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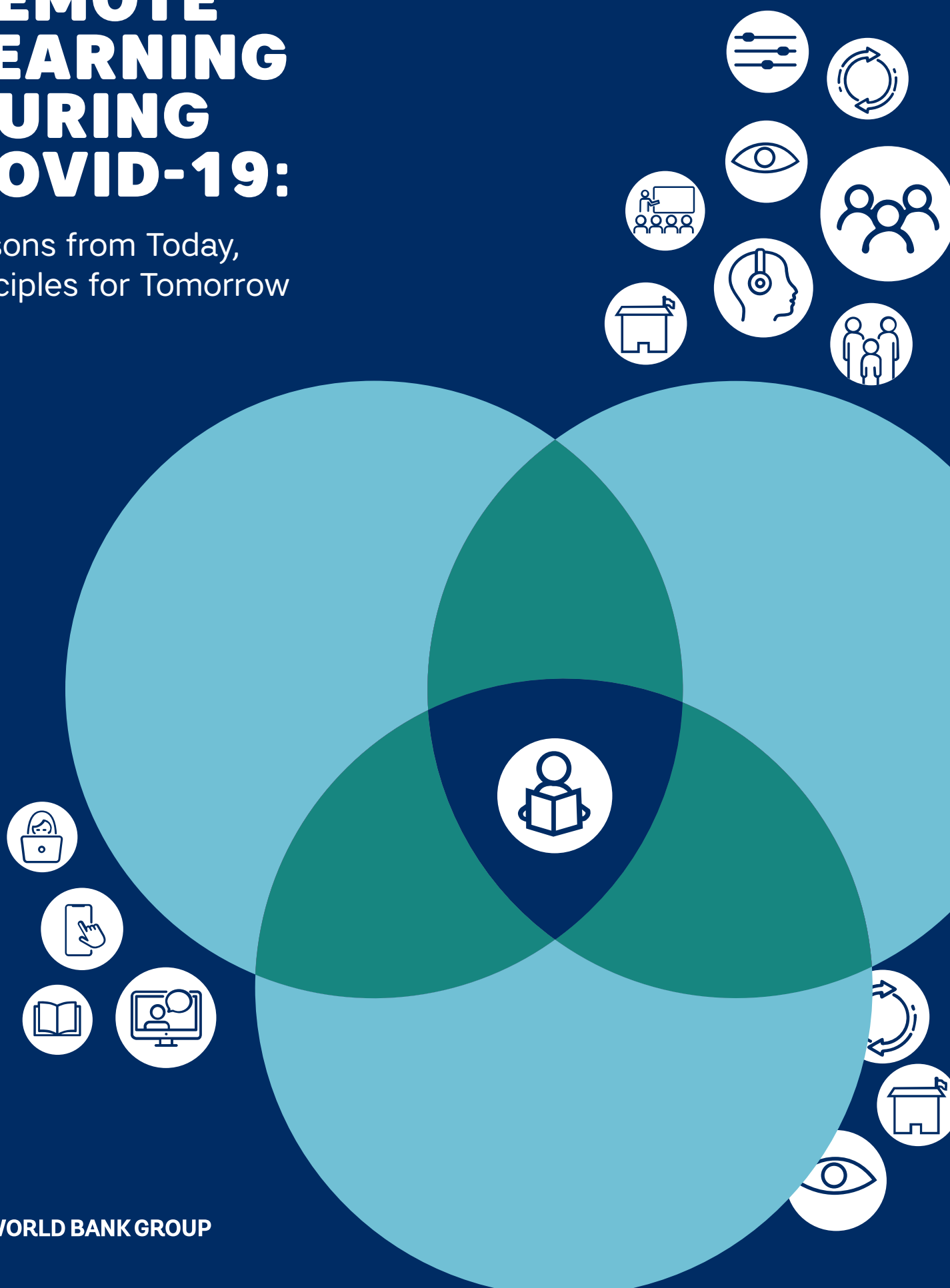
REMOTE LEARNING DURING COVID-19:

Lessons from Today, Principles for Tomorrow



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REMOTE LEARNING DURING COVID-19:

Lessons from Today, Principles for Tomorrow

Alberto Muñoz-Najar
Alison Gilberto
Amer Hasan
Cristóbal Cobo
João Pedro Azevedo
Maryam Akmal

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1818 H Street NW, Washington, DC 20433

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EXECUTIVE SUMMARY

School closures during COVID-19 led to an unprecedented global experiment in the delivery of remote learning. This report seeks to assess what lessons can be drawn from experiences of remote learning during COVID-19 in K-12 education, with a focus on low- and middle-income countries. It focuses on the period from March 2020 to October 2021 and addresses the following key questions:

1. Was remote learning during COVID-19 taken up and if so, was it effective? That is, did children learn as much as they did during pre-pandemic, in-person learning?
2. What lessons can governments derive from this wide-spread experience?
3. How might policymakers use these lessons to reimagine learning as schools begin to reopen?

