteries may be stolen or damaged (Burns 2011).
- IAI/IRI and other audio programs can vary in length, sequencing, subject content, and complexity, depending on the number of subjects integrated and the age of the learners. IRI programs have been created for preschool children all the way through adults. There is no “typical” IRI program. Given this, the timeline for the start-up of an IRI program also varies greatly. However, IRI programs developed in one country can be effectively adapted for use elsewhere. This reduces the time and cost needed for program development (Development Research Group and The World Bank 2005). Once IAI/IRI programs are developed, they can be used for many years until the curricula changes, new evidence in learning is acquired, or cultural contexts and storylines become outdated.
- IAI/IRI can be used to train pre-service, in-service and non-formal educators and mental health counselors and help ensure that they have the skills and knowledge to use technology to make learning effective in their classrooms, as noted in the Zanzibar ECACP case study above. IAI/IRI programs have an educator character in the programs that provides continuous modeling and support so that the teacher-learner can learn evidence-based pedagogical approaches as they listen. This is an advantage over more traditional radio programs, where learners are receptive listeners but do not have the opportunity to practice alongside their radio peers.

Learning Environment (Teaching and Learning)

- IAI/IRI programs can be designed to cover formal or non-formal curricula and reinforce teaching and learning materials. Monitoring and following up with learners and educators ensures that programming is being followed and used as intended.
- IAI/IRI programs are culturally responsive, and the story-based approach integrates local songs, games, and activities familiar to learners, including those in non-dominant language groups.
- IAI/IRI programs can emphasize active pedagogical practices that have proven to be most effective in ensuring that all learners learn and are easy for educators to enact; the programs model evidence-based teaching practices (such as teaching phonics or using gender-responsive⁹ teaching practices).

⁹ Gender responsive teaching and learning is “teaching methods and learning materials that take into account the specific learning needs of female and male students” (USAID, Introduction to Gender-Responsive Teaching Methods, PowerPoint, p. 3. Retrieved from https://www.mcsprogram.org/wp-content/uploads/dlm_uploads/2018/11/PowerPoint-Introduction-to-Gender-Responsive-Teaching-Methods.pdf).

- IAI/IRI programs require interactive thinking, action, and pairing as compared to traditional receptive radio programming that centers on receptive listening (receiving a speaker’s message and interpreting through one’s understanding of knowledge and language). It is important to note that some of the small group and partner work that requires physical proximity is not possible during the COVID-19 response when schools are closed. These activities would have to be adapted for use in the home with other members of the family or modified. For example, if preschool listeners are asked to trace the letter B on a peer’s back, they could instead trace it in the air or on a sibling’s back.
- The quality and effectiveness of the programs require trained writers and educators who are both content and pedagogical experts. As Burns (2016) writes, “Like all technologies, effective IRI [IAI] programs depend on the creation of high-quality, engaging content, reliable equipment and infrastructure, and funding for capital and recurrent costs.” In Tanzania during the 2000s, IRI programs were created by a team that was not trained in IRI and attempted to replicate the popularity of an IRI series produced by a USG-supported expert implementing team. The result was a low-quality IRI series that were not well-received by listeners and eventually taken off the air (USAID Radio Instruction to Strengthen Education Quarterly Reports 2007-2009).

Community and Home Environment

- When broadcast on radio, programs are transparent, allowing all community members to engage and see what their children are learning. IRI programs “engage a potentially large shadow/secondary audience when broadcasts are on-air, thus raising awareness of education issues” for children and youth, as well as of psychosocial issues children and youth may be facing during a pandemic such as COVID-19 (Christina and Louge 2015; see USAID and EDC’s annual evaluation on the INRAP FQEL program in Guinea).
- IAI/IRI programs commonly include life skills components that teach socioemotional and non-cognitive skills through stories and characters (e.g., interpersonal relations, self-efficacy, conscientiousness). Adults and children in the programs also teach about and model how to counter stigma and violence, such as supporting children with HIV/AIDs or when to speak to an adult about a safety concern. Programs can also integrate health and environmental awareness and safety, such as COVID-19, malaria prevention, or land and coastal ecology. These skills are important for learners and educators, as well as community members listening to the programs. Expertise in life skills curriculum writing is important for developing relevant components and storylines for programs, especially in sensitive crisis and conflict environments (Bosch, Hartenberger, and Alhamzy 2017; Christina and Louge 2015; Ho and Thukral 2009).

Evidence on Learning

- Reviews conducted by the World Bank, EDC, and many other organizations point to repeated gains in learning outcomes, as largely measured through literacy and numeracy measures, through IAI/IRI programs in both remote and urban areas of countries such as the Dominican Republic, El Salvador, Indonesia, Kenya, Lesotho, South Africa, Sudan, Somalia, Thailand, and Tanzania (Bosch, Hartenberger, and Alhamzy 2017; Ho and Thukral 2009; Morris et al. 2009; Murphy et al. 2002; Vindogradova and Morris 2014). The gains in learning outcomes, predominantly measured as changes in literacy and numeracy scores, often increase over time with increased exposure to IRI programming. Ho and Thukral (2009) found small to moderate gains in math and local language literacy outcomes for grades 1 and 4 and moderate-to-large gains in English-language outcomes among a number of programs. Morris et. al (2009) also found that grade one children in Zanzibar, Tanzania who listened to IAI programs in non-formal or formal learning environments had increased learning gains in numeracy and literacy relative to a comparison group that did not listen

to IAI programming. Numeracy and literacy were assessed because they are easier to evaluate with younger learners than psychosocial learning, and they correspond to the curriculum.

- Minimal statistical differences between literacy and numeracy outcomes for males and females were detected, which mirrors early grade testing results in non-distance learning environments (see gender differences in literacy and numeracy across The Southern and Eastern Africa Consortium for Monitoring Educational Quality). Similarly, rural learners “enjoyed” the same boosts to achievement as their urban counterparts, including rural learners in incredibly isolated communities with poorer access to technology, high-quality educators, and routine support from local education authorities (Ho and Thukral 2009).
- Relatively few studies have been conducted on the differences in gains for non-formal learners in IRI programs compared to those in traditional classroom settings in fragile contexts such as South Sudan and Somalia. However, some studies estimate that learners in IRI programs in these contexts demonstrate an advantage over their peers in non-IRI classrooms. These gains may be understated, given the multiplicity of stressors these learners are dealing with, including hunger, poverty, and lack of access to healthcare, water, and proper sanitation (Ho and Thukral 2009).

CASE STUDY | IRI AND THE EBOLA RESPONSE

Thousands of children lost their parents or caregivers and were at increased risk for a range of negative outcomes such as homelessness, neglect, and malnutrition due to the Ebola crisis. According to the United Nations Children’s Fund (UNICEF), an estimated 5 million children and youth lacked access to education in Guinea, Liberia, and Sierra Leone during the outbreak, because schools did not re-open at the start of the new school year in September 2014.

During the Ebola epidemic, radio education and self-directed learning opportunities were used to ensure that children and youth accessed education while schools and centers remained closed. Parents and community members played a crucial role in encouraging children and youth to learn at home, and then return to schools and centers.

A review of programming materials developed by Save the Children and its partners (Global Education Cluster 2015) demonstrates that the most effective programs involve students and their families in the development of radio education materials and mobile phone awareness-raising messages. Take-home learning materials were often a complement to radio instruction, combining academic content with life skills and psychosocial support to mitigate the traumatic effects of living through the crisis and disruption to daily life.

Similarly, students and their families provided ongoing feedback to inform the education response. Once schools had reopened and the Ebola crisis was over, using radio and involving community members in children’s education continued to improve access to learning.

In Liberia and Sierra Leone, national curriculum radio education programs have been airing since September 2014 (Save the Children 2014). More than 50 percent of households in Sierra Leone had children listening to the programs. In Guinea, education partners adapted radio programs to be more child-friendly.

The Liberia case study above demonstrates how radio technology is far from obsolete as a distance learning technology in Africa when schools are closed due to a crisis, such as the Ebola epidemic (Centers for Disease Control 2015).

Equity Factors. In addition to the different system, learning environment and home and community considerations, a number of important equity factors must be considered.

Exhibit 5: Equity factors in audio/radio platforms

EQUITY FACTOR	CONSIDERATIONS
Geographical location	<ul style="list-style-type: none"> Radios are often accessible in rural areas as well as urban environments and do not require electricity (see data in Exhibit 2 above). Radio and audio can be heard on simple and feature phones. Radio signals can reach remote areas that television signals cannot due to physical barriers.
Gender	<ul style="list-style-type: none"> Women/men tend to have equitable access to radio technology, however women are less likely to produce radio programming and more likely to be passive receivers (Fortune, Chungong, and Kessinger 2011). IAI/IRI programs can be designed to be gender responsive. In Liberia, female listeners were shown to prefer hearing women’s voices on the radio (Corlazzoli 2009). Women prefer to listen to the radio in the evening (after 6:00 PM), which should be considered when scheduling programming. Furthermore, “improvements in ICTs must be met with improvements in women’s radio programming to produce a substantial increase in women’s participation (Fortune, Chungong, and Kessinger 2011, p. 22). “Women are listening to radio, but radio stations are not listening to women. Radio is failing to meet the needs of women in their communities despite the belief from radio station staff that they are. Since the overwhelming majority of radio staff is male...women’s concerns and interests are insufficiently being taken into account in radio station programming. And yet the demand is great; when asked what kind of radio programming women prefer, they overwhelmingly cited women’s programming tailored to their needs” (Fortune, Chungong, and Kessinger 2011, p. 20).
Socioeconomic status	<ul style="list-style-type: none"> Radios are among the lowest-costing technologies available. Radio, one of the most widely used communication technologies, continues to play a prominent role in distance education in many of the world’s poorest countries and among communities of all socioeconomic statuses (Burns, Montalvo, and Rhodes 2010; Sarmah and Lama 2017). The digital divide is less prevalent when using radio as an educational medium than when using television or online learning.
Disability	<ul style="list-style-type: none"> Audio/radio is not accessible for people who are deaf, hard of hearing, deafblind and some people with auditory processing disorders and autism. Distance learning plans should also offer modalities that are not audio/radio to be inclusive of learners (and educators) with hearing impairments.
Minority and language groups	<ul style="list-style-type: none"> Radio/audio programming is generally offered in national and dominant languages but has the potential to reach minority groups if translated. Community radio can empower women and minority groups by giving them a way to receive information and express concerns (Fortune, Chungong, and Kessinger 2011) and have been used for IAI/IRI broadcasting.

MODALITY 2: VIDEO AND TELEVISION

SUMMARY

- Target learners: All ages and educational levels, but educational television broadcasting tends to target pre-school and early primary learners, while video instruction programming tends to target upper primary, secondary, university, and teacher training institutions
- Particularly useful for young children, pre-literate learners, and non-dominant language speakers (especially those whose home languages are primarily oral)
- The major categories include video instruction programming and educational television broadcasting
- Advantages
 - Low-tech requirements for user, if a household already owns a TV there may not be extra cost
 - Easy to facilitate after basic training
 - Can be designed to be accessible to learners with hearing, sight, other impairments
- Disadvantages
 - Requires another means for monitoring learning (e.g. phone follow up/caregiver check)
 - Less coverage in remote settings
 - May require cable access
 - Individualized instruction is not easy to implement

Video and television-based programming is an important modality for complementing and supplementing teaching and learning. There are two main categories in this modality, video instruction programs which are created to accompany certain curricula and content or as stand-alone programs (e.g., video demonstration of a science experiment or public service announcement on health education topics) and educational television broadcasting (e.g., Sesame Street and Ubongo Kids featured in the case studies below) intended to teach children through “edutainment,” which combines educational content with entertaining stories, games, music, and images. Video instruction programs can either follow curricula or complement curricula, and target any age group, from early childhood to university and preservice teaching students. However, many of the programs discussed below, such as video demonstrations and lectures, target secondary school-age learners. Video instruction programs are often small enough files that they can be shared via mobile phone, email, Internet (download), or other means. Educational television broadcasting, on the other hand, has historically targeted preschool and primary school age children and focuses on early literacy, numeracy, science, and life skills. While TV-based programs have been traditionally accessed via television, viewers are increasingly accessing such programming through tablets, smartphones, and other devices (see data in Exhibit 2).

A. VIDEO INSTRUCTION PROGRAMMING

While less commonly used as the sole modality for instruction historically, video programming has significant potential for promoting Universal Design for Learning (UDL) as it is often used to explain, demonstrate, reinforce, or contextualize content alongside other modalities (e.g., digital texts, print, radio, etc.). In México, a *telesecundaria* program was created to provide rural junior school learners with a year-round curriculum and uses a combination of in-class broadcasts, print, and discussions led by

facilitators who are not formally trained teachers (Burns 2020b). Although video instruction programming is more common for learners in upper primary, secondary, university, and teacher training institutions, simple content may also be developed for younger learners. Video instruction programming can be designed to be interactive, much like IAI, with time for viewers to reflect and engage in activities. For example, video trainings can show pre-service or in-service teachers how small children inside a classroom learn reading, writing, speaking, and listening in stages, with opportunities for viewers to think and analyze what they are seeing (per ECACP case study above). Video programs may also be used to model best pedagogical practice to pre- and in-service teachers, such as featuring a teacher explaining a topic (e.g., how to operate a tablet or how to solve a fraction) or engaging in a discussion with others. Finally, video instruction programs may be used for assessment purposes, such as videos of classrooms used by in-service teachers to analyze pedagogical and classroom management. In general, there have been few evaluations and studies of video instruction as compared to those of educational television broadcasting.

Below are a few video creation platforms for educators, many of which are also built into virtual, online classrooms (learning management systems) and are accessible on mobile phones.

TOOLS FOR EDUCATORS TO CREATE VIDEO AND DIGITAL LEARNING CONTENT (UNESCO 2020C)

- [Buncee](#) – Supports the creation and sharing of visual representations of learning content, including media-rich lessons, reports, newsletters, and presentations
- [EdPuzzle](#) – Video lesson creation software
- [Kaltura](#) – Video management and creation tools with integration options for various learning management systems
- [Nearpod](#) – Software to create lessons with informative and interactive assessment activities
- [Pear Deck](#) – Facilitates the design of engaging instructional content with various integration features
- [Squigl](#) – Content creation platform that transforms speech or text into animated videos
- [Thinglink](#) – Tools to create interactive images, videos, and other multimedia resources

B. EDUCATIONAL TELEVISION BROADCASTING

Educational television broadcasting has a rich history in distance learning around the world, especially in countries with well-developed broadcast and satellite infrastructure—Australia, Brazil, China, Cuba, India, Indonesia, Mexico, the Philippines, the United Kingdom, and the United States (Burns 2011). Television is still not as accessible across households in the Global South as radio (Exhibit 2), especially in areas without electricity, but its reach and viewership are expanding and educational broadcasting can be viewed increasingly on computers and phones with Internet access or downloading and streaming capabilities. Television programming industries in Sub-Saharan Africa have also been expanding in countries such as Ethiopia, Kenya, Nigeria, and South Africa, creating engaging programs that teach literacy and numeracy. One program in Tanzania, Ubongo Kids, has gained wide viewership among Swahili speakers and teaches literacy, numeracy, STEM topics, life skills, and principles of *utu* (often translated as humanity) such as good character traits, and leadership skills (see case study below). Botswana Television also offers daily educational programming in math and science that reaches 100% of the country through satellite and 90% through terrestrial transmitter (Burns 2020b).

There are limitations of educational television programming. One of the most obvious limitations is user access; if a child does not have a television set or device for viewing, electricity, or has a disability where they need closed captioning or adaptive technology, they will be unable to participate in the educational experience. Even if these requirements are met, the program must appeal to children, making use of elements such as humor, visual action, or appealing characters (Fisch 2004).

Unless there are instructor or print activities that accompany the video or television programming, the motivation to watch and learn from the program falls heavily on the learner's desire to participate and/or their caregivers' ability to reinforce learning for young learners. The application of learned knowledge and the transfer of skills when using television as a medium does not transfer in the same way as it might if a learner was able to participate in hands-on activities where they are able to interact with additional materials. To assist with this learning gap, television programming can be supplemented with interactive activities, or additional resources and information, which can also be customized to different contexts (Niyigena et al. 2020). Ubongo Kids now has ebooks on Amazon and WorldReader, a Kids Quiz app to measure learning, and a Toolkit as accompanying materials (Ubongo 2019). Another challenge with using a mass medium such as television is the lack of ability to personalize the content for individual learners. With other video formats, learning outcomes might be adjusted to accommodate learners at different levels (see ASCD 2020), which is not possible when using television broadcasting to reach children.

CASE STUDY | EDUCATION THROUGH EDUTAINMENT – UBONGO KIDS

Using media and technology to introduce educational content, Ubongo Kids (run by the NGO, Ubongo) has reached more than 17 million viewers in 31 countries, helping children learn math and science, financial literacy, digital literacy, gender rights, and engineering (Ubongo 2019). Ubongo Kids reaches these viewers not only through television and radio broadcasting, but also via their YouTube channel, downloadable audio files, phone applications, and eBooks. Caregivers and students can engage further with the material and other users through social media (Facebook, Twitter, Instagram, and WhatsApp). Ubongo Kids also plans to launch toolkits that will be made available to caregivers and practitioners who work in early childhood development and will contain educational resources covering a range of media. These toolkits will be distributed through web platforms, Google drive, USB/flash drives, and WhatsApp. Children are reaching higher learning outcomes, such as 12% higher school readiness scores than peers in control groups, and caregiver engagement has risen (Ubongo 2019). Ubongo focuses on human-centered research through focus groups and prototypes and assesses impact evaluation through mobile surveys, control trials, and viewership and listenership tracking.

In countries that lack educational programs in national and local languages, international programming may be considered. A large proportion of Sub-Saharan African countries have television subscription services that include international channels and programs in Arabic, English, French, and Portuguese, among others (Burns 2020b). During crises like COVID-19, when producing new educational television programming is not feasible or safe, airing international programs is one way to get educational content on the air, even if the dialects, culture, and pedagogical approaches differ (Burns 2020b).

In addition to educational programming that reinforces learning in subjects such as math, literacy, and science, some countries have already started to broadcast public service messaging on COVID-19 to

increase knowledge about transmission and promote preventive social behavior change. China, Iran, Jordan, Malaysia, Mongolia, Romania, and other countries have begun to broadcast educational programming television in response to COVID-19 school closures (BEC 2020; CGTN 2020; Fifield 2020; Iran Ministry of Education 2020; Munkhzul 2020b; Romania-Insider 2020; Roya News 2020). Other countries, such as Costa Rica and El Salvador, have produced videos for parents and educators (Cobo, Hawkins, and Rovner 2020). This approach has been used during other crises. France, for example, broadcasted educational programming on television during H1N1 in 2009. Given the recent implementation of educational programming, information about the nature of these programs remains limited.

Depending on the country, television broadcasts may be more accessible than online learning platforms or mobile education applications. However, they still require technology that families in low- and middle-income countries might not have. If educational television programming is used in response to school closures, it could be useful to pair this with online courses, paper packets, or other options discussed in the virtual classroom section (see Ecuador's use of multiple platforms in Cobo, Hawkins, and Rovner 2020). There is little conclusive evidence yet on what combined platforms and modalities produce the greatest learning outcomes, as measured either through cognitive or non-cognitive measures, since approaches can vary widely by country and components.

CASE STUDY | MONGOLIA'S USE OF TELEVISION BROADCASTING

Mongolia provides a strong example of what television broadcasting of education programs entails. The Ministry of Education, Culture, Science, and Sports has partnered with the Mongolia TV Channels' Association to produce television classes for students from kindergarten through secondary school (Munkhzul 2020b). As of March 5, 2020, more than 1,000 lessons had been broadcasted. This took the work of approximately 600 people, including teachers, advisors, journalists, cameramen, and directors (Munkhzul 2020a). Classes are broadcast in Mongolian and in Kazakh and Tuvan, two of the Turkic languages spoken in Mongolia (Unurzul 2020). These efforts are supported by UNICEF Mongolia. It is unclear whether this television broadcasting is paired with assignments for children to complete, with regular communication with teachers and classmates, or with other supplemental classroom instruction. As this is an ongoing response, it is too early to determine the effectiveness or lessons learned from this effort.

Considerations and adaptations. Considerations and adaptations for video and TV programming are divided by education systems level, learning environments, and home/community environment below.

Education systems level (political economy and infrastructure)

- In many countries (see Exhibit 2), television broadcasting has a bigger audience than online platforms where Internet connections are weak or non-existent or where families lack the devices to access online learning platforms (Fifield 2020; Kohli and Blume 2020). During the COVID-19 crisis, educational television programs are being rapidly broadcast in response to school closures (see Cobo, Hawkins, and Rovner 2020).
- Broadcasting of video and television programs (both national and international) requires affordable and allocated time on television stations. Like with radio, as privatization of televisions stations has

increased, broadcasting rates have also increased and often are cost prohibitive for government education ministries and departments. Governments that have an agreement with state-sponsored stations or their own broadcasting capabilities have greater access to affordable airtime and can often mobilize broadcasting more quickly.

- Safely producing new educational television programming during emergencies and social distancing is difficult, and programs may have to be creatively edited with fewer interactions among the actors. Therefore, using existing programs or international programs may be the safest solution in the short-term. Short video instruction programs that are easy to transfer through text or email are more feasible during crises.
- In countries with multiple national languages, programming may need to be first developed in the official languages of instruction to ensure greater accessibility. However, a plan to expand to additional language groups should be considered so as not to exacerbate further educational inequities for speakers of non-dominant languages. Likewise, ensuring that programming is accessible to viewers with disabilities needs to be taken into consideration.
- Educational television broadcasts nationally help convey common content and messages, but are not personalized to individual learners, schools, or contexts. All learners in the same grade range receive the same lessons, regardless of where they left off in the curriculum when schools closed (Iran Ministry of Education 2020; Munkhzul 2020b).

Learning environment (teaching and learning)

- Video instruction programming is typically used to complement and supplement teaching and content. It helps demonstrate and explain concepts that educators use in concise ways with images (e.g., showing how molecules are formed) and provides context for content and phenomenon (e.g., how germs are passed on). For educators who have never used video or television in their teaching, some form of training on how to use the programs is required (Masoud 2020). In Romania, for example, educational television programs were taught by educators who have experience with online instruction (Romania Insider 2020). While in-person training may not be feasible during crises and conflicts, some sort of orientation would ideally be provided to educators, either through a phone call or other means.
- Like with any other modality careful planning of content is important, so that what is taught is relevant, age appropriate and interactive, but also designed to be inclusive (using UDL principles), gender-responsive, and representative of the populations viewing the programs.

Community and home environment

- Video instruction programming can be tailored and filmed in the home environment and can target different audiences (e.g., caregivers, siblings, learners, educators).
- Many educational broadcasting program initiatives (e.g., Ubongo Kids and Sesame Street) have an accompanying caregiver's guide for use in the home so smaller children have more opportunities to actively engage with the content. While caregiver training is not always feasible, some initiatives have tried recording messages for the caregivers in the programs.
- Like radio, television broadcast programs are transparent and allow all community members to engage and see what their children are learning. Television programs can likewise engage a potentially large shadow/secondary audience, thus raising awareness about education, health, and environmental issues, among others, for children, youth, and adults.
- Educational television programs commonly include life skills lessons that use stories and characters to teach socioemotional and non-cognitive skills, such as interpersonal relations, self-efficacy, and

conscientiousness. Like with IAI/IRI, adults and children in the programs can also teach about and model how to counter stigma and violence, such as supporting children with HIV/AIDS, including characters with disabilities, representing a variety of cultural and linguistic groups, and teaching when to speak to an adult about a safety concern. Programs also can integrate health and environmental awareness and safety, such as COVID-19, malaria prevention, or land and coastal ecology. These skills are important for learners and educators, as well as community members listening to the program. Expertise in life skills curriculum writing is important for developing relevant components and storylines, especially in sensitive crisis and conflict environments.

Evidence on Learning

- Educational programs, such as educational TV or radio, can encourage literacy skills acquisition, such as children’s letter recognition, vocabulary, and syllabification (Borzekowski and Henry 2010; Baydar et al. 2008; STS 2018).
- An impact evaluation study of *Akili and Me* (Ubongo Kids adaptation in Rwanda), carried out in 2016 in partnership with the University of Maryland (US), found that children who watched the program had significantly higher scores for counting, number recognition, shape knowledge, letter identification, color identification, body part recognition, health knowledge, and vocabulary relative to a comparison group (Borzekowski, Lando, and Olsen 2019).
- Learners who watched *Sesame Street* were rated higher by their educators on several dimensions including quantitative and verbal readiness, attitude toward school, peer relationships, and engagement level (Fisch 2004; see more details in the case study below).

Although *Sesame Street* has received criticism for its use as a means of promoting public diplomacy (Molland 2019), there is evidence of its popularity globally and its potential positive influence on learning outcomes (Fisch 2004).

CASE STUDY | SESAME STREET – TELEVISION AS A MASS MEDIUM

Sesame Street is a great example of children’s educational television, as the show has been in production for over 50 years and airs in over 140 countries, with its success being driven by the collaboration of television producers, content experts, and educational academics. Studies have consistently shown the positive effects for children who watch *Sesame Street*—students were rated higher by their teachers on several dimensions including quantitative and verbal readiness, attitude toward school, peer relationships, and engagement level (Fisch 2004). Not only did researchers find immediate benefits for children, but there was also a correlation among teenagers who had watched *Sesame Street* as a child and higher academic self-confidence and emphasis on academic performance (Fisch 2004). *Sesame Street* is also unique in that the program is localized to the specific country and cultural context. While there are topics that remain universal across countries, such as numeracy and literacy, other aspects of the curriculum are adapted in order to hold more relevance for learners in specific localities.

Equity Factors. In addition to the different system, learning environment, and home and community considerations, a number of important equity factors should be considered.

Exhibit 6: Equity factors in video/TV platforms

EQUITY FACTOR	CONSIDERATIONS
Geographical location	<ul style="list-style-type: none"> • Users in rural areas may have limited access to television due to physical barriers, such as mountain ranges blocking tv signals and restraining connectivity (see data in Exhibit 2).
Gender	<ul style="list-style-type: none"> • Gender-responsiveness of existing television and video programming can vary greatly across countries and series. Original programming can be developed to be gender responsive. • While men and women are equally as likely to watch television at home and at friends' or relatives' homes, men are more likely than women to watch television in public places. In rural areas or others where household television ownership is not common, women's access to television may be particularly limited (Gillwald, Milek, and Stork 2010). • Television usage varies across country contexts. In some countries (e.g., Botswana, Kenya) men watch more TV than women. In other countries (e.g., Cameroon, Mozambique), women watch more TV than men. (Gillwald, Milek, and Stork 2010). • When schools are closed, girls often have a heavier burden of domestic and caring responsibilities in the home. Program scheduling needs to be flexible in order to remain accessible to girls with these responsibilities (UNESCO 2020b).
Socioeconomic status	<ul style="list-style-type: none"> • Television ownership can vary by household and income-level. • Expenses often required for television use (electricity access, TV set, TV license fee) are higher than those for other technologies (e.g., radio) (Gillwald, Milek, and Stork 2010).
Disability	<ul style="list-style-type: none"> • To increase access for persons with disabilities, these technologies must consider both the equipment (hardware including buttons, cables, remote controls and software such as menus, program guides, and closed captioning) as well as the program content (UNESCO 2019). • Text that appears on screen during television programs without an accompanying audio component is inaccessible to those with visual disabilities. Likewise, hearing lessons, warnings, or other auditory information shared through television programming is inaccessible to those with hearing disabilities. These barriers can be overcome through captioning, audio description, and sign language interpretation included with television programming (Raja 2016). • Sesame Street and Ubongo Kids are examples of programs that have characters with disabilities. "Some key themes we are looking to tackle this year include disability awareness and inclusiveness, kids living in crisis zones, communicable diseases and more economic empowerment" (Ubongo 2019).
Minority and language groups	<ul style="list-style-type: none"> • Television and video programming are often filmed in the national or dominant language, and minority and indigenous groups and languages may not be well-represented. • Ubongo Kids, although currently broadcast in 13 languages is committed to creating content that can be adapted to other languages and localizing content (Unongo 2019). • Enseña Perú participants created a COVID19 awareness campaign that makes videos in indigenous languages (BEC 2020).

MODALITY 3: MOBILE PHONE

SUMMARY

- Target learners: All ages and educational levels, pre-primary and primary learners with support; educators and secondary and tertiary learners can use mobile technology independently
- Particularly useful for supplementing or complementing curricula with educational apps and games, providing synchronous and asynchronous tutoring and feedback, and providing access to open source educational materials
- The major categories include electronic teaching and learning materials, educational apps and games, and distance tutoring and coaching
- Advantages
 - Can be non-electricity dependent
 - Low-tech requirements for users
 - Easy to facilitate after basic training
 - Can integrate monitoring of learning
 - Can be designed to be accessible to learners with hearing, sight, other impairments
- Disadvantages
 - Reception can be a problem in remote settings
 - Requires phone and/or Internet data (extra cost), but Universal Fund Agreements may mitigate or reduce costs
 - Can be engaging but often limited to two-way conversations/texting

Education through mobile phone technology and programs is among the most rapidly changing in the world. As mobile phone ownership increases so does the potential for this modality to improve teaching and learning and to provide learning in emergency and crisis situations like COVID-19. There are generally three types of phone technologies in current use: (1) basic mobile phones for calling, (2) feature phones with texting, multimedia, a simple web-browser and operating system, and GPS capabilities; and (3) smartphones with advanced operating systems, GPS, faster Internet speeds, and the basic capabilities of a tablet or computer. All three phones can be used for educational purposes, but with different functionalities and capabilities. Each year, the number of users with smartphones, which have greater audio, video, and online potential, increases, including in sub-Saharan Africa where access to low-cost smartphones increases (Burns 2020b; see Exhibit 2 for data).

Mobile phones can be used for a variety of educational purposes. They can receive and transmit educational content (e.g., used to listen to IAI programs and video programs or receive homework), maintain contact with educators and learners (e.g., communication and monitoring), and serve as an integrated part of learning and teaching (e.g., practice reading and comprehension).

In this review, mobile phone programming has been grouped by the way in which it is used, including:

- Distributing and sharing electronic learning and teaching materials and receiving homework and updates from learners
- Complementing and supplementing learning through educational apps

- Providing distance tutoring and coaching
- Facilitating teaching and learning groups through text message and social media groups

One of the greatest challenges to this modality has been creating content that can be accessed on both a feature and smartphone, providing phone data, and in getting users access to the Internet (both cost and infrastructure). However, countries are making rapid policy changes to ensure broader access to educational resources. For example, South Africa is “zero rating,” or not charging data, for educational websites and apps; Turkey has increased its data caps for educational resources from 4GB to 8GB per month; and the Kyrgyz Republic is working with mobile providers to give educators and student free SIM cards and special data plans (Trucano 2020).

While mobile phone programming is divided into four areas described below, it is important to note that mobile phones use audio and video content, and can be integrated into online (cloud-based) learning management systems or virtual classrooms as described in the section under Modality 4 – Online Teaching and Learning.

A. ELECTRONIC LEARNING AND TEACHING MATERIALS

One of the ways to provide continuity to learners when schools and learning centers are closed is to make classroom-based teaching and learning materials available electronically. This is being done in the form of texting or emailing electronic and digitized documents, e- and m-books, audio, and video files (e.g., PDFs of worksheets and textbook materials) or through using educational programs and apps where a range of digital materials are housed. In Tanzania, an application (TzShule) has been created to house past papers/exams, lesson notes, commuter skills, reviews, syllabi, videos, and other tools for secondary school learners preparing for one of three national exams. Learners can download this app for free on a smartphone, tablet, or computer. In some countries, educators are asking learners to send pictures of homework via text messages (or via email cloud-based learning management systems, where available).

In Nigeria (Northern Education Initiative Plus-NEIP), educational leaders are sending learners materials (e.g., text, audio, and/or videos) to caregivers’ phones for them to use with younger children. While the NEIP also has educational programs housed on tablets used by educators where schools are in session, programs that integrate classroom monitoring along with instructional guides and teaching materials cannot be used during times of social distancing. Having a built-in community mobilization and education component has helped the program quickly get materials and resources out to parents.

In addition to curriculum-based learning and teaching materials, there are several efforts to develop and pilot m-novels and mobile-based storybooks (see list below). South Africa successfully piloted an m-novel series (*Kontax*) via basic mobile phones wherein readers discussed the plot, voted in polls, left comments, and could enter a writing competition as part of the interactions. In seven months, the series was read over 34,000 times on mobile phones (Yoza Project 2016 in Burns 2020b). South Africa’s Institute for Digital Education (SAIDE) African Storybook Initiative also has over 1,311 story books in 189 languages for children. They also house applications to create new storybooks (Saide 2020).

OTHER MOBILE READING APPLICATIONS (UNESCO 2020C)

- [African Storybook](#) – Open access to picture storybooks in 189 African languages.

- [Biblioteca Digital del Instituto Latinoamericano de la Comunicación Educativa](#) – Offers free access to Spanish language works and book collections for learners and teaching staff in schools and universities.
- [Global Digital Library](#) – Digital storybooks and other reading materials easily accessible from mobile phones or computers. Available in 43 languages.
- [eKitabu](#) – Free and low-cost digital books for all ages. Available in English, Swahili, and Kenyan Sign Language.
- [Room to Read](#) – Resources to develop the literacy skills of children and youth, with specialized content to support girls.
- [StoryWeaver](#) – Digital repository of multilingual stories for children.
- [Worldreader](#) – Digital books and stories accessible from mobile devices and functionality to support reading instruction (includes BookSmart App). Available in 52 languages.

A number of platforms have integrated text, video, and audio content into their learning materials. Many of these platforms share non-curricular materials and learning content, but they are useful in complementing and supplementing learning for young learners (e.g., Ubongo) all the way to adults (e.g., Funzi).