This report is part of a larger effort led by the World Bank to provide guidance and technical assistance to optimize country effectiveness in the design and execution of remote learning strategies. It has been developed in conjunction with Remote Learning During the Global School Lockdown: Multi-Country Lessons, a qualitative study conducted between May and November 2020 to understand the perceived effectiveness of remote and remedial learning solutions implemented across 17 countries.

Key Findings

Emerging evidence as to the effectiveness of remote learning during COVID-19 is mixed at best. When compared to in-person learning prior to the pandemic learning outcomes have been generally worse with remote learning. The empirical evidence from low-, middle-, and high-income countries reveals different and nuanced results. In low-income countries, remote learning was not as widely taken-up as in middle-income countries. While take-up was not as much of an issue in high-income settings, evidence suggests that remote learning did not produce as much learning as in-person schooling prior to the pandemic. Poorer countries lag far behind richer ones in the scale and scope of their remote learning measures. Thus, once can expect that the results in developing country settings is likely to reveal an even starker picture, given that many have delivered very little remote instruction despite full or partial school closures of one year or more.

For remote learning to be effective it requires three complementary, critical components: effective teachers, suitable technology, and engaged learners. These components are critical for take-up, which is a necessary first step for effectiveness. A teacher with high subject content knowledge, technical skills in using technology and supporting resources, and appropriate pedagogical techniques is likely to be more effective at remote learning than a teacher lacking some or all of these attributes. Availability of technology is a necessary but not sufficient condition for effective remote learning, as it needs to be suited to the context in which it is deployed. Last but not least, effective remote learning requires an engaged learner, whose engagement depends on intrinsic motivation, teacher and technology effectiveness, and contextual factors such as the home environment.

Governments deployed remote learning in a variety of ways. Multimodal responses were common but there were differences between regions and country income levels. Some countries took advantage of available preexisting education technology infrastructure to deploy remote learning strategies ranging from paper-based take-home packages to radio, TV, phone, and internet-based solutions. Others did not. For instance, as of June 2021 nearly 40 percent of the countries in Sub-Saharan Africa did not undertake any remote learning strategy despite having full and partial school closures of about one year, on average, resulting in millions of children not receiving any instruction during that period. Most of the countries in the different regions chose to implement multimodal remote learning. Others, such as Mali and Lebanon, relied on unimodal solutions. Regardless of whether countries chose unimodal or multimodal approaches, their strategies varied in terms of design, use, and contextual features.

Governments tried to facilitate take-up of remote learning in multiple ways. Some governments partnered with the private sector and/or delivered targeted aid directly to households to facilitate children's access to remote learning (including tutoring). A number of countries adjusted curricula to accommodate the reduction in school days. Some countries supported teachers with remote teacher training and other forms of assistance. At the same time, other countries have sought to help disadvantaged groups during the pandemic by improving access to remote learning infrastructure, designing learning materials in minority languages or gearing them toward children with disabilities, and offering flexible and self-paced platforms.

Yet many countries struggled to ensure take-up and some even found themselves in a remote learning paradox. That is, too often countries chose a distance learning approach that was unsuited to the possibilities and needs of the majority of students. For example, in some countries, governments provided online (digital) learning solutions, although a majority of students could not access these due to infrastructure (lack of devices) or connectivity constraints, thus resulting in uneven take-up and amplified inequalities. Several factors lead to low student take-up, such as inadequate home environments, children's attention spans, low digital literacy of students, teachers and/or parents, and the accessibility of devices. In other countries, teachers lacked the skills to effectively utilize the remote learning technologies that were deployed to deliver remote instruction.

What once was a digital divide for some is now a digital chasm for many. Pre-pandemic access to technology, as well as access to resources and skills to utilize technology effectively, differs widely within and across countries. Parental engagement and support, which is critical to facilitate remote learning, varies by education and socioeconomic background, and household income losses during the pandemic only deepened the divide. Marginalized children and vulnerable groups, such as girls, students with disabilities and ethnic minorities, are likely to be disproportionately affected and at greater risk of falling further behind.

This report proposes five principles for reimagining learning as countries strive to build back more effective, equitable and resilient education systems, drawing on ongoing lessons from remote learning during COVID-19 school closures:

Adopt Suitable Technology

1. Ensure remote learning is fit-for-purpose. When deciding on modes of remote learning, countries must account for access and utilization of technology among both teachers and students, including digital skills when online solutions are involved. They must also ensure that teachers are supported to acquire and use the technical and pedagogical competencies needed for the chosen mode of remote learning.

Prioritize Effective Teachers

2. Use technology to enhance the effectiveness of teachers. Teacher professional development must target the development of the skills needed to be an effective teacher in a remote setting.

3. Establish meaningful two-way interactions. Using the most appropriate technology for the local context, it is imperative to enable opportunities for students and teachers to interact with each other, with suitable adaptations to the delivery of the curriculum.

Ensure Learners are Engaged

4. Engage and support parents and students as partners in the teaching and learning process. Given the isolation and disconnection caused by school closures, it is imperative that parents and families more broadly are engaged and supported to help students access remote learning opportunities, and to ensure their socio-emotional well-being.

5. Rally all actors to cooperate for learning. Cooperation across governmental departments as well as partnerships between the public and private sector, and even between groups of teachers and school principals is vital to the effectiveness of remote learning and to ensure that the system continues to adapt, learn and improve in an ever-changing remote learning landscape.

Conclusion

Despite the challenges that this report notes, in the course of just 18 months, a variety of experiences have been documented, capacities created, and new forms of education delivery adopted at a scale. This presents a number of possibilities for reimagining how education can be offered and enriched in the years to come. This is especially pertinent as governments around the world continue to implement school closures and plan to offer multiple remote learning strategies in the face of a lingering pandemic. In some countries schools remain fully or partially closed. In others, schools are open in some regions for some grades some of the time. Remote learning remains a key means of ensuring continuity of learning as school systems return to increased in-person learning. When its three complementary components–teachers, students and technology–are well-aligned, remote learning has the potential to address the inequality in learning that has held back global progress on learning poverty for far too long.

1. INTRODUCTION

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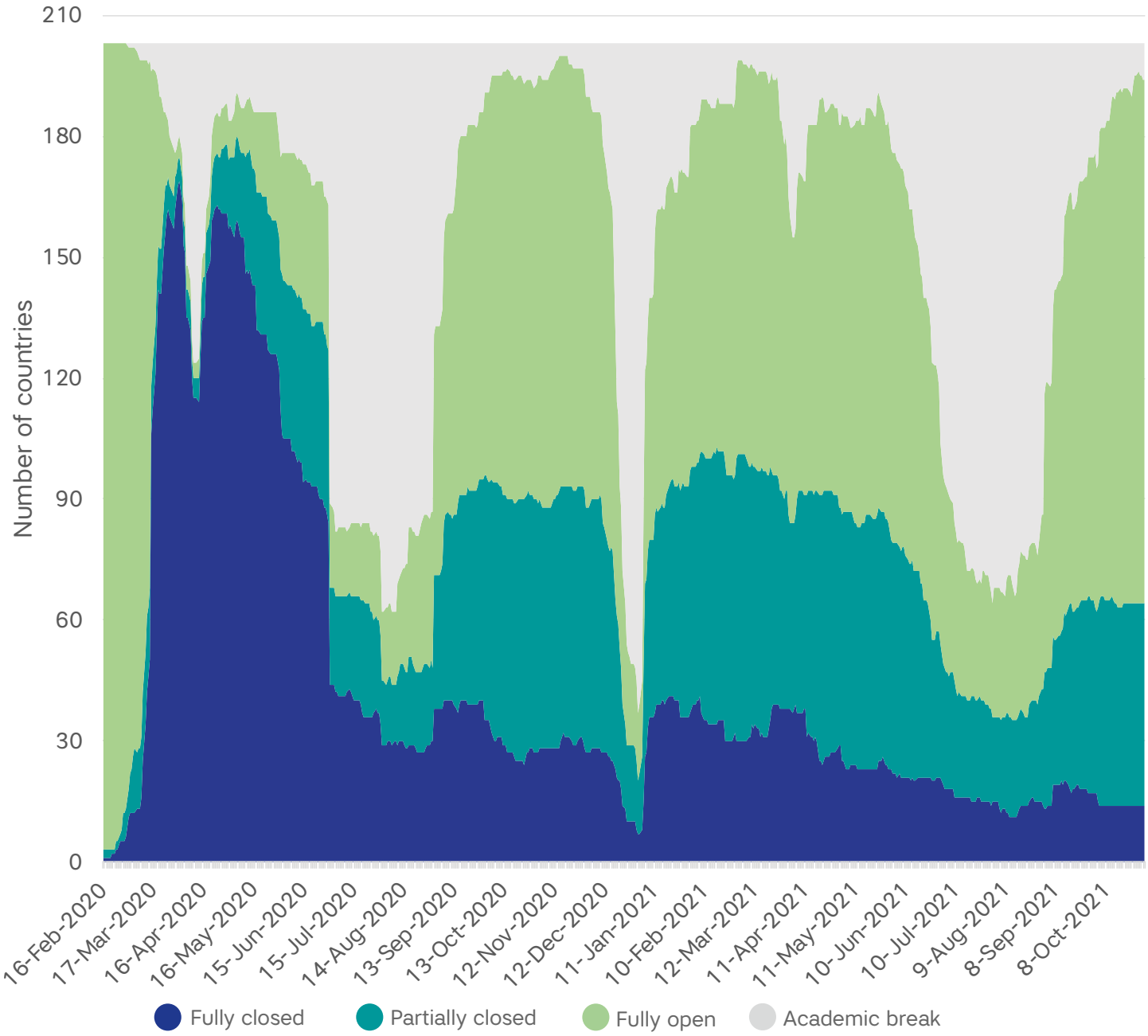
1. INTRODUCTION