EDUCATION PROGRAMMING BUILT FOR USE ON FEATURE AND SMARTPHONES (UNESCO 2020C)

- [Cell-Ed](#) – Learner-centered, skills-based learning platform with offline options
- [Eneza Education](#) - Revision and learning materials for basic feature phones
- [Funzi](#) – Mobile learning service that supports teaching and training for large groups
- [KaiOS](#) – Software that gives smartphone capabilities to inexpensive mobile phones and helps open portals to learning opportunities
- [Ubongo](#) – Uses entertainment, mass media, and the connectivity of mobile devices to deliver localized learning to African families at low cost and scale
- [Ustad Mobile](#) – Access and share educational content offline
- Systems with offline functionality:
 - [Kolibri](#) – Learning application to support universal education, available in more than 20 languages
 - [Rumie](#) – Education tools and content to enable lifelong learning for underserved communities

As schools and educators quickly mobilize to create continuity for the learners, a digital divide gap between schools, communities, and households emerges even further (Turner Lee 2020). Learners must have access to feature phones or smartphones at home, phone signals and phone data, and/or Internet data or Wi-Fi to connect. For younger children, having caregivers with literacy skills and technology-literacy is also important. In China and US, well-resourced schools in urban areas have more technology to distribute and more resources to create educational applications, while those in rural and less-resourced areas have less access to hardware and software distribution, as well as phone signals and Internet bandwidth (Turner Lee 2020). Likewise, low-income families, and households in rural areas have less broadband Internet access, which creates a “homework gap.” As Jessica Rosenworcel of the US Federal Communications Commission describes this phenomenon, the “homework gap” is a divide created when low-income learners lack online access and lag behind their higher-income classmates on

engaging in school-related activities and school-assignments (Turner Lee 2020). This “homework gap” is exacerbated in countries in the Global South where digital divides have been studied (see Hennessey et al. 2010; Niyigena et al. 2020). Using the example of the TzShule app, this resource has enormous potential in helping secondary school learners prepare for exams. However, there is also the likelihood that it will exacerbate the already large discrepancies between exam performance for learners from well-resourced households and areas (e.g., urban) and low-resourced households and areas (e.g., high-density urban neighborhoods and rural schools). In a longitudinal study in Zanzibar, few learners surveyed from rural and high-density areas owned their own phones, and the majority only borrowed a family member’s phone on occasion for making phone calls or listening to the radio (Morris 2018). Meanwhile, many of the urban learners in the study owned their own phone or had regular access to one in their home. As learners in Zanzibar prepare for ordinary-level exams in October 2020, access to educational apps with important curricular content will likely impact achievement gaps.

B. EDUCATIONAL APPS AND GAMES

Educational apps and games have a huge potential for helping learners access teaching and learning materials as well as practicing and developing skills. Some apps are built by governments and learning institutions to house curriculum-based learning, teaching materials, and books (e.g. BookSmart App) while others are built by developers to support knowledge and skills development. Many apps are designed for smartphones or feature phones, but some programs can be used on basic phones using Java-based applications that enable multimedia lessons or used off-line (see Stepping Stone and EDC 2013).

Some educational apps have been shown to increase student learning; however, this has primarily been studied in contexts where these approaches complement in-person instruction, rather than as the main lesson, and are most effective with inquiry-focused pedagogy (Burns 2019; Lim 2018; Sung, Chang, and Liu 2016; UNESCO 2018). However, some digital education games have shown promise in teaching basic literacy and numeracy to out-of-school learners in low- and middle- income countries, including Jordan and Sudan (Lim 2018), without a teacher’s support, which could meet the needs of many learners displaced from school by COVID-19 in the short-term.

The user age of educational apps and games can vary greatly; some are geared toward learners in upper primary, secondary, and university and teacher training institutions, while others are designed for early learners developing foundational skills in literacy and numeracy. Games can provide engaging and interactive ways to support learning as well as give educators additional tools to build content knowledge. Well-designed educational games require less instructor capacity to run effectively (Lim 2018). There are many education sites that offer open-source educational games and apps (e.g., Khan Academy) and that allow learners and educators to develop their own content (Burns 2020b). The fastest way to develop new digital educational games that will work in a new country context is to build them off entertainment applications that already exist in that country (Lim 2018).

C. DISTANCE TUTORING AND COACHING (PHONE, TEXT, AND VIRTUAL PLATFORM)

Many countries across the Global North and Global South have long traditions of tutoring through phone calls or text messages. Tutoring, which can be either one-on-one or in small groups, has historically been geared at supporting learners in developing subject knowledge, practicing mastery, developing communication and language skills, and gaining expert perspectives. While in sub-Saharan

Africa paid tutoring has been more accessible to households with higher socioeconomic status (see Bray 2007 for across sub-Saharan Africa and Morris 2018 in Tanzania), there exists a plethora of private tutoring providers throughout regions such as sub-Saharan Africa, and especially in Nigeria, Kenya, and South Africa, who provide real-time SMS or video tutoring (Burns 2011).

Tutoring can be carried out through multiple platforms either on basic, feature or smartphones. Basic phone tutoring is generally administered through SMS and text messaging and phone calls. Tutoring on feature (to some extent) or smartphones is increasingly administered through virtual platforms, such as Skype, WhatsApp, Zoom, among other video conferencing programs. One example of a successful tutoring program for literacy and language development is Paper Airplanes (see case study below). In addition to connecting learners with tutors during disruptions in learning, engaging community and family members as educational supports and encouraging sibling tutoring can also be important in crisis-affected and post-conflict settings (Zakari and Bartlett 2014). The USAID Northern Education Initiative Plus in Nigeria (as described above) sends out materials to caregivers and families to support their tutoring, as well as offering one-on-one support to their children in the form of SMS messages and interactive voice response (IVR), or pre-recorded messages that interact with callers and can customize information (i.e. the automated messaging system that directs many business calls). Twilio is used for the IVR programming and TextIt for customizing SMS messages. Tutoring blasts may also include small audio or video files and allow for reversed messaging (where the message recipient sends a response back to the administrator).

During long closures of education institutions, tutoring and coaching of preservice teachers is also important so that learners can keep up with educational studies to prevent teacher shortages post-crisis. As with younger learners, one-on-one or small group coaching can come through the form of phone, text, and virtual conferencing. Preservice and in-service teachers, as well as younger learners, also increasingly use group chat platforms described below.

CASE STUDY | VIRTUAL TUTORING IN (POST-)CONFLICT SITUATIONS

Paper Airplanes, an NGO offering non-formal education to students affected by the ongoing conflict in Syria, uses online tutoring to deliver a non-formal curriculum to adult learners. Their largest program is the English program, which serves approximately 300 students every semester. Students are primarily located in Syria, Lebanon, Jordan, and Turkey, though some have migrated beyond the Middle East. Students are paired with an individual tutor each semester. Tutors are located globally, with the largest concentration in the United States (Oshiberu 2018; Paper Airplanes 2018).

Paper Airplanes has a four-level English curriculum based on the Common European Framework for Languages (CEFR) and serves students from the A2 (advanced beginning) to C1 (advanced) levels. Students and tutors meet using a variety of platforms, depending on connectivity and access, including Skype (79.6%), Google Hangouts (23.9%), Facebook (12.3%), and WhatsApp (23.2%). Likewise, students and tutors use a mixture of computers, tablets, and mobile phones to meet. While the goal is synchronous instruction, some pairs meet asynchronously using voice notes, texts, and emails. This primarily occurs when there are Internet connectivity problems (G. Wimer, personal communication, April 2, 2020).

Challenges with the Paper Airplanes model are largely technology related. Internet connectivity is the number one issue. However, students and tutors struggle with digital literacy and technological troubleshooting. To this end, Paper Airplanes has developed robust student and tutor training modules on Google Sites and Google Classrooms, and they have also developed a troubleshooting guide that pairs can reference. Despite the technological challenges, there is a high degree of satisfaction among students and tutors, as well as a strong sense of community (G. Wimer, personal communication, April 2, 2020). Among students, there was an 85% retention rate, and 89% of students felt their English improved as a result of participation. Over 90% of tutors reported improving their tutoring and mentoring skills (Paper Airplanes 2018).

D. VIRTUAL AND SOCIAL MEDIA TEACHING AND LEARNING GROUPS (E.G., WHATSAPP, TWITTER, GOOGLE HANGOUTS, SKYPE, ZOOM)

Across the world, educators and learners have increasingly been using open-source social media and virtual conferencing during the COVID-19 pandemic. These platforms include WhatsApp, Skype, Google Hangouts and Meet, WhatsApp, Facebook, Zoom, Twitter, among others (see list of collaboration platforms below). WhatsApp is the social media platform that has seen the greatest increase in usage from January to March 2020. In the earlier days of the COVID-19 pandemic (December 2020), usage increased by 27 percent and 51 percent in the current phase (March 2020). The biggest increase has been in the 18-34 age group (Kantar 2020). The World Health Organization has been using WhatsApp to disseminate health materials on prevention of COVID-19. During the month of March 2020, Google Meet (Google's video conferencing product) increased by 25 times the usage in January 2020 (day-over-day growth surpassed 60 percent) (Kurian 2020). In December 2019, the number of daily participants in Zoom meetings was at approximately 10 million; in March 2020 this was at 200 million (O'Flaherty 2020).

These platforms allow educators to share digital text, audio, and video resources; hold virtual classes (as described in Modality 4 – Online Teaching and Learning below); and hold group lectures, discussions, and group tutoring. Most video conferencing platforms (e.g., Skype and Zoom) allow for recording of sessions so that educators can share their lessons with a wider audience at different times. These open-source social media and video conferencing apps also enable learners to connect with each other to study and review lessons and subject matter, and for educators and caregivers to share lessons and ideas. A wide range of education initiatives led by international organizations (EDC, IREX, RTI, Room to Read, Save the Children, Worldreader, Teacher for All) described using educator, learners, and caregivers WhatsApp or Facebook groups (in addition to SMS) for virtual workshops and training; sharing resources, activities, materials, and support strategies; supporting each other; and communicating important news; and collaborating (BEC 2020). All these Apps and programs can be easily accessed on smartphones as well as computers and tablets, and to some extent on feature phones. With increased usage, cybersecurity concerns have emerged. Zoom, in particular, has seen “Zoom bombing,” where unauthorized users break into calls to harass users (Paul 2020).

These platforms can be used in conjunction with a formal or non-formal curriculum to offer content instruction, individualized tutoring, or facilitate study groups among learners. They require Internet connectivity but enable real-time interaction with educators and other learners. Such social media and video conferencing platforms not only help support learning, but also counter learners’ feelings of loneliness and isolation and promote wellbeing (Hollingsworth 2020; Instructional Partners 2020).

COLLABORATION PLATFORMS THAT SUPPORT REAL-TIME VIDEO COMMUNICATION (UNESCO 2020C)

- [BlueJeans](#) – Cloud platform for video and audio conferencing as well as large-scale events such as town halls, webinars, and trainings
- [Dingtalk](#) – Communication platform that supports video conferencing, task and calendar management, attendance tracking, and instant messaging
- [FaceTime](#) – Audio and video calls for Apple devices
- [Hangouts Meet](#) – Video calls integrated with other Google’s G-Suite tools
- [Lark](#) – Collaboration suite of interconnected tools, including chat, calendar, and cloud storage, in Japanese, Korean, Italian and English
- [Slack](#) – Collaboration workspace and suite of interconnected tools, including chat, calendar, messaging, and cloud storage (connects to Apps such as Dropbox Zoom, Twitter, etc.)
- [Skype](#) – Video and audio calls with talk, chat, and collaboration features
- [Teams](#) – Chat, meet, call, and collaboration features integrated with Microsoft Office software
- [Webex](#) – Cloud platform for video and audio conferencing, collaboration, chat, and webinars
- [Zoom](#) – Cloud platform for video and audio conferencing, collaboration, chat, and webinars
- China also uses Wechat and Weibo in place of Facebook and Google platforms

Considerations and adaptations. Considerations and adaptation for mobile phone programming are divided by education systems level, learning environment, and community and home environment. Challenges as well as proposed solutions are included below.

Education systems level (political economy and infrastructure)

- While mobile phone infrastructure has increased globally and across the Global North, there are still large areas with poor coverage. “Some ministries are working with Internet providers to set up free public Wi-Fi access points that learners can walk to and upload/download data. Where past educational connectivity programs have run their course, some telecom providers are also simply turning them back on for previously registered devices. [United States]” (Trucano 2020).
- Cost of phone data, Internet data, and Wi-Fi varies from country to country and region to region but is still cost-prohibitive for low-income households and educational institutions. “Some countries are lifting data caps on educational connectivity programs. In other words: A student used to be able to use 4GB a month for free; now she can use 8GB [Turkey]” (Trucano 2020). Additionally, some countries have Universal Service Funds (mandates of telecoms to provide services to marginalized groups like rural, isolated, or low-income) they can tap into for ensuring the Internet is more accessible to historically marginalized communities (Trucano 2015; Trucano 2020).
- Although an increasing number of households have access to phones (and increasingly smartphones), universal access for families is still a problem. Many of the educational apps, games, programs, and social media chats do not function on basic phones. “Ministries of education are working with mobile operators to help get more devices into the hands of learners and educators in a variety of ways, including not only procuring and delivering new devices (in some cases, Universal Service Funds can be used to help with this), but also in inventorying, preparing and distributing devices from schools for home use. [Egypt]” (Trucano 2020).
- In the Covid-19 crisis, current infrastructure and phone coverage trends in low- and middle-income countries suggest encouraging the use of simpler, lower-bandwidth games, which can be accessed more easily using lower-level technology. Governments and international development partners can also support bandwidth shaping. “Ministries of education can request that telecom providers give preferential access to scarce bandwidth for education-related data and services. In addition, countries can request that web and cloud hosting providers provide increased bandwidth at the server level. [Kenya]” (Trucano 2020).

Learning Environment (Teaching and Learning)

- In some countries and regions, “voice-over Internet protocol (VOIP),” or calling over the Internet, such as through WhatsApp or Google Hangouts, is prohibited. “Where VOIP is banned, ministries of education can work with regulators and the ministry of telecommunications to allow it, in order to enable communication between educators and learners in support of remote learning. [Oman]” (Trucano 2020).
- Learning through mobile phones rarely provides the depth and breadth of learning required to support learners in keeping up with subject content and in preventing further achievement and homework gaps. It is important to plan in advance for how to support children and youth who are historically marginalized to ensure that they do not fall further behind (ASCD 2020; Turner Lee 2020).

Community and Home

- Many families (and educators) who have not used SMS messaging prior to COVID-19 may not be able to keep up with and use this platform for teaching and learning (see James 2018 for an example of this in Liberia and Exhibit 2 for general statistics). This can create information and access gaps (exacerbate homework gaps and digital divides). “Ministries of education can work with mobile providers to support awareness-raising campaigns in support of online learning via SMS (and

in some cases, are working with the telecom ministry to enable related mass texting activities that may run afoul of regulations related to “text spam”) and to quickly set up call center helpdesks to support remotely located educators, learners and their families. [Ecuador]” (Trucano 2020).

- Many families across the Global South must work outside of the home even during a crisis or emergency. The expectation of leading education activities and supporting children, especially for caregivers with low literacy and who are not fluent in the language of instruction, is not only daunting but unrealistic for many families. Children from households with caregivers who do not speak the language of instruction and/or who have low literacy levels are likely to need more support during and after a crisis (ASCD 2020).
- In many households, family members share telephones. While device distribution will help get mobile phones in the hands of educators and learners, free SIM cards can also help ensure learners can stay connected. “Ministries of education are working with mobile providers to make available free SIM cards for use by teachers and learners, with expedited registration procedures, coupled with special data plans. [Kyrgyz Republic]” (Trucano 2020).
- Playing literacy games and other literacy traditions can be a strong predictor of reading scores (DBE, RSA 2017); singing also encourages a love of language, rhythms of language, and phonemic awareness (Nord et al. 2000). The quality of the home literacy activities and cooperation has been found to affect literacy achievement in school (Nord 2000; Leseman and De Jong 1998). Families can be encouraged to engage in such activities through mobile text message campaigns.

Evidence on Learning

- While there is limited evidence on the effectiveness of teaching subjects and topics beyond literacy and numeracy in the Global South, basic games can still support learning in the current crisis. In Global North countries, even simple digital games have been shown to increase academic self-efficacy and tenacity because learners get more practice and gain comfort in the academic setting, slowly building on skills (Lim 2018).
- Family-owned technology or community-based technology may support literacy acquisition of key skills, according to evaluation studies (STS 2017).
- The presence of print materials has been found to be an important factor in reading achievement in a number of countries (Brombacher et al. 2012; DBE, RSA 2017; Mwoma 2017). It is not clear yet, if audio books and e-books have the same potential for supporting this achievement but there is evidence that they can support teaching and learning for certain school-age children and adults (see a study in the UK in Picton and Clark 2015).
- Participation in a tutoring program, where trained high school graduates help struggling readers, can have a positive effect on learners’ reading scores (Banerjee et al. 2006). “Tutoring programs using volunteers from the community, older children, or peers seem to show positive impact” (Cao et al. 2014, p.11). Mixed effects of community tutoring and support on reading achievement were also found in UNICEF’s program in Bangladesh, China, the Democratic Republic of Congo, Ethiopia, Tajikistan and Yemen (Banerjee et al. 2006; Spier et al. 2014; UNICEF 2012). These tutoring programs can be carried out over mobile phone (and online) technologies.
- Due to overcrowded learning environments, shortages of educators, and disruptions in learning, engaging community and family members as educational supports and encouraging peer tutoring can be important in crisis-affected and post-conflict settings (Zakaria and Bartlett 2014).
- Research shows that “ICT components should be aligned with pedagogy (Trucano 2005). In other words, if the underlying approach to literacy instruction is weak, it is unlikely that a limited,

standalone intervention with a mobile phone, computer, or e-reader will produce significant change” (Kim et al. 2016, p. 15).