Education systems worldwide reacted to COVID-19 by closing schools and rolling out remote learning options for their students as an emergency response. School closures compounded an ongoing learning crisis (**Box 1.1**). At the peak of the pandemic, in April 2020, about 1.6 billion K-12 learners in over 190 countries were deprived of in-person schooling (UNESCO 2020a; **Figure 1.1**). As of October 2021, 32 percent of countries worldwide either fully (14 countries[1]) or partially (50 countries) closed schools. The longest closures have been in South Asia and Latin America and the Caribbean, with an average of 429 and 387 days, respectively, in which schools were fully or partially closed, in both cases equivalent to more than the 75 percent of their total instruction time since the pandemic began.

Figure 1.1 School Closure Status from February 2020 to October 2021



Source: World Bank. Calculations based on UNESCO global monitoring of school closures caused by COVID-19.
Note: The analysis covers schools from pre-primary to upper secondary level. See Annex figure A.1 for the evolution of school closures by region.

COVID-19 has led to an unprecedented experiment in the deployment of remote learning as a means to counter school closures and to deliver education effectively and at scale.[2] This is particularly relevant as the pandemic continues to linger and undermines the traditional relationship between teachers and students. Looking ahead to other similar system-wide shocks, it is clear that for learning to be effective for everyone, everywhere, hybrid education, which combines both in-person and remote learning, is here to stay (Saavedra et al. 2020).

This report seeks to assess what lessons can be drawn from the ongoing global experiences of remote learning during COVID-19. It examines the period March 2020 to October 2021 and addresses the following key questions:

1. Was remote learning during COVID-19 taken up and if so, was it effective? That is, did children learn as much as they did during pre-pandemic, in-person learning?
2. What lessons can governments derive from this wide-spread experience?
3. How might policymakers use these lessons to reimagine learning as schools begin to reopen?

To answer these questions, the report draws on a variety of sources, including qualitative country case studies early in the pandemic developed using key informant interviews, a global survey of country responses jointly fielded and analyzed by the World Bank, UNICEF, the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the Organisation for Economic Co-operation and Development (OECD), emerging quantitative evidence from research studies conducted during this period, a global tracker on education recovery facilitated by a partnership between the World Bank, Johns Hopkins University and UNICEF, and high-frequency household surveys fielded by the World Bank.

The report is organized as follows: Section 2 describes the conceptual framework, underscores what matters for remote learning take-up and effectiveness, and explains the types of learning experiences considered. Section 3 assesses how countries responded to school closures induced by COVID-19. Section 4 discusses what we are learning from country responses. Section 5 presents key principles that school systems can draw on to reimagine learning going forward.

Box 1.1 School Closures Exacerbate the Learning Crisis and Widen its Impact

Economic and health shocks stemming from COVID-19 have pushed children to drop out, forcing some to leave school permanently. Millions of children are being deprived of daily school meals while schools are closed. Around 369 million students worldwide went without school meals at the peak of the pandemic in April 2020. By October 2021, that number remained stubbornly-high: 187 million children (World Food Programme 2021). This can lead disadvantaged children to dropout or be at higher risk of doing so (UNESCO, UNICEF, World Bank, and OECD 2021b).

For instance, as of September 2020 over 300,000 students in Peru – about 15 percent of the student population – had dropped out since school closures began. This high drop-out rate has been attributed to economic instability, in addition to difficulties in accessing remote learning programs (Perez 2020). In the case of Punjab in Pakistan, 2.5 percent of girls enrolled in schools pre-pandemic might not return to classes (Hasan et al. 2021).

Additionally, children whose families have experienced COVID-19 are at higher risk of dropout (World Bank 2020e). It is estimated that between March and October 2020 around 10.7 million students (a majority between 12 and 17 years old) were at high risk of dropping out from primary and secondary education due to income shocks (Azevedo et al. 2019).

School closures are harming children's mental health and their motivation to learn.

- A longitudinal study in the United States before and during the pandemic, showed that students using remote learning had lower levels of emotional, social, and academic wellbeing compared to classmates that attended in-person schooling (Duckworth et al. 2021).
- Another study analyzed 14-18 year-old students in Ecuador during COVD-19 and determined that 16 percent presented symptoms indicating depression (Asanov et al. 2020). This was an increase compared to pre-pandemic figures. One of the main factors behind this was the lack of socio-emotional support schools could offer to students and the social isolation caused by the remote learning experience.
- In Brazil, the Lemann Foundation, Itaú Social, Imaginable Futures, and Datafolha, conducted a series of telephone surveys of more than 1,000 caregivers, selected randomly. The study found that: students' lack of motivation for learning activities at home increased from 46 percent in May to 54 percent in September 2020; the perception that learning had not improved increased from 46 percent to 50 percent; over 70 percent of students felt anxious about remote education, and 31 percent of respondents had worries regarding dropping out.