Equity Factors. In addition to the education system, learning environment and home and community considerations, a number of important equity factors should be considered. These are outlined below.

Exhibit 7: Equity factors in mobile phone platforms

EQUITY FACTOR	CONSIDERATIONS
Geographical location	<ul style="list-style-type: none"> In many rural and remote areas, there is limited phone network coverage and lower bandwidth (Niyigena et al. 2020, Trucano 2020 and see Exhibit 2).
Gender	<ul style="list-style-type: none"> Across low- and middle-income countries (LMICs), women are 10% less likely than men to own a mobile phone (International Telecommunication Union 2017). Women in South Asia are 38% less likely to own a phone than men (Global System for Mobile Communications 2015). The gender gap is usually greater in rural areas than in urban areas. Even for women who do own mobile phones, a gender gap in usage still persists. Women report less frequent usage, especially for more advanced services such as Internet or data services, due to barriers such as cost, security and harassment, operator trust, technical literacy and confidence, and network quality (Global System for Mobile Communications 2015). Cultural gender norms have made mobile phone adoption challenging among some communities, such as Berber communities in Morocco (Dodson, Sterling, and Bennett 2013). “For low-resource illiterate women, the inability to access life-improving benefits such as sharing information in a cost-effective way or taking advantage of mobile-based development services can further marginalize these women. There are widespread and persistent technological, social, and linguistic barriers that limit the usefulness of text messaging and other mobile phone features for these women” (Dodson, Sterling, and Bennett 2013, p. 85). “Gender-based barriers are often more nuanced: they include lack of financial resources, low literacy levels due to lack of educational opportunities, and culturally-prescribed gender hierarchies that can impede the use of mobile phones by women” (Dodson, Sterling, and Bennett 2013, p. 85).
Socioeconomic status	<ul style="list-style-type: none"> Low-income families often have less access to smartphones and bandwidth (Trucano 2020).
Disability	<ul style="list-style-type: none"> Accessibility features, such as voice recognition, text-to-speech, screen reader, adjustable screen displays and magnification, among other features might be necessary to allow access, depending on a student’s disability. Specialized applications can also be used to assist with Internet usage.
Minority and language groups	<ul style="list-style-type: none"> Mobile phone programs are often in the national or dominant language in countries and not all families may speak these languages. Caregivers may not be fluent or literate in languages educators and learning institutions are using to communicate with learners. Low literate and/or oral language-dependent communities cannot rely on text as a viable communications system (Dodson, Sterling, and Bennett 2013) “An overall lack of functional literacy and numeracy is a major contributor to a mobile utility gap in that community. Non-standard mobile phone interfaces, a complex language environment with both Arabic and Berber dialects and multiple alphabets...present significant impediments to using mobile phones as a

MODALITY 4: ONLINE TEACHING AND LEARNING

SUMMARY

- Target learners: Secondary school and above (or with accompaniment for younger learners)
- Particularly useful for emulating face-to-face classroom learning and delivering higher level curriculum
- The main categories include learning management systems, massive open online courses (MOOCs), screencasting programs, and open access resources such as digital textbooks and teaching materials
- Advantages
 - Can integrate monitoring of learning
 - Can be designed to be accessible to learners with hearing, sight, other impairments
- Disadvantages
 - Least accessible in reach, access, and age of users (and most inequitable access)
 - Dependent on electricity/charging
 - May require smartphone, tablet, or computer at a cost
 - Requires significant technology literacy/training

Online teaching and learning modalities include learning management systems like Blackboard, Moodle, Skype, and Google Classroom; massive open online courses (MOOCs); screencasting programs like Screencast-O-Matic; and open access resources such as digital textbooks and teaching materials. These programs and resources allow educators and learners to connect with each other synchronously and asynchronously via the Internet to continue curriculum during disruptions in face-to-face education. Using these online programs, where Internet connectivity is available, educators can deliver curriculum content to learners through computers, tablets, smartphones, and even (with extensive modifications) basic phones (Creed and Morpeth 2014; Instruction Partners 2020; UNESCO 2020c; UNESCO 2020d). While these programs allow for both synchronous and asynchronous education, they are also among the most complex solutions for distance learning. As a result of the complexities involved, these tools are most suitable for educators and learners in secondary school and above (or with accompaniment for younger learners).

In order to use online learning resources, learners and educators require an Internet-ready device, stable electricity, stable Internet, digital literacy, and linguistic competence in the language of the platform (Qureshi et al. 2012). Provided these conditions are met, online platforms offer educators and learners a wide array of possibilities for teaching and learning across most content areas and potentially offer improved student safety in conflict and crisis situations (Oshiberu 2018; Rajab 2018). Educators, school administrators, and other education sector stakeholders have used online distance learning approaches to provide continued student education in the Global South (Niyigena et al. 2020; Oshiberu

2018; Rajab 2018; World Bank 2020). However, research on the effectiveness of online education is mixed, and both “extensive and inconclusive” (Rajab 2018).

An important caveat to using virtual classrooms, video conferencing tools, and screencasting programs is that educators will need to receive pedagogical and monitoring support to ensure all their learners can continue receiving high-quality education, as digital content delivery often relies on unfamiliar teaching techniques. This becomes even more important as the content itself becomes more advanced (Instructional Partners 2020).

While computer and Internet penetration is increasing globally, many low- and middle-income countries are still working to improve connections, particularly in rural areas. Even in urban areas, large gaps remain in terms of regular computer and Internet access, particularly for low-income families and individuals. Furthermore, many users can only access the Internet on smartphones, which requires using phone data (Silver and Johnson 2018). Some countries are addressing Internet access issues by requesting increased bandwidth and preferential access for educational materials (Kenya); unbanning online calling, also known as VOIP (Oman); distributing Internet-ready devices to educators and learners (Egypt); and creating additional public Wi-Fi hotspots (USA) (Trucano 2020).

During closures of learning institutions, even for scheduled holiday breaks or inclement weather, educational inequalities tend to worsen (see [Young Lives studies](#) in the Global South and longitudinal studies in the US like Chicago Longitudinal Study). These inequities worsen for various reasons according to the Young Lives study, an international longitudinal study following 12,000 children over 15 years in Ethiopia, India (in the states of Andhra Pradesh and Telangana), Peru and Vietnam. The main reason being that learners in households with higher SES and/or urban house settings are more likely to have access to computers and other technology (Moore 2020). Access to technology in the home impacts learners’ ability to succeed in online learning as a large study in East Africa revealed among undergraduate students (Niyigena et al. 2020). In some contexts, technology access is gendered. For example, in India, boys are much more likely to have access to computers and Internet than girls (Moore 2020). Access to appropriate technology for learners with special needs is also a critical problem, although understudied. Finally, time and space to study is a challenge. In a longitudinal study in Zanzibar, learners from families in rural areas with pressing economic needs reported having less time to study; girls having even less time than boys because of gendered household expectations (Morris 2018).

Before launching into new learning management systems and virtual classroom design, it is important to tap into existing resources and pioneers in the regions. One example is the University of South Africa (UNISA) featured in the case study below.

CASE STUDY | OPEN AND DISTANCE-LEARNING – UNISA

The University of South Africa (UNISA) introduced satellite classes in 2006 to improve the pass rate of first year students enrolled in business management courses. These virtual classes were broadcast live from a satellite studio and could be watched in one of 17 different venues in South Africa and Namibia. Because of the high student-to-lecturer ratio (about 4,000 students to every 1 instructor), there were about 15 additional tutors available to assist students with learning needs on Saturdays (Swanepoel, De Beer, and Muller 2009). During the class, content was recorded and put on a DVD so that students could either purchase the material or travel to one of the regional offices to view either in study groups or individually (which is not feasible during COVID-19 but may be available through streaming).

These satellite classes contribute great value to open and distance learning for many reasons. Students who might struggle with long commute times are not faced with a geographical barrier and their travel costs are also reduced as they are able to choose an educational location that works best for them. Additionally, because these classes can be broadcast over and over again, students are still able to access the material even in the case of space limitations or infrastructure constraints, power failure, inability to attend the live session, or other factors that may prevent engagement or attendance. These recordings can be re-watched and used in study groups or by tutors. This type of educational approach allows for one professor to communicate with many students, expanding the capacity of the educational reach, especially for UNISA's students that are located in more rural areas.

A. VIRTUAL CLASSROOMS, SCREENCASTING, AND MOOCS (E.G., BLACKBOARD, MOODLE, SKYPE, ZOOM, AND SCREENCAST-O-MATIC)

Many countries, primarily in the Global North, are currently implementing an array of virtual classrooms, or online learning management systems, which are integrated systems that allow educators to post video lectures, assignments, quizzes, and discussion boards for learners. Educators can give assignment feedback and grades through these systems. They also allow for learners and educators to meet in real time via chat and video calls. These include widely recognized and used programs in secondary schools and universities in the Global North like Google Classrooms, Blackboard, and Moodle (Trucano 2020), as well as platforms developed by individual nation states and regions (UNESCO 2020). These programs function best on computers and tablets, as word processing can be laborious on smartphones.

To supplement virtual classrooms, educators can access free screencasting programs such as Screencast-O-Matic to record video lectures. Screencasting lets educators record video of themselves, video of their computer screen with a voiceover, or a combination of the two. These programs can use the built-in webcam and microphone on a computer, or an external webcam and microphone. Screencasting is a useful way to record video lectures as educators can have a PowerPoint on their own computer and lecture with the slides as they would in a face-to-face classroom. Programs such as Skype and Zoom, discussed in Modality 3 – Mobile Phone above can be used to record video lectures. Learners can submit questions about the lecture via chat or discussion board in the virtual classroom for the teacher to answer asynchronously.

Massive Open Online Classrooms (MOOCs) are another type of virtual classroom that provide access to classes taught globally. Some MOOCs offer a certificate or credit for a cost. They can be taught in real time with active teacher monitoring, but truly massive courses tend to use automated grading, which can reduce quality (Balfour 2013).

MOOC PLATFORMS (UNESCO 2020C)

- [Alison](#) – Online courses from experts, available in English, French, Spanish, Italian and Portuguese
- [Canvas Network](#) – Lifelong learning and professional development for educators
- [Coursera](#) – Online courses taught by instructors from well-recognized universities and companies
- [EdX](#) – Online courses from leading educational institutions
- [European Schoolnet Academy](#) – Free online professional development courses for educators in English, French, Italian, and other European languages
- [Future Learn](#) – Online courses to help learners study, build professional skills and connect with experts
- [Icourses](#) – Chinese language courses for university learners
- [University of the People](#) - Online university with open access to higher education

B. OPEN EDUCATIONAL RESOURCES (E.G., DIGITAL TEXTBOOKS AND TEACHING AND LEARNING MATERIALS)

Open educational resources (OER), free online textbooks and educational materials, can be used in conjunction with virtual classrooms. OER include “courses, textbooks, videos, journal articles, and other materials that are usually available online and are licensed in such a way (typically with a Creative Commons license) so as to allow for reuse and revision to meet the needs of teachers and learners” (Hilton 2016). Large repositories of open books include the Global Digital Library (books and games in multiple languages for primary school) and the Open Textbook Library (university textbooks in English).

University learners in the United States have been found to prefer open online textbooks to traditional paper textbooks and were twice as likely to report reading those textbooks compared to learners using traditional textbooks. Learners prefer using open textbooks because they are free and accessible anywhere there is access to a computer, tablet, or smartphone (Cuttler 2018). While learners seem to prefer using OER to more expensive hard copies of books, some educators have been reluctant to adopt these materials in their classes due to perceived lower quality of open access materials and restrictions by the publishers in accessing some books online (Cuttler 2018). As more OER come online, however, this perception is changing. Increasingly, educators are finding OER to be high-quality and adaptable to their courses (Hilton 2016; Young 2018). In one year, membership in the Open Textbook Library increased from 300 to 650 university libraries in the United States (Young 2018). Countries explicitly using OER in response to COVID 19 include Bulgaria, Egypt, Russia, and Uruguay (World Bank 2020).

OER content includes self-directed learning programs. A number of these programs are included below.

OPEN EDUCATIONAL RESOURCES (UNESCO 2020C)

- [British Council](#) – English language learning resources, including games, reading, writing and listening exercises.
- [Byju's](#) – Learning application with large repositories of educational content tailored for different grades and learning levels.
- [Code It](#) – Helps children learn basic programming concepts through online courses, live webinars, and other kid-friendly material. Available in English and German.
- [Code.org](#) – Wide range of coding resources categorized by subject for K-12 learners. Offered for free by a non-profit.
- [Discovery Education](#) – Free educational resources and lessons about viruses and outbreaks for different grade levels.
- [Duolingo](#) – Application to support language learning. Supports numerous base and target languages.
- [Feed the Monster](#) – Android application in multiple languages to help teach children the fundamentals of reading.
- [Geekie](#) – Portuguese language web-based platform that provides personalized educational content using adaptive learning technology.
- [Khan Academy](#) – Free online lessons and practice in math, sciences, and humanities, as well as free tools for parents and educators to track student progress. Available in 40+ languages, and aligned to national curriculum for over 10 countries.
- [KitKit School](#) - Tablet-based learning suite with a comprehensive curriculum spanning early childhood through early primary levels.
- [LabXchange](#) – Curated and user-created digital learning content delivered on an online platform that enables educational and research experiences.
- [Mindspark](#) – Adaptive online tutoring system that helps learners practice and learn mathematics.
- [Mosoteach](#) – Chinese language application hosting cloud classes.
- [OneCourse](#) – Child-focused application to deliver reading, writing, and numeracy education.
- [Polyup](#) – Learning content to build math and computational thinking skills for learners in primary and early secondary school.
- [ProFuturo Resources](#) - A catalogue of educational resources in Spanish organized by subject area for learners aged 3-18.
- [Quizlet](#) – Flashcards and games to support learning in multiple subjects.
- [Siyavula](#) – Mathematics and physical sciences education aligned with the South African curriculum.
- [YouTube](#) – Huge repository of educational videos and learning channels.

Considerations and adaptations. There are several features of online programs that make them responsive to different educational contexts and needs. Considerations and adaptations for online programs are divided by education systems level, learning environment, and community and home environment below.

Education systems level (political economy and infrastructure)

- Online learning programs and resources require stable electrical power, stable Internet connectivity, and access to a computer, tablet, or smartphone. In addition, sufficient bandwidth and server space is necessary. Sufficient bandwidth is needed to download resources quickly, and server space must be available to save content (see mobile phone section above).
- Using pre-existing virtual classroom programs and OER will decrease the time it takes to re-establish education in a crisis.

Virtual classrooms (learning management systems)

- Online platforms provide multiple ways of engaging with content such as video lectures, virtual discussion groups, discussion boards, chat functions, online quizzes, and educational games.
- Courses can range from fully synchronous, with educators actively lecturing and monitoring course work (e.g., Google Classroom, Blackboard, and Moodle), to fully automated and asynchronous (e.g., MOOCs).
- Synchronous and real time asynchronous platforms offer the opportunity for learners to turn in assignments and have educators monitor their progress.
- Creating assignments on virtual classrooms can enable easy monitoring of student work and allow educators to provide frequent feedback, both of which contribute to improved learning (Burns et al. 2019; Lim 2018; Sung, Chang, and Liu 2016).
- Educators often lack the capacity to use student centered learning techniques in low- and middle-income countries due to lack of training in these methods and lack of experience with them in their educational backgrounds. All forms of teaching using digital technology are more effective when using student centered learning techniques (Burns et al. 2019; Creed and Morpeth 2014; Lim 2018; Sung, Chang, and Liu 2016; UNESCO 2018).
- In approaches where educators can deliver content and maintain contact with learners, educators can continue to play social, emotional, and instructional mentorship roles for learners, providing stability and an opportunity to monitor learners' vulnerability (Instructional Partners 2020).

Screencasting

- In this approach, educators pre-record lessons on their own device to share with learners over the cloud, via email, or through a video-sharing platform. Screencasting programs are available for free online and allow for both video recording and screen sharing with voice overs.
- As with video conferencing tools, basic screencasting programs are free, but more advanced features cost money (e.g., Screencast-o-matic allows for 15-minute recordings, but access to longer recording allowances have a fee).

Open educational resources (OER)

- The major advantages to OER are that they are a free and open source for learners and educators. OER can also be downloaded when Internet is available and printed or used offline when Internet is not available.
- OER can be found for a wide range of content areas at primary, secondary, and tertiary levels. Commonwealth of Learning has curated a list of OER, which can be found [here](#).
- Depending on file sizes and Internet speeds, downloading textbooks could take a long time and use up significant amounts of data. The use of smaller mobile friendly resources (e.g., worksheets, short articles) may be more ideal in contexts with less reliable Internet service.