Marginalized children and at-risk groups, such as low-income girls, children with disabilities, and ethnic minorities, are disproportionately affected and risk falling further behind. School closures have caused girls to become more vulnerable to child marriage, gender-based violence and early pregnancy, leaving 5.2 million girls worldwide in primary and secondary school at risk of dropping out from school permanently (UNESCO 2020b). Notably:

- Given a scenario of eight months of school closures in Sub-Saharan Africa, teenage pregnancy could increase as much as 65 percent , equivalent to 1 million girls that might not return to classes when schools reopen (World Vision International 2020).
- Similarly, girls in Punjab have been spending more time on household chores compared to boys during the pandemic (Hasan et al. 2021).

Finally, indigenous children have lower primary enrolment levels compared to national averages in their countries, are more vulnerable to leave school due to household economic shocks, and often face instruction in a language other than their native language, even when they are able to access remote learning (Azevedo et al. (2021).[3]

Source: World Bank, UNESCO, UNICEF (forthcoming).

Notes

1. List of countries fully closed as of October 2021: The Bahamas, Barbados, Belize, Brunei Darussalam, Cuba, Dominica, Fiji, Grenada, Jamaica, Myanmar, Philippines, Sri Lanka, Sao Tome and Principe, and Uganda.
2. Technology here is meant to run the gamut from paper and pencil to internet-connected electronic devices.
3. As reported in a survey of education ministries conducted by UNESCO, UNICEF, World Bank and OECD, henceforth referred to as the joint survey. UNESCO, UNICEF, the World Bank, and OECD (2021b).

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2. CONCEPTUAL FRAMEWORK

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2. CONCEPTUAL FRAMEWORK

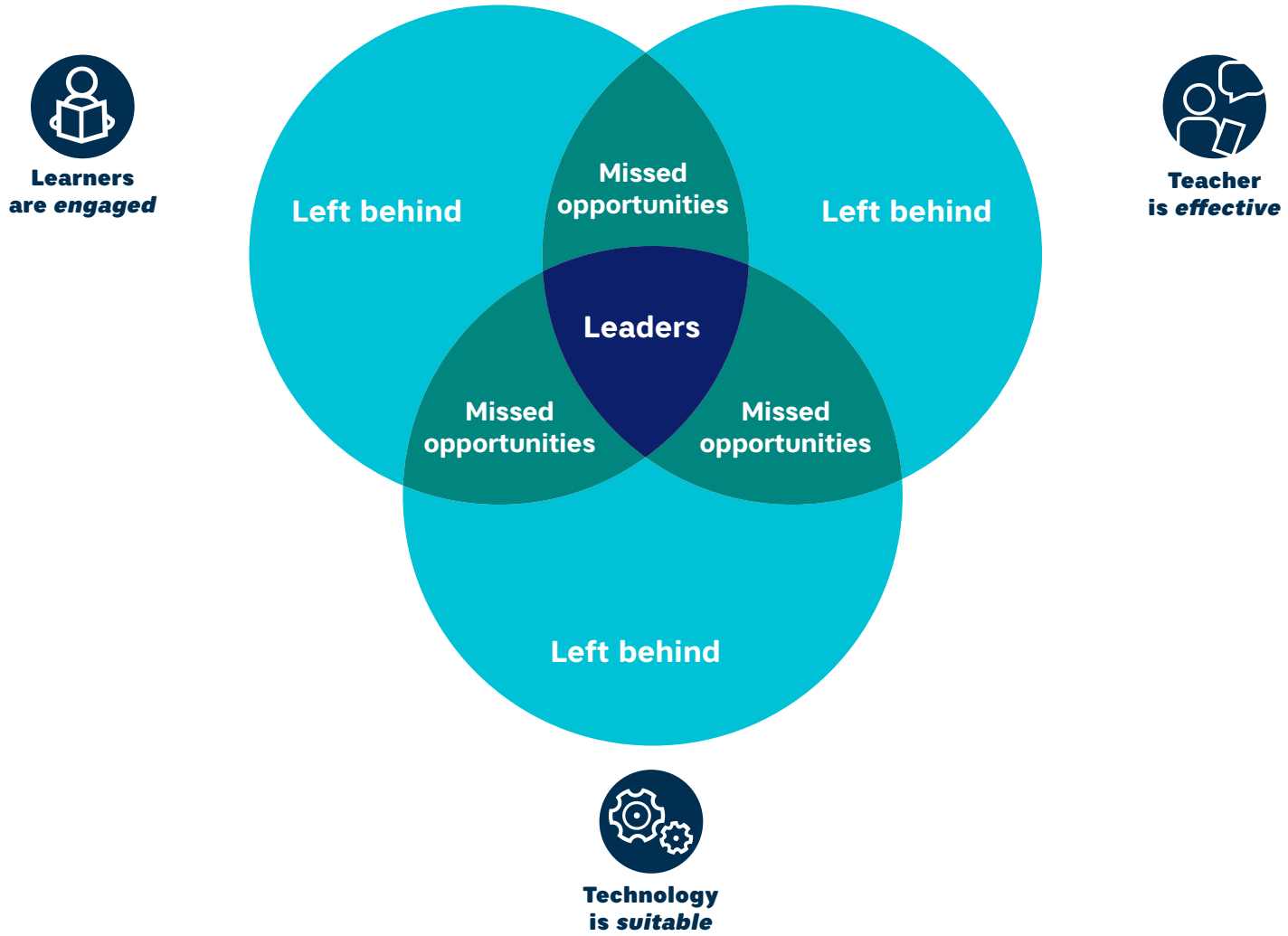
What matters for remote learning take-up and effectiveness?

Three key features of remote learning guide this report's analytical framework (**Figure 2.1**):

- First, is the teacher knowledgeable and does she have the skills needed to teach remotely?
  - » Consider two polar examples: on the high end, a teacher has in-depth content knowledge and possesses not only the skills to use the digital platforms and resources, but she is also capable of adjusting her teaching practice in order to secure the engagement of students when teaching remotely. Such a teacher is likely to be more effective than her counterpart on the low end of the spectrum: a teacher with little to no content knowledge or who has limited knowledge on how to effectively use technology when teaching. These challenges impose barriers to teaching remotely but also to create the needed learning environment between students and teachers. The reality is that school systems likely have teachers all along such a continuum.
- Second, is technology for remote teaching—ranging from paper take-home packets to internet-connected electronic devices—suitable?
  - » This report considers a technology suitable if it is both widely available and appropriate for the remote learning needs of the context in which it is deployed. It must also help teachers be effective in a remote learning environment. Thus, deploying remote learning via the internet in settings where internet penetration and bandwidth are low are likely to be examples of technology being unavailable and inappropriate as students who live in this context would not be able to access these learning solutions. Also, such technology deployment undermines teacher effectiveness as even the most knowledgeable teachers would be unable to reach the majority of their students. Globally, school systems are operating with technology resources that range from low to high suitability.
- Third, are learners engaged in remote learning?
  - » The development of cognitive and socio-emotional skills has always been the result of an interplay between a wide range of characteristics of the children, their school, their teachers, and their households. Children need regular interactions facilitated by teachers and parents that encourage engagement with the learning content, ignite motivation, and allow for regular feedback. For children to be engaged, they not only need access to the remote learning technology being used by their school system (such as paper packets, phones, laptops, or internet connections) but they also need access to engaging content as well as regular feedback and motivation from teachers. This report seeks to assess whether the conditions that students have found themselves facing during COVID-19 school closures allows them to be engaged learners.

Figure 2.1 provides a simplified depiction of how these three features may combine with each other. In practice, a continuum of combinations is possible. The combinations below could just as easily describe differences across countries as they could the disparate experiences of groups within a given country: richer or poorer households, families living in urban or rural areas, and students connected to high-speed internet, or those without connectivity. Three stylized situations are worth highlighting based on experiences of remote learning during COVID-19:

Figure 2.1 Conceptual Framework for Remote Learning During COVID-19



Source: World Bank.

- **'Left behind'** countries or groups can be characterized by education delivered by a teacher who has little to no experience or training in delivering education in a remote learning modality. It could also be one where a teacher with low content knowledge is tasked with delivering online remote education in a country where student access to technology or connectivity are low. In this scenario, take-up of any remote learning being deployed is likely to be low, as will be its effectiveness.
- **'Missed opportunities'** can occur when either technology is unavailable or inappropriate or when teachers are not knowledgeable or not effective. In such a situation, education is being delivered by knowledgeable teachers with little to no experience or training in delivering remote learning. Alternatively, in this scenario, high content knowledge is paired with a technology that is not widely accessible or where—despite availability—bandwidth issues are limiting. This situation could also arise when appropriately-designed and accessible remote education content is delivered by a teacher with low content knowledge. Take-up of opportunities for remote learning and their effectiveness are likely to be sub-optimal and lead to missed opportunities for success.
- **'Leaders'** are able to deliver contextually-appropriate remote learning opportunities taught by a teacher with high content knowledge who is experienced or trained in remote learning. Students in these settings have easy access to the chosen remote education technology which could range from paper take-home packets to online courses. Remote learning take-up is consequently expected to be high and likely to maximize a two-way student-teacher interaction. The resulting effectiveness might also be high. Such experiences, while limited, are characteristic of countries that could reasonably be considered remote learning leaders during the pandemic.

Types of learning experiences

In this section, we define the different types of learning experiences considered in this report (see **Box 2.1** for a summary).