Community and home environment

- Online education affords flexibility for educators and learners, particularly when electricity and Internet are intermittent. Teaching and learning can occur during those times of day when power is reliable, and offline studying can take place at other times.
- Educators and learners can also be flexible about meeting times. They can arrange to have video calls or synchronous lectures at times that might otherwise be outside of the normal school day.

Evidence on Learning

- In the context of low- and middle-income countries, laptop and mobile technology used to promote inquiry-based, student-centered teaching approaches have been effective where educators receive the training and support to use these techniques (Lim 2018; Sung, Chang, and Liu 2016).
- Computer and tablet literacy and ownership is still a major concern for institutions rolling out online programs and is a significant factor in the digital divide; the length of computer ownership influences literacy (see Niyigena et al. 2020 study in East Africa).
- Studies conflict on whether learners have better learning outcomes (e.g., higher grades and test scores) in online education. However, no statistical difference was found in student outcomes in Saudi Arabia between learners who took a course face-to-face and learners who took the same course online from the same professor (Rajab 2018).

Equity Factors. In addition to the different systems, learning environments, and home and community considerations, a number of important equity factors should be considered. These are outlined below.

Exhibit 8: Equity factors in online teaching and learning

EQUITY FACTOR	CONSIDERATIONS
Geographical location	<ul style="list-style-type: none">• Rural communities are less likely to have the infrastructure to support Internet access. In 2015, only 29% of the world’s rural population (3.4 billion) had 3G mobile-broadband coverage compared with 89% of the world’s urban population (4 billion) (International Telecommunication Union 2017).• In East African countries, university learners from rural communities have lower rates of computer ownership, Internet access, and online fluency than those from urban communities (Niyigena et al. 2020).
Gender	<ul style="list-style-type: none">• The proportion of men using the Internet is higher than the proportion of women using the Internet in about two-thirds of countries worldwide (see Exhibit 2).• Barriers to access may relate to local context factors, such as low literacy and digital literacy, and safety concerns, which often affect women disproportionately. Women may be less knowledgeable about mobile Internet than men, which limits their usage (Niyigena et al. 2020).• In many countries, there is a connection between gender parity in education enrollment and gender parity in Internet use. For the least developed countries, the gender gap in Internet use in 2017 was 33%, compared with 16.1% in developing countries and 11.6% in the world gender gap (International Telecommunication Union 2017).• In least developed countries, only 1 out of 7 women is using the Internet compared with 1 out of 5 men. Additionally, the gender gap has widened in Africa since 2013, as the proportion of women using the Internet is 25% lower than the proportion of men (International Telecommunication Union 2017).• Gender disparities are present in household computer use. Parents are more likely to encourage boys to use computers, and educators often offer more encouragement of computer use to boy learners rather than girl learners (Harrell

EQUITY FACTOR	CONSIDERATIONS
Socioeconomic status	<p data-bbox="513 222 1419 317">1998). Gender inequity in computer use is also reinforced through gendered computer activities geared towards boy learners, which prompts greater enthusiasm for boys to participate and greater hesitation for girls (Harrell 1998).</p> <ul data-bbox="513 331 1419 485" style="list-style-type: none"> • Internet use is more common among those with higher levels of education. Among 39 countries surveyed by the Pew Research Center (2018), 34 countries reported a double-digit difference. Among those with less education in South Africa, the percentage of people accessing the Internet was 41%, which is less than half the percentage of higher-educated responders at 85%.
Disability	<ul data-bbox="513 506 1419 1003" style="list-style-type: none"> • There is a disparity in Internet use between those with disabilities and those without. A study by the UK Office for National Statistics (2013) found that persons with disabilities were more than 20% less likely to have used the Internet than those without a disability. • It is feasible to expect that Internet access and usage is lower for persons with disabilities than for the general population, as on average, they have lower employment rates, lower income, and less education. These factors add barriers to their ability to afford Internet services and electronic devices and affect their level of digital literacy (UNESCO 2019). • Content and software need to be designed with accessibility for people with disabilities from the beginning. If this is not integrated into design from the beginning, then some accessibility features that are built into many devices will not work (ASCD 2020). • Computers may remain inaccessible without adaptive technology. For example, learners with physical disabilities may be unable to operate certain devices, such as the mouse, keyboard, or screen.
Minority and language groups	<ul data-bbox="513 1024 1419 1239" style="list-style-type: none"> • Content is often either in English or another dominant language of the region, rather than the local language. Even if content is available in the local language, the software used to create and access the content is often in the regional majority language or in English, reinforcing the dominant status of those languages (Cunliffe and Herring 2005). Users usually do not have the financial resources to purchase a program that supports their language and are not able to wait for the development of such a program (Cunliffe and Herring 2005).

Sources: Broadband Commission for Sustainable Development, 2018. UNESCO, 2019; International Telecommunication Union, 2017; UK Office for National Statistics, 2013; Pew Research Center, 2016.

CONCLUSION

This review provides a comprehensive look at distance learning modalities that exist around the world (audio and radio, video and television, mobile phone programming, and online learning), the technology available, and the existing evidence of what has been effective, why, for whom, and in what contexts. This review began by identifying the main purposes of distance learning: teaching lessons based on formal or nonformal curricula as the *primary means of instruction* (e.g., for learners not in school or learning online); teaching lessons based on formal or nonformal curricula to *complement (reinforce) learning* (e.g., short teaching demonstrations); providing *additional educational support* to learners (e.g., tutoring); and *supplementing learning* beyond a formal or nonformal curriculum (e.g., educational television). Whether intended for extending learning, enhancing learning, or creating equity in learning, distance education has the potential to reach learners of all ages (from preschoolers to adults), low-tech and high-tech environments, and from different demographics.

As noted throughout the review, the lessons and examples can be applied in crises and conflict contexts, as well as beyond these contexts. As there is no “one-size-fits-all” or “right” approach to distance learning, planning and designing of approaches must take into consideration the education system, learning environments, and community and home contexts in which learners and educators live. First, access to technology (infrastructure and hardware) and what ministries and education authorities have the capacity to develop and manage must be analyzed alongside what educators can and know how to teach, and what learners have access to in their homes and communities. Second, distance learning content must be designed to be responsive to learners from different SES, gender, ethnic and language, geographical (rural/urban) backgrounds, as well as inclusive of learners with special needs. Within learning institutions, educators must have the knowledge, skills, and attitudes to uptake distance teaching, as well as the mentorship and coaching to ensure they are teaching inclusively for all learners. Learner must see themselves in the programs and materials and have the accompanying materials and familial support to be successful in distance learning. If equity measures are not taken, then the digital divide and achievement gap between learners and communities is not narrowed, it is likely amplified (Turner Lee 2020; OECD 2015; Picton and Clark 2015). Third, wellbeing of educators and learners must be considered by ministries and education authorities in planning for and designing distance learning, and furthermore, fostered in learning institutions and in the home and community environment. While in times of crises, distance learning may have to be rolled out quickly, long-term and comprehensive planning is critical (Burns 2020b).

One of the main findings of this review is that there is a lack of conclusive and robust research and study of distance learning modalities, especially in the Global South. As such, much of the recommendations are based on lessons learned through implementation efforts. Despite lack of sufficient literature and research, this review has captured creative and innovative strategies being used—some old and some new—to support teaching and learning in diverse and complex contexts. One of these important and notable strategies is a multiple-modality approach, which reaches learners and educators across different contexts and demographics. If resources are allocated, design coordinated, equity factors considered and efforts evaluated effectively, distance learning has great potential for extending and enhancing education.

STRATEGIC RECOMMENDATIONS

Based on the evidence gathered for this review, and the four distance learning modalities used and studied around the world, nine key recommendations for developing more comprehensive distance learning strategies in USAID-recipient countries are made below. While distance learning is important in times of crises and conflict such as COVID-19, as reiterated throughout this review, distance learning is also important in non-crisis contexts. The recommendations below are grouped by stages: those that are specific to rolling out distance learning in crises and conflict contexts, and those that help ensure more effective and strategic long-term distance learning strategies to promote greater access to and equity in quality teaching and learning.¹⁰ Framing recommendations by stages helps stakeholders respond to the different scenarios that precipitate efforts to uptake distance learning, while at the same time allows countries and programs to adapt recommendations to their specific context. These recommendations should be carefully tailored and adapted to the stage and needs of the country/context in which distance learning is taking place, and the capacities of the education system actors implementing such programs.

Stages of Shifting In-Person Learning to Distance Learning in Emergency Contexts

As of April 2020, the global education community has been grappling with the need to provide immediate, effective strategies for distance learning. However, ultimately these recommendations aim for building broader access to quality multi-modal teaching and learning.

- **Immediate protection.** Ensuring learning communities (educators, learners, educational leaders, and families) are safe by closing schools and learning centers and pausing educational activities that require social contact (e.g., by filming live programs).
- **Stability and temporary strategies (to provide continuity).** Shifting in-person learning to distance learning through the four modalities covered in this report. Ensuring learners have basic needs met (e.g., food, shelter, safety, and physical and psychosocial well-being) through cross-sectoral efforts.
- **Support for resuming in-person teaching and learning.** When the COVID-19 threat has subsided and schools and learning centers can resume teaching and learning, they will need additional financial and resource support (e.g., paying teachers, providing extra tutoring and coaching, and repairing neglected infrastructure).
- **Preparation for quality multi-modal teaching and learning.** The COVID-19 pandemic will not only further expose teaching and learning inequities and difficulties (Turner Lee 2020), but also present new strategies for distance teaching and learning. These lessons can be documented, studied and evaluated, and strategically put in place to help education institutions and actors prepare for future pandemics and threats, while ensuring greater inclusion and becoming leaders in preventing further crises.

¹⁰ These stages were adapted from *A Broad Strategy for Schools During the Covid-19 Pandemic* (Harris 2020) at The Brookings Institution.

The nine recommendations made in this review are grouped by the stages of shifting learning from in-person to distance learning. However, when in-person learning has resumed or for contexts not experiencing a disruption in schooling, attention should be paid to the long-term strategic recommendations.

Exhibit 9: Summary of strategic recommendations

STABILITY AND TEMPORARY STRATEGIES.	
Recommendation 1	<ul style="list-style-type: none"> a. Mobilize and implement distance learning modalities as quickly as possible to create some continuity to learning and create systems. b. Monitor and evaluate quality and learning outcomes to the extent possible.
Recommendation 2	<ul style="list-style-type: none"> a. Support educators' capacity to uptake distance learning. b. Be responsive to educators' psychosocial wellbeing.
Recommendation 3	<ul style="list-style-type: none"> a. Support caregivers and families as they take on greater roles as learning facilitators. b. Be responsive to caregivers' psychosocial wellbeing.
Recommendation 4	<ul style="list-style-type: none"> a. Support learners as they transition to distance learning. b. Be responsive to learners' psychosocial wellbeing.
SUPPORT FOR RESUMING IN-PERSON TEACHING AND LEARNING.	
Recommendation 5	<ul style="list-style-type: none"> a. Plan for and budget eventual resumption of in-person instruction. b. Provide continuous support during transition back to in-person instruction.
PREPARATION FOR GREATER MULTI-MODAL DISTANCE TEACHING AND LEARNING.	
Recommendation 6	<ul style="list-style-type: none"> a. Increase access to existing open source teaching and learning materials appropriate to countries, languages, and contexts. b. Ensure distance learning support is monitored and evaluated and equity analyzed.
Recommendation 7	<ul style="list-style-type: none"> a. When creating new distance learning strategies and content, draw on evidence to inform what technology is feasible and what combination of modalities are safe, appropriate, and most effective and equitable. b. Plan and budget for well-designed and multiple-modal approaches.
Recommendation 8	<ul style="list-style-type: none"> a. Provide guidance to education institutions and educators on how to deliver distance learning. b. Provide guidance to education institutions and educators on how to ensure distance learning is both designed for and responsive to learners with disabilities.
Recommendation 9	Ensure that multiple-modality distance learning strategies are continuously updated and revised based on the changing technologies, contexts, and needs of the educators and learners.

Recommendation 1a. Mobilize and implement distance learning modalities and technologies as quickly as possible to create some continuity in learning and create systems.

In addition to ensuring learners continue to access subject content, distance learning can provide normalcy and psychosocial support to educators and learners. Efforts to continue classes and routines—whether through online courses, radio, mobile phones, or other modalities—can help ensure learners have routines, networks, and communities that support their wellbeing (ASCD 2020). A UNICEF poll in

Liberia during the Ebola crisis found that what bothered youth the most was “no school” (Global Education Cluster et al. 2015; UNICEF, WHO, and IFRC 2020).

As discussed under each of the four modalities throughout this paper, distance learning approaches and plans vary greatly by country, regions within countries, learner demographics (e.g., age, disability, language groups, and gender), access to technology, and capacity of governments and learning institutions to provide learning and teaching through distance learning platforms. As Burns (2020) writes:

There’s no “right” distance education choice right now. Every country has to choose the best medium or a mix of media based on access, technical infrastructure, content, the ability to adapt this content to the appropriate distance education medium or mix of media—and make learning opportunities available to learners as quickly as possible.

As this review has emphasized, each modality has its advantages and disadvantages. Radio and television have wide reach, but often require educator or caregiver reinforcement and follow-up activities to make them most effective (Ho and Thukral 2009). Mobile phone technology has huge potential in disseminating learning, teaching, and educational materials; reinforcing learning; providing tailored tutoring and guidance; and administering games and engaging learning activities. However, large-scale and stand-alone education activities via mobile phone have not been captured and evaluated (Burns 2020b). Online learning through learning management systems may offer the most comprehensive strategy, but demands considerable skills and infrastructure for design and rollout, as well as significant financial and expertise resources, and they have the least reach in terms of age and geography of users (Burns 2020b; Niyigena 2020).

Specific recommendations for ministries, donors, and implementers:

- *Draw on existing technology and programming to roll out content as quickly as possible and create fast, innovative adaptations where feasible.* Use the INEE Checklist to help make decisions on appropriate ICT; for example, rebroadcasting IAI/IRI programs and setting up an SMS messaging platform with households to inform them about broadcasts and provide additional educational resources to reinforce programming.
- *Increase access to technology and Internet data and bandwidth.* For example, partner with telecom operators (who may provide Universal Fund Agreements to support marginalized communities) and technology companies to ensure sufficient bandwidth and servers to meet the country’s educational needs.

Recommendation 1b. Monitor and evaluate quality and learning outcomes to the extent possible.

Although countries around the world have piloted and rolled out distance learning—from crises and conflict areas such as Afghanistan, Somalia, and Syria to post-conflict areas such as Sri Lanka—there has been little study of the effects and impacts as well as the quality of the learning (which includes both cognitive and non-cognitive measures). Therefore, while this review sheds light on what has been done, how, and why, there is little conclusive evidence on what is most effective. “Until there is evidence on what alternative modes and methods work and under what circumstances, it will be largely impossible for school districts and individual schools to develop comprehensive strategies needed for education contingency planning” (Anderson 2020). In the meantime, using checklists such as INEE’s [Checklist for Information and Communications Technologies \(ICT\) Interventions to Support Education in Crises and Conflict Settings](#) (2018a) is a good start. Likewise, supporting coalitions that are already established leaders in

crisis response is also critical in rolling out distance learning quickly. Once such coalition is [Ready](#), a global consortium of organizations and institutions (Save the Children, Johns Hopkins, UK-Med, Mercy Malaysia, and EcoHealth Alliance) aimed at strengthening NGOs in their support of affected governments and institutions during disease outbreaks and pandemics. Consortiums like Ready, along with agencies like the World Bank and GPE, should also be tasked and funded to create guidance and tracking systems for monitoring teaching and learning and to help country governments make decisions about when to reopen schools. Long-term investment in monitoring and evaluation (M&E) will be discussed in Recommendation 6b.

Specific recommendations for ministries, donors, and implementers:

- *Support M&E of distance learning programs.* This is the only way to address the lack of conclusive evidence and guidance on the quality and effectiveness of distance education on teaching and learning outcomes, whether assessed through cognitive or non-cognitive measures. It is also critical to ensuring that distance learning is not amplifying teaching and learning inequities.
- *Engage existing coalitions in M&E efforts.*

Recommendation 2a. Support educators' capacity to uptake distance learning.

Educators and school administrators are leaders—the backbone of teaching and learning—and critical to ensuring learning can continue during crises such as the COVID-19 pandemic even as caregivers and families step into educator roles. Educators and school administrators can provide critical technology, materials, content, and support to families and learners during educational disruptions (ASCD 2020). There are several ways to support educators in taking on different and greater responsibilities during crises and uptaking distance learning. First, provide information and quick virtual trainings to get them prepared to teach virtually (more extensive training and capacity building is discussed in Recommendation 8a). Set up coaching and mentorship to help educators get comfortable teaching online. “Focus on what learning matters most” (ASCD 2020, p. 18). As these teachers are “learning on the fly” (Perry 2020), they need all the support they can get to get comfortable with teaching in a new environment.

Second, provide educators with key messages and actions in the form of checklists and information to ensure they provide consistent information to communities, families, and learners. For example, UNICEF is working with the International Federation of Red Cross and the World Health Organization to develop [key messages and actions](#) for COVID-19 prevention and control:

This will include specific messages, actions, and checklists for school administrators, teachers, and staff; parents and community members; and learners and children. The guidance will also contain a section on engaging learners of different ages in health education to prevent and control the spread of COVID-19 and other viruses and to develop media literacy and critical thinking skills to combat social stigma and become active citizens (Anderson 2020).