Remote learning

Remote learning refers to synchronous or asynchronous instruction provided in a place outside the classroom. Synchronous learning means that students are connected to learning experiences where a teachers' immediate feedback is possible. Asynchronous or self-directed learning means that students can learn at their own pace and chosen time. Remote learning takes an array of forms ranging from paper-based take-home packages to online platforms. Remote learning is also possible through a variety of different channels, such as mobile phones, television, radio, and tutors.

In-person learning

In-person learning refers to instruction at school in real time, with teachers and students interacting in person. Learning is typically a result of interactions between teachers, learners and their peers, and supported by parents, caregivers, learning resources, schools, and school leaders (Saavedra et al. 2020). The learning experience depends on the ability of the teacher to teach and on the ability and motivation of the learner to learn. In addition, parental socioeconomic background, features of the learning space, the language of instruction, and peer interactions are among many factors that may influence learning outcomes. In particular, peer interaction is a critical factor influencing language skills and socioemotional development. It is also a considerable factor in shaping student motivation to succeed at school.

Hybrid learning

Hybrid learning combines in-person learning with remote learning. It is sometimes also referred to as blended learning.

Multimodal approaches

Multimodal approaches refer to settings where school systems use multiple modes of delivery for learning. These are also sometimes referred to as multi-channel approaches. These can be either synchronous or asynchronous. Multimodal approaches can use analog and/or digital channels. They can include different forms of interaction: one-to-many (teacher to students), one-to-one (one teacher to one student, or student-to-student), or many-to-many (many students interacting among themselves and with multiple teachers).

Synchronous approaches

These remote learning approaches allow real-time interactions between students and teachers while lessons and instructional content are being shared.

Asynchronous approaches

These remote learning approaches allow interactions between students and teachers to take place before or after delivery of the lessons and instructional content.

Box 2.1 Remote Learning Encompasses a Variety of Modalities and How These are Combined Matters

Remote learning modalities can run the gamut from paper-based take-home packages to radio or television broadcasts, to mobile phones, to tutors, and to online platforms (UNESCO, UNICEF, World Bank, and OECD 2020a). For some of these modalities, access to electronic devices with appropriate software and connectivity are necessary. For others, no such access is needed. These modalities can be used in a variety of ways and combined to expand take-up and also effectiveness:

- **Students lacking access to any digital connectivity and device** can be reached using paper-based take-home packages or tutoring for remote learning.
- **Students with radio spectrum and radio access** can listen to pre-recorded radio instruction (Anzalone and Bosch 2005).
- **Students with TV signal and TV access** can access remote learning through live or pre-recorded lessons, and edutainment programs transmitted over free-to-air TV, cable TV, or paid satellite TV, among others (World Bank 2020b).
- **Students with telephone access** can make or receive audio calls with teachers, tutors and peers.
- **Students lacking broadband network connectivity but with mobile phone and mobile network access** can also engage in remote learning using text messages (SMS) and audio calls.
- **Students with limited broadband network connectivity and device access can still use digital solutions.** In such environments, desktop computers, laptops, tablets and smartphones can allow access to offline apps, pre-loaded e-content, or preloaded content on a variety of storage media (such as CDs and USB drives).
- **Students with broadband network connectivity and device access can make use of online platforms** through desktop computers, laptops, tablets, smartphones, or digital TV. Online platforms can include web portals, mobile apps, and podcasts, to name a few. Children with such access can use a broader set of digital solutions for remote learning. They can attend classes live through video conferencing platforms (such as Zoom or Microsoft Teams for instance), watch and revisit pre-recorded lessons, play educational games, download audio and video content as well as e-textbooks, and participate in online forums. They can also benefit from an online learning management system, or cloud-based collaborative file editing (World Bank 2020a), or listen to educational radio programs broadcast online.
- **While radio and TV primarily allow one-way interactions, it is possible to combine these with other technologies and to use them for two-way interactions.**
- Two-way interactions are possible if technologies are used to complement each other. For example, the use of TV and radio can be complemented with messaging apps to generate feedback from students, calls from teachers to assess student progress or help solve questions. Hotlines and online helpdesks—with toll-free numbers, SMS, email and social media (World Bank 2020c)— can provide technical assistance and pedagogical and socio-emotional support for students, caregivers, and teachers (McBurnie 2020; World Bank 2020b). SMS can also be used to inform students of broadcast schedules, to expand the take-up of TV and radio programs.[1]

Ultimately, how remote learning strategies are used and combined can make them more or less interactive, more or less synchronous, and this combination of attributes can influence its effectiveness.

Source: World Bank.

Note

1. Devices with broadband network connectivity (online) and mobile network or fixed-telephone lines (offline), such as computers or phones, allow two-way interactions. However, it is possible for these to be used for one-way interactions only. A one-way interaction may arise if these high-tech resources are underused. Internet and mobile phones could be used as merely information delivery devices. For example, this is the case with live online classes that do not leave time for questions and answers, or pre-recorded classes that do not provide opportunities for discussion.

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3. HOW DID COUNTRIES RESPOND TO EDUCATION DISRUPTIONS?