Third, allow educators to make mistakes, ask for help, and relax rules that prevent educators from being in touch with learners or supporting distance learning efforts. Also, support them in problem solving along the way (ASCD 2020). As Harris (2020) describes, some schools have in place well-intentioned and necessary protections to safeguard learner health, safety, and civil rights, such as not communicating with learners through social media. Educators and administrators need to have ethics and guidelines for distance learning; however, some regulations that prevent social media and texting with learners may have to be relaxed temporarily.

Specific recommendations for ministries, donors, and implementers:

- *Provide educators with key messages and actions, through the form of checklists and information to ensure they provide consistent information to communities, families, and learners.* For example, give administrators and educators clear messaging on how to prevent the spread of COVID-19, combat stigma, and roll out distance learning.
- *Provide educators with relevant technology, and facilitate distance training, coaching, and mentoring to help educators gain confidence in using technology, modalities, and inclusive approaches.* For example, create WhatsApp training groups or send out short audio and video files of how to use mobile phones for group conversations.
- *Allow educators to make mistakes and ask for help; support them in problem solving.*

Recommendation 2b. Be responsive to educators' psychosocial wellbeing.

Like caregivers and learners, educators need support, activities, and encouragement to care for their physical and psychosocial wellbeing, especially in crisis and conflict settings (ASCD 2020; Fark et al. 2019). A number of universities across the world have begun to offer online fitness, relaxation, and counseling services through online and mobile phone platforms, as well as providing links to financial and mental health counseling. Although these resources are more limited for educators conducting basic education and non-formal programs in the Global South, encouraging universities and education institutions to offer these services to partnering universities and institutions in the Global South could be a start. Additionally, as educators are worried about income, job security, and other concerns, clear administrative messaging that assures educators that their physical and economic safety is a priority will help ease anxieties. Educators should be encouraged to form virtual support groups to help address their sense of loneliness or helplessness, facilitate experience sharing, and discuss coping strategies when facing learning difficulties (ASCD 2020; Instructional Partners 2020; UNESCO 2020c; UNESCO 2020d). Finally, governments and donors can think about financial mechanisms to support educators during this period. For example, hardship grants and bonuses may be a way to help educators with added expenses during the pandemic and to show them they are appreciated and to encourage they return. Post-Katrina a huge flight of educators was experienced, and amplified issues of inequities among teachers and institutions (Perry et al. 2020).

Specific recommendations for ministries, donors, and implementers:

- *Offer educators support, activities, and encouragement to care for their physical and psychosocial wellbeing (see specific examples in [Landscape Review: Teacher Wellbeing in Low Resource, Crisis, and Conflict-affected Settings](#) by Fark et al. 2019).*
- *Offer financial mechanisms (e.g., hardship loans) to support educators.*
- *Support education social groups and communities.*

Recommendation 3a. Support caregivers and families as they take on greater roles as learning facilitators.¹¹

Caregivers and families are one of the greatest sources for ensuring continuity in learning and in supporting learners' psychosocial wellbeing. As Wang et al. (2020) note, "in the event of home

¹¹ Note that this recommendation excludes adult learners like pre-service or in-service teachers.

confinement, parents are often the closest and best resource for children to seek help from.” Caregivers can be encouraged and given tips on how to monitor children for psychological needs and be there to provide information and comfort (UNICEF, WHO, and IFRC 2020). As caretaking is often gendered, creating messages that encourage male and female caregivers alike to support learners’ development is important.

Although caregivers and families are an important resource in supporting and monitoring distance learning, they cannot be expected to oversee curriculum and instruction as a teacher would (ASCD 2020). Taking on a “learning coach” role is daunting and/or impossible for caregivers already grappling with additional stress from economic insecurity (especially those who work in activities that force them to go outside of the home); health conditions; and securing adequate water, food, health, and other social services in remote or marginalized regions. However, female and male caregivers can be encouraged to do what they can to support learning, such as reading together (dialogic reading) or practicing math during household activities with male and female learners alike. Create clear expectations and processes for households and learners to follow. For example, send out mobile phone messages to caregivers or learners at consistent times and days so they come to expect communication. If asking learners to share work, set up clear and simple directions like texting homework through an image each Monday. These approaches will help minimize the digital divide and homework gaps that emerge during distance learning and crises.

Some distance learning efforts have already tapped into community mobilization efforts to create outreach to families. For example, in northern Nigeria’s Northern Education Initiative Plus Project, the implementing team is in communication with families and caregivers from whom they had gathered contact information during community mobilization visits. The team also sought advice from community leaders and groups in designing their distance learning approach during COVID-19, as these local experts often best know the needs and realities of their community members.

Once distance learning approaches have been confirmed for a region or community, implementation teams can execute campaigns over radio, television, mobile phones, traditional and social media, and other platforms to foster caregivers’ knowledge of how distance learning will be carried out and to solicit buy-in and confidence in the expectations of caregivers. These campaigns and outreach efforts should include information on how and why caregivers should provide technology access to their children and youth, as caregivers often control access to the technology, whether television, radio, phones, or computers, in the home (UNESCO 2020d). Outreach should also provide suggestions to caregivers on the amount of time learners should have each day to study and the kinds of spaces conducive to learning (Morris 2018).

Specific recommendations for ministries, donors, and implementers:

- *Design and implementation should use resources such as the INEE guide for supporting home learning to inform best-practice approaches.*
- *Where feasible, speak with families and caregivers in some of the most disadvantaged situations to understand what support they can safely and realistically provide to their children and youth.*
- *Provide caregivers and families with clear information, guidance, and expectations on how they should support learning at home, including providing access to technology and helping learners find time and space to learn. Focus on “what learning matters most” (ASCD 2020, p. 18).*

- *Provide caregivers and families with tips and resources to monitor young learners' wellbeing and address fear, anxiety, and other effects of confinement and social distancing. For example, this may include mental health surveys for caregivers, educators, and learners (designed for different age levels).*

Recommendation 3b. Be responsive to caregivers' psychosocial wellbeing.

The wellbeing of caregivers' and families' needs to be considered when distance learning approaches are designed and rolled out. Design and implementation teams should review existing guidance on how caregivers can support learning while minimizing expectations of already burdened caregivers. For example, INEE (2018b) has a [guide](#) for supporting home learning for caregivers (parents and guardians) and Education Above All (2020) has compiled [Education Resources for Home Schooling](#) to support for parents and guardians.

Specific recommendations for ministries, donors, and implementers:

- *Position caregivers and families as important support systems and resources, while considering the extra burden and stress put on families when designing expectations and approaches for in-home learning.*
- *Provide caregivers with age-appropriate health surveys and distance counseling services to support their learners.*

Recommendation 4a: Support learners as they transition to distance learning.

As learners transition to new routines, content, technology, and space, ongoing support is important. This includes communicating with learners about the steps of the transition, suggesting routines, offering ways to contact educators and peers for support, and providing guidance on how to use new technology and programs. While settling into a learning rhythm may take time during a rapid shift to distance learning, clear instructions and plans can help support this transition. Giving learners a sense of control and agency in their distance learning helps mitigate the loss of control they are experiencing (ASCD 2020).

Special attention should be paid to providing tailored support to marginalized learners, such as those who do not speak the primary language of instruction, do not have literate caregivers, are living with housing or food insecurity, or have disabilities.

Specific recommendations for ministries, donors, and implementers:

- *Communicate steps and plans for transitioning to distance learning in age-appropriate ways.*
- *Ensure all learners have access to technology, know how to use technology, and access to teaching support.*
- *Create specialized strategies for learners who need extra support in the transition to online learning. For example, special support for learners with disabilities.*
- *Create additional distance tutoring for learners who are the most marginalized and likely to be adversely affected. For example, those who were having difficulty in reading and math prior to school closures.*

Recommendation 4b: Be responsive to learners' psychosocial wellbeing.

In any crisis, ensuring learners' psychosocial wellbeing is paramount. Traumatic experiences early in life, such as those caused or exacerbated by a pandemic, can have long-term effects on health and

productivity in adulthood (ASCD 2020; Decosimo et al. 2019; Wang et al. 2020). There is evidence that school closures, home confinement, and social distancing can have negative impacts on mental and physical health. These effects can include fear, anxiety, frustration, boredom, and less physical activity. A 2013 study in the United States found that children experiencing quarantine during pandemics are four times more likely to display symptoms of post-traumatic stress disorder than those who do not (Sprang and Silman 2013). Learning institutions might have contingency plans for providing access to education during natural disasters, armed violence, and short-term incidents, but might not be equipped to support the psychosocial wellbeing of learners during longer-term school closures (Anderson 2020; Wang et al. 2020). Despite sparse literature, there are some lessons from past crises and suggestions for supporting wellbeing across various modalities during school closures.

Distance learning programs can consider including audio, video, and digital resources and activities to enhance physical and psychosocial wellbeing. These might include physical education videos or other approaches that allow learners to maintain physical activity while inside and isolated from their peers (Wang et al. 2020). As COVID-19 spread in China, health professionals and authorities provided mental health surveys and courses and counseling services to older learners. These were provided through a variety of popular online and mobile platforms, such as Weibo, WeChat, and TikTok (Liu et al. 2020). Such counseling could be provided via mobile phone calls, texts, and social media groups (e.g., WhatsApp or Google Hangouts). Learners can also be provided with emotional and behavioral-regulation strategies to help with their stress (ASCD 2020). Although safeguarding learners' physical safety (from risk of violence, rape, child labor, and abuse) requires coordination with other actors and agencies, raising awareness among communities and supporting efforts like mental health counseling and programs aimed at keeping children safe could be a start.

Arts-based activities could also be integrated into teaching and learning materials across the different modalities. In Liberia, an arts program focusing on mental health led to a statistically significant reduction in psychological stress symptoms during the Ebola crisis. Although the program was delivered in person, it would be possible to adapt elements for courses delivered through other modalities. As the program evaluation notes, there is an “urgent need for psychosocial support programming after a trauma” (Decosimo et al. 2019). Such activities should be designed to be age-appropriate, culturally relevant, gender-responsive, and engaging (Wang et al. 2020).

Finally, encouraging learners to start mobile phone text groups to keep in contact with their peers during the crisis and to study together can help reinforce communities of support. There is extensive research on how peer support helps learners overcome barriers and isolation encountered in schooling (see ASCD 2020; Morris 2018). Encouraging learners to work together to find creative solutions to distance learning and support will help them to get through the current pandemic.

Specific recommendations for ministries, donors, and implementers:

- *Include audio, video, and digital resources to enhance physical and psychosocial wellbeing.*
- *Draw on face-to-face arts-based approaches to create digital activities across the four modalities to make learning engaging and support socioemotional needs and outcomes.*
- *Coordinate with other actors and efforts to ensure learners are getting more holistic support (e.g., physical safety, mental health counseling) and that caregivers and families are aware of how to support their learners (in collaboration with Recommendation 3b).*
- *Encourage learners to start mobile phone text groups to keep in contact with their peers during the crisis and study together.*

Recommendation 5a: Plan for and budget eventual resumption of in-person instruction.

Distance learning may provide basic continuity in learning and compensate for some lost instructional time (Boisvert 2017), but unless it has been designed as an intentional stand-alone program from the start, it is unlikely to meet the educational needs and learning outcomes demanded in curriculum and standards. When rolled out quickly and without forward planning, distance learning has the potential to exacerbate educational inequalities (OECD 2015; Picton and Clarck 2015; Turner Lee 2020), as described in detail throughout this review. Therefore, ministries of education and other authorities need to plan early for the transition of educators and learners back to their learning institutions once they have met immediate distance learning needs and access during a crisis.

Careful planning and funding for reopening schools can put strategies into motion for addressing anticipated and exacerbated inequities (see Perry et al. 2015; [School Conditions and Educational Equity in Baltimore](#), Johns Hopkins University Center for Applied Public Research 2020). Planning should ensure that educators and learners have accurate public health and safety information and procedures in place to maintain safe operations. These should also provide educators and learners clear guidance on where to start in the curriculum and key areas to focus on until regular teaching and learning can resume. Continuous coordination among governments, partners, and community members is also critical once schools reopen.

Specific recommendations for ministries, donors, and implementers:

- *Set up data gathering procedures to monitor learners to the extent possible when not in school.* For example, an SMS system with regular check-ins with families and caregivers to understand to what extent learning is taking in place in the home and challenges faced in learning.
- *Dedicate financial resources and funding to resumption of in-person learning.* For example, additional teaching and psychosocial support in the period immediately following emergency closures.
- *Develop clear plans for reopening schools in advance, including how to keep learners safe and where educators and learners should start in the curriculum.*
- *Plans should anticipate inequities that will emerge and have strategies and funding for addressing these inequities.* Provide additional tutoring to learners who need extra support. This could include intensive after-school programs or tutoring during school breaks. Distance tutoring should continue to be offered post-pandemic and be designed to support marginalized learners such as those who do not speak the primary language of instruction, do not have literate caregivers, are living with housing or food insecurity, and those with disabilities (Harris 2020). Ensure that those who are known to be hardest hit during emergencies (e.g., minority learners, families in poverty, learners with disabilities) have the resources they need to return to school (Perry et al. 2020).
- *Design and implement accelerated learning programs.* For example, to compensate for lost learning during Ebola, Sierra Leone's Ministry of Science, Education, and Technology implemented two shortened academic years with an accelerated syllabus focused on core subjects. The Accelerated Education Program was used to re-enroll older learners who did not return to school after the Ebola outbreak. The program filled critical gaps created by the interruption of instruction to continue their education (see [10 Principles for Effective Practice in Accelerated Education](#) from the Accelerated Education Working Group 2019).

Recommendation 5b: Provide continuous support during the transition back to in-person instruction.

Once crises are mitigated and schools are safe to be re-opened, supporting ministries, schools and learning centers, and communities to resume in-person teaching and learning activities will be critical. One immediate approach is to integrate age-appropriate lessons and activities into teaching, which helps learners process questions, concerns, and anxieties that emerged during learning institution closures. In Guinea, post-Ebola, 123 education district officials and 310 facilitators were trained to support teachers, principals, and 2,591 schools to deliver psychological first aid, basic counseling, and psychosocial support (Global Education Cluster, UNICEF, INEE and Save the Children 2015). Such facilitators could also be trained to help advise educators on creating lesson plans and activities geared at preventing future spread of communicable diseases and ensuring psychosocial supports. Public health information should be integrated into lesson plans and curriculum, as well as through school outreach activities. Educators have been trained to continue public health awareness post-crisis as a preventive measure. In Sierra Leone, 7,000 teachers were trained as social mobilizers in leading prevention activities. In Liberia, 203 national youth volunteers and 11,000 teachers were trained to reach 30,000 community members with messages on hygiene promotion, infection control, and early warning signs (Global Education Cluster, UNICEF, INEE and Save the Children 2015). Finally, institutions will likely need to step in to redress inequities in special education, discipline, and enrollment post-crisis. As was learned post-Katrina, if coordinated and centralized intervention does not take place, massive teacher and student flight can occur and trust between education leaders, institutions, and communities may be harmed (Perry et al. 2020).

Specific recommendations for ministries, donors, and implementers:

- *Continue to provide home-based learning guidance and resources.* For example, after the Ebola crisis, schools continued to support home-learning modalities (radio programs and take-home materials) and added life skills and psychosocial support elements to extend and augment learning opportunities. Governments continued making investments in home learning and community engagement education interventions continued after schools reopened to keep children and youth in school and to provide educational opportunities for those who were unable to return (Global Education Cluster, UNICEF, INEE, and Save the Children 2015).
- *Continue to provide specialized tutoring and supports to learners.*
- *Make coordinated and centralized redress of education inequities early on to prevent teacher and student flight.*
- *Work to build and rebuild relationships between education leaders, learning institutions, community groups, and families.*

Recommendation 6a. Increase access to existing open source teaching and learning materials appropriate to countries, languages, and contexts.

In any distance learning intervention, substantial coordination among national, local, and international education partners and communities is essential to make teaching and learning materials open source and get technology into the hands of educators and learners. While many education institutions and organizations may house radio, video, and digitized teaching and learning content, donor agencies such as USAID and government ministries often have the rights to make these programs accessible and should consider making these resources open source, if they are not already. Additionally, materials need to be surveyed and catalogued by modalities, language, age-appropriateness, accessibility to

learners with disabilities, and other considerations (programmatic snapshots provided in the annex are a start to this end). Several distance learning inventories have already been developed and should be built upon (see UNESCO 2020e; Cobo, Hawkins, and Rovner 2020). Collaboration among education partners is critical in establishing such inventories quickly and mobilizing access to materials. For example, during the Ebola response, UNICEF, Save the Children, the INEE, and Global Education Cluster efficiently coordinated and distributed a cohesive set of education messages and materials during (see INEE's website).

Activating education clusters or administrative groups is another way to get open source materials out to educators, learners and communities quickly. In Liberia, the Education Cluster was activated at the Ministry of Education's request and co-led by Save the Children and UNICEF, alongside other partners, to ensure a rapid, comprehensive, and high-quality education response. In Sierra Leone and Guinea, UNICEF and Save the Children worked with ministries of education to coordinate the Ebola education response through existing education groups. Regionally, education partners coordinated efforts through regional forums in Dakar (co-chaired by UNICEF and Plan International) and virtual Global Education Cluster meetings.

Specific recommendations for ministries, donors, and implementers:

- *Foster collaboration between government agencies, donor groups, and implementers to ensure distance learning efforts are efficient and are not creating overlap and redundancy.*
- *Add to existing country and regional-level distance learning inventories so available modalities and programming are transparent and accessible to all.*
- *Ensure distance learning programs are open source and accessible to as many communities as possible.*

Recommendation 6b. Ensure distance learning support is monitored and evaluated and equity is analyzed.

The only way to increase the evidence base and create effective, high-quality, and sustainable solutions for future crises is to carefully study and evaluate what has worked and what has not and to monitor equity (Anderson 2020). The global education community needs to equip learning institutions, educators, caregivers, and learners with the best solutions available, and M&E and research on modalities (as discussed in recommendation 1b) is essential. Furthermore, collecting specific data on educator and learner demographics is critical for studying equity in distance learning efforts. Data should at a minimum be disaggregated by and study gender, language and ethnicity, disability, geographic location (urban/rural), and SES, among other factors.

Specific recommendations for ministries, donors, and implementers:

- *Fund monitoring, evaluation and research on which distance learning modalities, technologies, and multiple-modality approaches were most effective, why, in what conditions, and for whom.*
- *Ensure data is disaggregated by and studies gender, language and ethnicity, disability, geographic location (urban/rural), and SES, among other factors.*

Recommendation 7a: When creating new distance learning strategies and content, draw on evidence to inform what technology is feasible and what combination of modalities are safe, appropriate, and most effective and equitable.

If supporting or funding a new distance learning program, make sure plans put protection of developers and technical teams' health first in times of crisis. For example, edit and splice videos of individuals as opposed to recording and filming interactive groups. In one country's team interviewed for this review, donors asked a distance learning development team to create new secondary educational video programs for learners. The development team of more than 10 experts were shooting together in a small studio, which violates the protections of social distancing. Therefore, explicit plans should be made for how to safely create new audio and video programming.

When making materials and programming accessible, design for the users in the country or region with the least access to technology, training, and bandwidth—as opposed to designing complex platforms that cater to households with advanced technology and technical literacy (this draws on a Universal Design of Learning approach). For example, make digital content that can be downloaded and used offline whenever possible to account for learners' limited Internet connections. Combine modalities such as radio, television, and mobile phones to ensure education services reach as many households and learners as possible, and to reach learners with disabilities (UNESCO 2020d). Additionally, take into consideration the language(s) of learners. While programs may be in a language of instruction, closed captioning, multilingual approaches, and translations are ways to make programming more accessible to learners who speak the language of instruction as their second or third language, or beyond. For example, while IAI programs in Malawi may be recorded in Chechewa, accompanying learning materials in other languages like Tonga and Chinyanja may developed, and there may be characters in the program that speak Tonga, Chinyanja, and other languages integrated into storylines and scripts.

When developing content, ensure the programming reflects the needs and realities of the learners and their families. This includes making lessons and programming learner-centered or inquiry-based (Burns et al. 2019; Creed and Morpeth 2014; Hollingsworth 2020; Instructional Partners 2020; Lim 2018; Sung, Chang, and Liu 2016; UNESCO 2018; UNESCO 2020d). For example, the length of individual learning sessions should be based on learners' self-regulation skills, such as 20-30 minutes or less for primary school learners and 40 minutes or less for secondary school learners (UNESCO 2020d). Also, make distance learning content learner-friendly, age-appropriate, and engaging for learners when possible by using music, songs, stories, and games (Ho and Thukral 2009). Content should also be created to be responsive to and representative of learners with disabilities and follow UDL principles (Hayes, Moran, and Turnbull 2019), as well as gender-responsive (encourage learners of all genders and pay attention to not reproducing gendered norms and stereotypes—see USAID [Gender Equality and Women's Empowerment Strategy](#)). Finally, content should keep in mind that learning outcomes include cognitive skills development acquisition as well as non-cognitive and socioemotional skills. Weaving these together in design helps ensure learning is comprehensive.

Finally, creating clear expectations and processes for educators, learners, and households to follow is critical (see Recommendation 3a for additional details). While audio/radio, video/TV, mobile phone, and online learning programs promote learning, accompanying digital and print text materials are also important to complement learning.

Specific recommendations for ministries, donors, and implementers:

- *When planning new programs and modalities, put the health and safety of distance learning production and development teams first.*
- *Design materials and programs for users with the least access to technology, training, and bandwidth, and combine modalities to reach a greater number of households and learners.*
- *Make distance learning content evidenced-based, learner-friendly, age-appropriate, and engaging for all learners (using UDL principles).*
- *Create clear and stable expectations and processes, as well as accompanying materials, for learners, educators, and caregivers to follow*

Recommendation 7b: Plan and budget for well-designed and multiple-modality approaches.

Quality and UDL-informed distance learning materials require planning and budgeting. Sufficient finances and time must be allotted to development, piloting, testing (formative evaluation), refining, and rolling out modalities. Drawing on planning and cost data from previous distance learning efforts and implementing cost-benefit analyses where feasible will help ensure that new programming has sufficient development time and resources. While during crises there is a push to quickly develop new programming, these efforts often do not yield the learning outcomes (cognitive and non-cognitive) desired.

Specific recommendations for ministries, donors, and implementers:

- *Plan for sufficient time and costs to develop quality and UDL-informed programming and modalities.*

Recommendation 8a: Provide guidance to education institutions and educators on how to deliver distance learning.

One of the most important aspects of ensuring the effectiveness of distance learning is providing educators and administrators with the technology, training, mentorship and coaching that focuses on what they need (best modality), how they need it (pedagogy and technology), when they need it (frequency and length), and why they need it (to master technology or engage in inclusive pedagogy). Many studies on professional development for distance learning recommend building programming that is teacher-centered and inquiry-based, which means building on existing skills, knowledge, and approaches (Lim 2018; Sung, Chang, and Liu 2016). As Burns (2011) describes, providing professional development support to educators follows the same principles and approaches to training in-person educators (e.g., ensuring content knowledge, structured instructional approach, pedagogical content knowledge, knowledge of how learners learn, and efficacy). However, specialized training in instructional design for distance learning (pedagogical approaches) and technical training on how to use technology are also critical (Burns 2011; Trucano 2010). As Burns (2011) describes, providing professional development support to distance educators follows the same principles and approaches to training in-person educators (e.g., ensuring content knowledge, structured instructional approach, pedagogical content knowledge, knowledge of how learners learn, and efficacy). However, specialized training in instructional design for distance learning (pedagogical approaches) and technical training on how to use technology are also critical (ASCD 2020; Burns 2011; Trucano 2010a). Additionally, virtual and online educators need time to try things out and be innovative in how they design, instruct, assess, and engage with learners (Burns, 2020a). In summary, “High-quality teaching demands high-quality professional

development. And high-quality professional development demands time and resources” (Burns 2011, p.243).

Specific recommendations for ministries, donors, and implementers:

- *Provide educators with technology and facilitate comprehensive training in distance teaching and learning. Provide coaching and mentoring to help educators gain confidence in using technology, modalities, and inclusive approaches (e.g., UDL-responsive). Training programs should be evidence-based, well-planned, ongoing, and with sufficient financial and technical resources.*
- *Education leaders (e.g., head teachers and principals) should be trained alongside instructors as it is important that they can coach and support educators and take advantage of new distance learning approaches that emerge (Trucano 2010a).*
- *Allow educators the space to experiment, innovate, and pilot, and allow them to make mistakes as they try out new ways of teaching online.*

Recommendation 8b. Provide guidance to education institutions and educators on how to ensure distance learning is both designed for and responsive to learners with disabilities.

While UDL principles and attention to learners with special needs have been referenced throughout this review, it is important to explicitly recommend integrating UDL into distance learning and ensuring programming and technology is accessible to learners with disabilities. Learners with disabilities and their families are often the most marginalized during crises, and sudden shifts to distance learning means they are also among the first to lose critical services (see Perry et al. 2020 post-Katrina). In the United States, many school districts are not providing educational services for learners with disabilities because they are concerned with compliance. Some education advocates have pushed for more flexibility during this pandemic to encourage educators to do more to reach learners with disabilities (Harris 2020).

Distance learning developers and implementers—and the governments and donors overseeing these efforts—should ensure resources and materials development aligns with the UDL framework and international accessibility standards to the best of their ability. Developers should also review guides on how to make digital content accessible (see University of Arkansas’ Explore Access website; UDL and ICT Toolkit; Hayes, Moran, and Turnbull 2019; World Vision’s All Children Reading Blog 2020 on accessible solutions). Not all digital platforms and content are created equal. Many modalities and digital platforms and content do not consider accessibility in their design or have accessibility features built in. These features are critical for learners with disabilities to gain equitable access to education content. Moreover, they help improve the quality of learning for all learners (see some examples of accessibility in the Annex under each of the programmatic snapshots).

Finally, as discussed earlier, it is important to ensure that content is both representative of, and responsive to, learners with special needs. This could include characters in educational television and IAI/IRI programs with disabilities as well as modeling important conversations and practices of inclusion in teaching and learning content.

Specific recommendations for ministries, donors, and implementers:

- *Ensure resource and material development aligns with the UDL framework and international accessibility standards.*

- *Use digital platforms and content that consider accessibility in their design and/or have accessibility features built in.*
- *Create content representative of, and responsive to, learners with special needs.*
- *Monitor and evaluate distance learning programs' accessibility and effectiveness for learners with special needs (and by different disability groups).*

Recommendation 9: Ensure that multiple-modality distance learning strategies are continuously updated and revised based on the changing technologies, contexts, and needs of educators and learners.

Technology is constantly evolving and changing, as is instructional design for distance learning. While this review provides information on the effectiveness of current modalities and technologies, this information needs to be updated every few years. Likewise, strategies on distance learning need to be designed to be dynamic and responsive to new findings and practices and integrate M&E and research into every step to ensure that effectiveness and quality of teaching and learning is being measured. Equity analyses also need to be funded to ensure that distance learning and teaching is reaching all children, especially those from marginalized groups and not amplifying digital divides and achievement and homework gaps.

Specific recommendations for ministries, donors, and implementers:

- *Provide financial and technical resources to review distance learning modalities and strategies every year to capture new information and approaches.*
- *Provide financial and technical resources to monitor and evaluation distance learning.*

ANNEX: PROGRAMMATIC SNAPSHOTS



Accommodations for learners with visual impairments



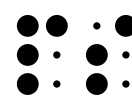
No accommodations for learners with visual impairments



No accommodations for learners with hearing impairments



Closed captioning available for learners with hearing impairments



Braille



Accommodations for learners with physical impairments



Facilitators are able to offer accommodations

ACCOMMODATIONS OFFERED FOR PROGRAMMING

Exhibit 10: Audio/Radio programmatic snapshot



Disability limitations: None of the audio/radio programs are currently designed to be accessible to hearing impaired individuals. Programs can be designed to be inclusive of learners who are blind, have visual processing impairments, physical impairments, and some cognitive and learning disorders.

COUNTRY/ REGION	NON-FORMAL OR FORMAL	TARGET GROUP (AGE/ GRADE)	CONTENT AND LEARNING GOALS	FACILITATOR	NOTES	IMPLEMENTERS (LINKS)
Afghanistan	Non-formal	Out-of-school children and youth	Content: Literacy Goals: To improve teaching practice in literacy To increase literacy	Community facilitator	<ul style="list-style-type: none"> UNESCO has provided technical support to ERTV and the Ministry of Education. Funded by DFID. 	UNESCO Educational Radio and Television of Afghanistan (ERTV) Project Radio Education for Afghan Children
Bolivia (1998+)	Formal	Grades 1-5	Content: Mathematics	Teacher		USAID funded; EDC developed

COUNTRY/ REGION	NON- FORMAL OR FORMAL	TARGET GROUP (AGE/ GRADE)	CONTENT AND LEARNING GOALS	FACILITATOR	NOTES	IMPLEMENTERS (LINKS)
Bolivia (1992+)	Formal	Grades 3-4	Content: Health	Teacher		USAID funded; EDC developed
Bolivia (1994+)	Non-formal and formal	Children in early childhood centers and preschools	Goal: Early childhood development	Community facilitator and teacher		USAID, UNICEF, Plan funded; EDC developed
Burkina Faso (2018+)	Formal	Preschool	Early childhood development and teacher training in Moore and Gourmachema	Community ECD facilitators		World Bank funded; EDC and Ministry of Education PACEEQ program
Burkina Faso (pilot 2019)	Non-formal (with formal curricula)	Primary	Content: Literacy, math, other Goals: Distance learning, particularly in conflict areas where schools and educators were targeted	Community facilitator	<ul style="list-style-type: none"> • Create schools where learners have been displaced by violence 	UNICEF partnered with the Children's Radio Foundation Radio Education in Emergencies
Comoros (2006-2010)	Formal	Pre and in-service first and second-grade teachers; parents and communities	Content: English as a Second Language Goals: Improve instructional practice; help communities support schools.	Teachers, parents, communities		USAID funded; EDC developed Support Technology for Educators and Parents and Comorian national Ministry of Education
DRC	Formal	Preschool	Pilot for early childhood development	Teacher		World Bank funded; EDC developed
DRC	Formal	Primary Learners (Grades 1-6)	Content: French literacy, mathematics Goals: Improve numeracy and literacy teaching and learning; engage families and communities in learning	Teacher		USAID funded; EDC developed PAGE (Pour une Approche Globale de l'Education) and Package for Improving Education Quality (PIEQ) " Apprenons avec Matahata "

COUNTRY/ REGION	NON- FORMAL OR FORMAL	TARGET GROUP (AGE/ GRADE)	CONTENT AND LEARNING GOALS	FACILITATOR	NOTES	IMPLEMENTERS (LINKS)
El Salvador	Formal	Preschool and Grade 1	Content: Literacy, numeracy	Teacher		USAID/World Bank funded EDC EDIFAM program
Ethiopia (2002+)	Non-formal	Primary age children	Content: Integrated primary subjects in Somali		<ul style="list-style-type: none"> Served Somali refugees 	USAID funded; EDC IRIS
Guinea (1999+)	Formal	Grades 1-6	Content: French, math	Formal school teacher	<ul style="list-style-type: none"> Nationwide, institutionalized 	USAID funded; EDC and INRAP FQEL program
Guyana	Formal	Grades 1 and 2	Content: Mathematics	Teacher		IDB funded; EDC and Ministry of Ed BEAMS program
Haiti	Non-formal	Level 1 and 2	Content: Youth literacy and math			EDC EKLA program
Haiti (1996+)	Formal	Grades 2-4	Content: Reading, civics, math in Creole	Teacher		USAID funded; EDC and FONHEP FAD/EDA program
Honduras (1999)	Formal	Grades 7-9	Content: Middle school integrated curriculum	Teacher		USAID funded; EDC EDUCATODOS program
Honduras (2002+)	Non-formal and formal	Preschool	Content: Early childhood development	Formal and nonformal preschool teachers	<ul style="list-style-type: none"> Institutionalized by FEREMA 	USAID funded, EDC and FEREMA Juego y Aprendo program
India (2004+)	Formal	Teacher training and grades 1-5	Content: Math, science, social studies, English	Formal school teacher	<ul style="list-style-type: none"> Reach of more than 4 million by 2005 	USAID funded, EDC T4 program
Indonesia	Formal	Kindergarten	Content: Kindergarten ECD	Teacher		USAID funded; EDC DBE2 program
Liberia (2015)	Formal	Primary and secondary student (6+)	Content: English, math, life skills for older youth Goals: Enrich classroom instruction in literacy and	Learning center facilitator; then home learning	<ul style="list-style-type: none"> Originally classroom based; Adapted for home 	USAID funded; EDC developed

COUNTRY/ REGION	NON- FORMAL OR FORMAL	TARGET GROUP (AGE/ GRADE)	CONTENT AND LEARNING GOALS	FACILITATOR	NOTES	IMPLEMENTERS (LINKS)
			numeracy, provide life skills support		use in response to Ebola crisis	
Madagascar	Formal	Grade 1-6	Content: French, Malagasy, mathematics, English, teacher training	Teachers and community school teachers		USAID funded; EDC developed Appui Technique aux Educateurs et Communautés
Malawi	Non-formal	Preschool (3-5)	Content: Literacy, numeracy Goals: Prepare learners for primary school and support teachers; provide spaces of learning, social engagement and academic development	Community teacher/caregiver	<ul style="list-style-type: none"> Pilot of 15 episodes in Chechewa and English (used for proof of concept in other countries) 	Education Development Center and Save the Children Tiyende!
Malawi	Formal	Primary grades 1-4	Content: Literacy, numeracy Goals: Implement a new primary school pedagogical approach	Classroom teacher	<ul style="list-style-type: none"> Reached all primary schools across Malawi Aired long after Ministry assumed management 	USAID funded; EDC developed Tikwere and MERIT programs
Mali	Non-formal and formal	Grade 1-3 learners in formal schools; levels 1 and 2 in nonformal learning centers	Content: Literacy and mathematics in French, Bamanankan, Songhai, Tamashek	Grade 1-3 learners in formal schools; levels 1 and 2 in non-formal learning centers	<ul style="list-style-type: none"> Content: Literacy and mathematics in French, Bamanankan, Songhai, and Tamashek 	USAID funded; EDC developed Mali PHAREv “Road to Reading”
Nepal (19696-200)	Non-formal	Preschool (3-5)	Content: Literacy, numeracy Goals: Support caregivers and communities in providing ECD	Caregivers	<ul style="list-style-type: none"> Collaboration with Ministry of Education and Radio Nepal 	EDC Bhaniyang Chautari

COUNTRY/ REGION	NON- FORMAL OR FORMAL	TARGET GROUP (AGE/ GRADE)	CONTENT AND LEARNING GOALS	FACILITATOR	NOTES	IMPLEMENTERS (LINKS)
Nepal (1999+)	Formal	Teacher training in English and math; grades 3 and 5	Content: Grades 3 and 5 English and math Goal: Teacher training	School teachers		UNICEF-funded; ECD and CERID
Nigeria		Grade 3-6 learners	Content: Literacy, numeracy Goals: Provide Qurannic Schools with quality literacy and numeracy instruction			USIAD/NIGERIA LEAP
Pakistan	Formal	Primary School	Content: Literacy, numeracy Goals: Improve literacy and numeracy teaching and learning			USAID funded; EDC ESRA program
Paraguay	Formal	Preschool	Content: Early childhood mathematics	Teacher	<ul style="list-style-type: none"> Added grades 1-3 and science, extended to Panama and Costa Rica by IDB and government staff 	IDB funded; EDC and Ministry of Education Tikichuela program
Papua New Guinea (1986)	Formal	Grades 4-6	Content: Science			USAID funded; EDC developed
Rwanda (2011-2016)	Formal	Grades 1-4	Content: Literacy, numeracy Goals: Improve literacy and numeracy teaching and learning	Classroom teachers		USAID funded; EDC developed Literacy, Language, and Learning (L3) Rwanda
Sierra Leone (2014)	Formal and non-formal	Out-of-school primary student	Content: English, mathematics, social studies, life skills	None	<ul style="list-style-type: none"> Response to Ebola Crisis developed by 	UNICEF and Ministry of Education and Science and Technology






COUNTRY/ REGION	NON- FORMAL OR FORMAL	TARGET GROUP (AGE/ GRADE)	CONTENT AND LEARNING GOALS	FACILITATOR	NOTES	IMPLEMENTERS (LINKS)
			Goals: Provide education during Ebola		professional teachers	
Somalia (2001-2010)	Formal and non-formal	Grades 1-5	Content: Literacy, math	Community teacher (trained) and teacher		USAID funded; EDC developed Interactive Radio Instruction for Somalis; Somalia Interactive Radio Instruction Project (SIRIP)
South Africa		Levels 1-3	Content: English as a Second Language			USAID/NORAD funding, OLSET, EDC and Real World Productions
South Sudan	Formal and non-formal	Grades 1-4 and Levels 1-4	Content: English Literacy, integrated primary subjects Goals: Improve literacy and numeracy teaching and learning	Community teacher (trained) and Teacher		USAID funded; EDC developed Southern Sudan Interactive Radio Instruction (sSIRI)
Tanzania (Mainland) (2004-2010)	Non-formal	Primary (8-18)	Content: Literacy (Kiswahili, English), math, life skills, science, history Goals: Provide preschool education to out-of-school children and help them matriculate into formal schools	Community teacher (trained)	<ul style="list-style-type: none"> Reached most marginalized coastal and pastoralist youth Not broadcast at present as radio station privatized 	Education Development Center, MoEVT Mambo Elimu (USDOL) and USAID Radio Instruction to Strengthen Education
Tanzania (Zanzibar) (2006-ongoing)	Non-formal and Formal	Preschool-Standard 1	Content: Literacy (Kiswahili, English), math, life skills Goals: Provide preschool education to out-of-school children; Improve quality of teaching and learning in Standard 1-2	Community teacher and classroom teacher	<ul style="list-style-type: none"> In operation from 2007-2012 under EDC and MoEVT from 2012-present (2020) Has been expanded to all districts; broadcast on 	USAID funded; EDC developed, MoEVT, Tucheze Tujifunze Global Partnership in Education later funded








COUNTRY/ REGION	NON- FORMAL OR FORMAL	TARGET GROUP (AGE/ GRADE)	CONTENT AND LEARNING GOALS	FACILITATOR	NOTES	IMPLEMENTERS (LINKS)
					station-sponsored radio	
Tanzania (Zanzibar) (2010-present)	Formal	In-service teachers	Content: Learning, numeracy, science, other subjects Goals: Providing primary school teachers with preschool certification	In-service teacher (practicing in classroom)	<ul style="list-style-type: none"> Teacher was the center of the program and followed the program to try new pedagogies in the classroom. 	USAID funded; EDC developed, Zanzibar Teacher Upgrading by Radio
Zambia (199-2009)	Formal and non-formal	Grades 1-7 learners in community and later in public schools	Content: Literacy, numeracy, social studies, life skills Goals: Provide community school children with learning	Community school teacher	<ul style="list-style-type: none"> Expanded to include HIV/AIDS component 	USAID funded; EDC developed, Quality Education Services Through Technology (QUESTT) Taonga Market
Zambia (2019+)	Formal	Kindergarten	Content: Early childhood development/school readiness	Kindergarten teacher		USAID funded; EDC developed, Let's Read Zambia program



Exhibit 11: Video and TV programmatic snapshot



Disability limitations: Other than Sesame Street, the video and TV programs are not currently designed to be accessible to vision impaired individuals. However, many allow for facilitator-made accommodations and personalized learning that can be designed to be inclusive of learners who are blind, have visual processing impairments, physical impairments, and some cognitive and learning disorders. Many programs offer closed captioning.

PROGRAM	COUNTRY/ REGION	NON-FORMAL OR FORMAL	TARGET GROUP (AGE/ GRADE)	SUBJECT AND LEARNING GOALS	FACILITATION REQUIRED (BY WHOM)	NOTES (OPPORTUNITIES AND CHALLENGES)	IMPLEMENTERS (LINKS)
Sesame Street  	Over 140 countries	Non-formal	Primarily pre-K	Content: Numeracy, literacy, perceptual skills, problem solving, relationship building Goals: Provide foundational literacy, numeracy, life skills	Caregivers or learners, but with little monitoring	<ul style="list-style-type: none"> • Culturally relevant content depending on country or region • Not personable to different learner needs • Must access via television • Does not come with hands-on activities 	Sesame Workshop
Ubongo Kids  	31 countries across Africa	Non-formal	Pre-K to early primary	Content: Numeracy, language and literacy, cognitive development, science and technology, gender rights Goal: Provide foundational literacy, numeracy, and life skills	Caregivers, teachers (learners can also access through social media, YouTube channel, phone applications, public television)	<ul style="list-style-type: none"> • Multiple points of access even if a child does not have a tv • Toolkits available to pair with programming 	Ubongo Learning
Aptus 	Chile	Formal	Pre-K to 8th grade	Content: Language and communication, math, science, history	Videos released on website; teachers send links to families to facilitate with children	<ul style="list-style-type: none"> • Includes curriculum that some schools have not covered in class • More responsibility for caregivers to monitor facilitation 	Chilean Ministry of Education

PROGRAM	COUNTRY/ REGION	NON- FORMAL OR FORMAL	TARGET GROUP (AGE/ GRADE)	SUBJECT AND LEARNING GOALS	FACILITATIO N REQUIRED (BY WHOM)	NOTES (OPPORTUNITIES AND CHALLENGES)	IMPLEMENTERS (LINKS)
							
UčiTelka, Odpoledka  	Czech Republic	Formal	Primary school	30-minute lessons designed for specific age groups – core subject to replicate classroom experience	Caregivers or learners; teacher or moderator teaches during the class video time	<ul style="list-style-type: none"> • Two programs available for older and younger learners, with time blocks for age ranges • Little facilitation required • Replicates classroom experience • Not able to be personalized past breakdown of age groups 	Czech Television
Egyptian Knowledge Bank (EKB)   	Egypt	Formal	Kindergarten to secondary education	Platform to offer communication between learners and teachers – continue with normal curriculum	Teacher, student, caregivers for monitoring	<ul style="list-style-type: none"> • Replicates classroom experience • Caregivers must ensure learners complete curriculum • Can still complete exams and assignments 	Ministry of Education
Bimbel Online 	Indonesia	Formal	Kindergarten to secondary education	Mobile application offering online platform to continue normal curriculum	Learners	<ul style="list-style-type: none"> • Ease of facilitation for teachers and caregivers • Animated learning videos • Study rooms; practice questions and discussion • Live teaching 	Ruangguru

PROGRAM	COUNTRY/ REGION	NON- FORMAL OR FORMAL	TARGET GROUP (AGE/ GRADE)	SUBJECT AND LEARNING GOALS	FACILITATIO N REQUIRED (BY WHOM)	NOTES (OPPORTUNITIES AND CHALLENGES)	IMPLEMENTERS (LINKS)
							
Da Vinci Learning 	Over 90 countries in Central and Eastern Europe, Africa, and Asia	Nonformal	Pre-K to primary	Science, arts, innovation, creativity	Learners, caregivers but with little monitoring	<ul style="list-style-type: none"> • 24/7 television channel, interactive video-on-demand app allowing users to access with different devices • Ease of facilitation • Cannot be personalized to align with school curriculum or individual learner needs 	Da Vinci Learning







See Cobo, Hawkins, and Rovner 2020 for programs in Latin America


Exhibit 12: Mobile phone programmatic snapshot



Disability limitations: None of the mobile phone programs are currently designed to be accessible to hearing impaired or vision impaired individuals. However, these learners are able to participate if they have access to supportive technology, such as mobile apps or software that assists in learning. Because of this, facilitators, whether that be learners or teachers, are able to use accommodations, but with extra preparation not offered through programs.

COUNTRY/ REGION	NON-FORMAL OR FORMAL	TARGET GROUP (AGE/GRADE)	CONTENT AND LEARNING GOALS	FACILITATION REQUIRED (BY WHOM)	NOTES (OPPORTUNITIES AND CHALLENGES)	IMPLEMENTERS (LINKS)
India 	Non-formal (after-school program)	Ages 7 to 14 Lower-income rural children	Content: English as a Second Language Goals: Spelling, listening comprehension, recognition	4 local staff members (3 undergraduate learners and one recent graduate) ran after-school sessions where they explained the games and provided technical support to learners	<ul style="list-style-type: none"> Learners were loaned cellphones during after- school sessions with preloaded ESL learning games Learners had to pass a test to demonstrate basic numeracy and ELS literacy before qualifying for this program 	Evaluation by Carnegie Mellon University
Liberia 	Non-formal	Youth ages 15- 35 with low literacy (interruptions due to war)	Content: Literacy (reading and writing practice) Goal: Support youth with improving reading and writing	Youth directly (once they learn the technology)	<ul style="list-style-type: none"> Learners may have to learn how to use the SMS technology (may require a training of sorts); follow up on receipt of messages Costs of who pays for the reverse messages 	USAID/EDC Advancing Youth Program Mobile Phone Literacy Pilot (James 2017)
Nigeria 	Non-formal	Any age	Content: Math	Tutors are online during specific hours to help learners work out math problems	<ul style="list-style-type: none"> Learners invite “Dr. Math” to be a contact on an instant messaging application (MXit), and the system will start sending them questions No registration form, no waiting period, no costs 	Research by Kaduna State University and Usmanu Danfodio University, Nigeria Included in review by Shehu and Tukur










COUNTRY/ REGION	NON-FORMAL OR FORMAL	TARGET GROUP (AGE/GRADE)	CONTENT AND LEARNING GOALS	FACILITATION REQUIRED (BY WHOM)	NOTES (OPPORTUNITIES AND CHALLENGES)	IMPLEMENTERS (LINKS)
Pakistan  	Non-formal	Adolescent girls	Content: Literacy Goals: Maintain literacy skills after basic literacy courses	Unclear	<ul style="list-style-type: none"> Includes daily text messages that learners are expected to respond to and monthly evaluations and interactive exercises to assess knowledge gain 	UNESCO/MOBILINK Partnership
Philippines  	Non-formal	Learners ranged from 12- to 48-years old, with most between 15 and 23	Content: English, math	No facilitation required	<ul style="list-style-type: none"> Combined use of SMS with a workbook; SMS use involved quizzes and tests Learners in the SMS group showed marginally higher test scores than control group Costs increased due to SMS messaging costs, though learners said the flexibility made the costs worthwhile Several problems with the SMS server and system, evidencing that careful planning is necessary 	Molave Development Foundation, Inc (MDFI) and Department of Education, Philippines. Project Mind https://files.eric.ed.gov/fulltext/EJ881581.pdf
South Africa  	Formal	Learners aged 16-18	Content: Science, math Goal: Allow learners to continue studying at home	App developed by school teachers and government subject advisors, after that, no facilitation was needed	<ul style="list-style-type: none"> Learners provided with mobile phones that were pre-loaded with a learning app and had sufficient Internet data The app allowed learners to switch between their native language and the language used in the classroom This method allowed learners to engage and succeed in classes more than they did with traditional classroom methods 	Research by University of Warwick






COUNTRY/ REGION	NON-FORMAL OR FORMAL	TARGET GROUP (AGE/GRADE)	CONTENT AND LEARNING GOALS	FACILITATION REQUIRED (BY WHOM)	NOTES (OPPORTUNITIES AND CHALLENGES)	IMPLEMENTERS (LINKS)
Syria, Turkey, Lebanon, Jordan 	Non-formal	High school and adult learners affected by conflict	Content: English Goal: Access to English medium higher education and employment in third countries	Tutors and learners meet one-on-one to follow an English language curriculum. Program is run fully online by volunteer staff members, plus 2-3 paid staff	<ul style="list-style-type: none"> • Tutors and staff are not geographically bound, making implementation flexible • Multiple levels of curriculum allow for English learners at all levels • Improved student safety, especially for women and girls who can access education from home • Internet and electricity are unstable, especially in refugee camps 	Paper Airplanes (https://www.paper-airplanes.org)

See Cobo, Hawkins, and Rovner 2020 for programs in Latin America.

Exhibit 13: Digital, web-based or online learning programmatic snapshot

Disability limitations: While most of the digital, web-based or online learning programs do not offer fully inclusive opportunities for all of their offered resources, most have the option for users to choose content which does meet their learning needs.

COUNTRY/ REGION	NON-FORMAL OR FORMAL	AGE/GRADE LEVELS (DEMOGRAPHICS)	CONTENT AND LEARNING GOALS	FACILITATION REQUIRED (BY WHOM)	NOTES (OPPORTUNITIES AND CHALLENGES)	IMPLEMENTERS (LINKS)
Cote d'Ivoire   	Formal	Preschool, elementary, middle and high school learners	Goal: Support learners outside the classroom in the different disciplines taught at school	Educators, learners (platform of pedagogical resources)		Ministry of Education: Ecole Numerique
Ethiopia  	Formal	Secondary school learners and educators	Content: Geography, Amharic, physics, biology, basic technical drawing for grade 12, math	Learners	<ul style="list-style-type: none"> E-textbooks for educators and learners in electronic format 	Ministry of Education
Kenya  	Formal	Pre-primary, primary, secondary learners	Content: Multiple	Learners	<ul style="list-style-type: none"> KICD Distance learning content and e-library; KEC portal offering a library of digital resources 	Kenya Institute of Curriculum Development (KICD); Kenya Education Cloud (KEC) KICD KEC
Rwanda  	Formal	Pre-primary, primary, secondary learners	Content: Multiple	Learners	<ul style="list-style-type: none"> Online platform with all courses as per the national curriculum 	Rwanda Education Board

COUNTRY/ REGION	NON- FORMAL OR FORMAL	AGE/GRADE LEVELS (DEMOGRAPHICS)	CONTENT AND LEARNING GOALS	FACILITATION REQUIRED (BY WHOM)	NOTES (OPPORTUNITIES AND CHALLENGES)	IMPLEMENTERS (LINKS)
Saudi Arabia   	Formal	University undergraduate	Content: Computer science Goal: Continuity of education during regional conflict	University faculty at both male and female campuses of the university	<ul style="list-style-type: none"> University used Blackboard as its online learning platform No statistical difference between student performance in face-to-face versus online classes Enrollment was significantly lower in online classes due to student fears and lack of confidence regarding online learning 	University of Najran (https://ieeexplore.ieee.org/document/8276222)
South Africa 	Non-formal and formal	Pre-primary, primary, secondary learners and teachers	Content: Multiple	Learners	<ul style="list-style-type: none"> ePortal (e-learning portal) contains different types of resources available in English and Afrikaans and MoE provides a number of online courses and reading material made available on the site to facilitate learning from home during school closures 	Ministry of Education ePortal
Uganda 	Non-formal	Pre-primary, primary, secondary learners and educators	Content: Multiple	Learners	<ul style="list-style-type: none"> Free e-Learning platform to assist children during the school shutdown caused by the COVID-19 pandemic 	Kolibiri

See Cobo, Hawkins, and Rovner 2020 for programs in Latin America

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