GIOVANNI-GAGLIARDI

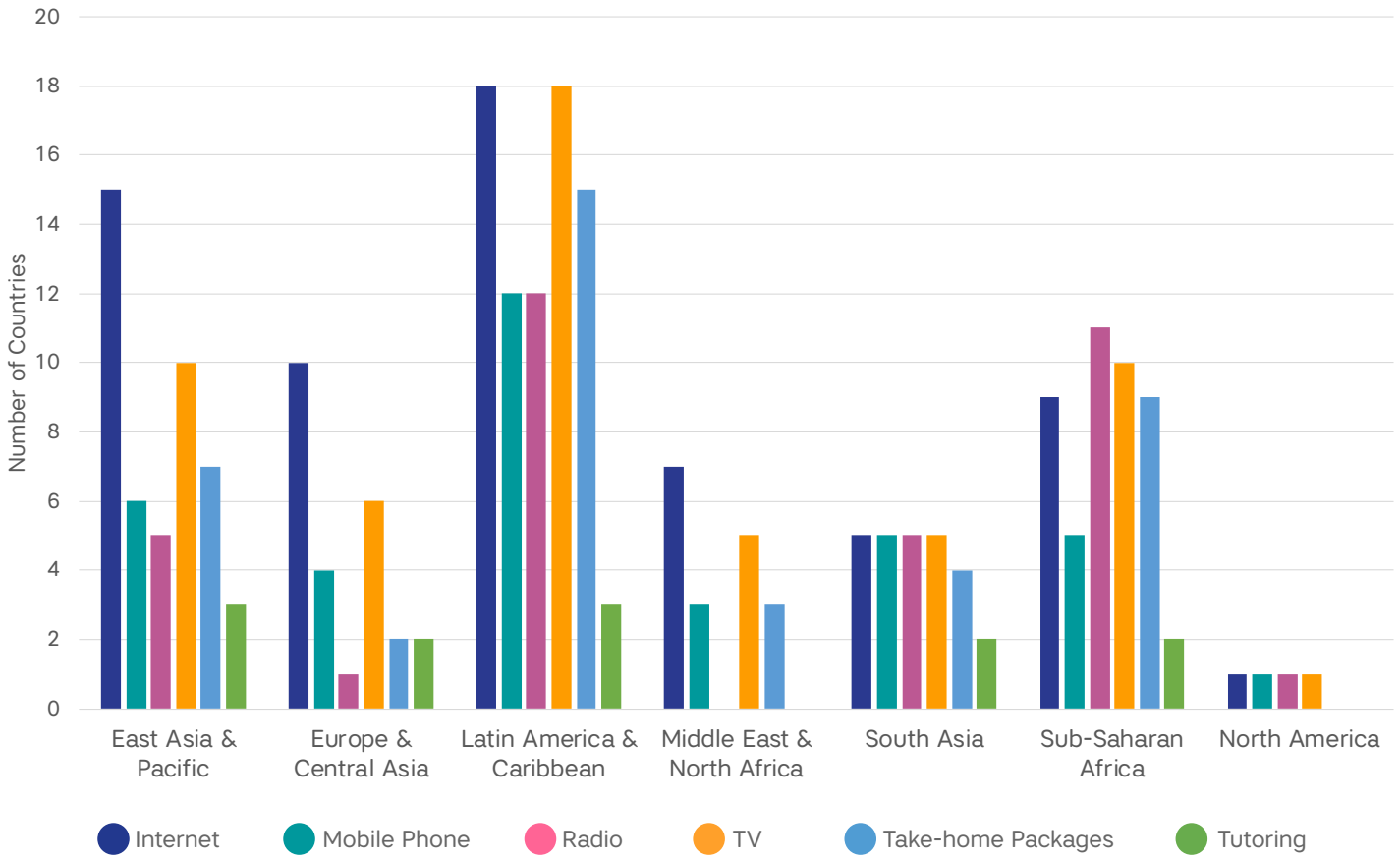
3. HOW DID COUNTRIES RESPOND TO EDUCATION DISRUPTIONS?

While multimodal responses were common, regional and country income differences abound

The vast majority of countries offered multiple modes of remote learning. According to the Joint Survey, most countries delivered remote learning through online media (91 percent) and TV (85 percent), followed by paper-based take-home materials (82 percent), and mobile phones (70 percent). Eighty percent of governments in the Middle East and North Africa, 93 percent in Europe and Central Asia, and 97 percent in Latin America and the Caribbean decided to implement multimodal remote learning programs. Others focused on unimodal solutions, such as Mali and Lebanon, though both chose different unimodal solutions.[1]

Regional differences in remote learning strategies are substantial. According to the Global Education Recovery Tracker, as of September 2021, all regions delivered remote learning strategies through the internet or mobile phone, with a notably higher number of countries from Latin America and the Caribbean (18) than elsewhere, while TV and radio were also used in most regions, as seen in **Figure 3.1**.

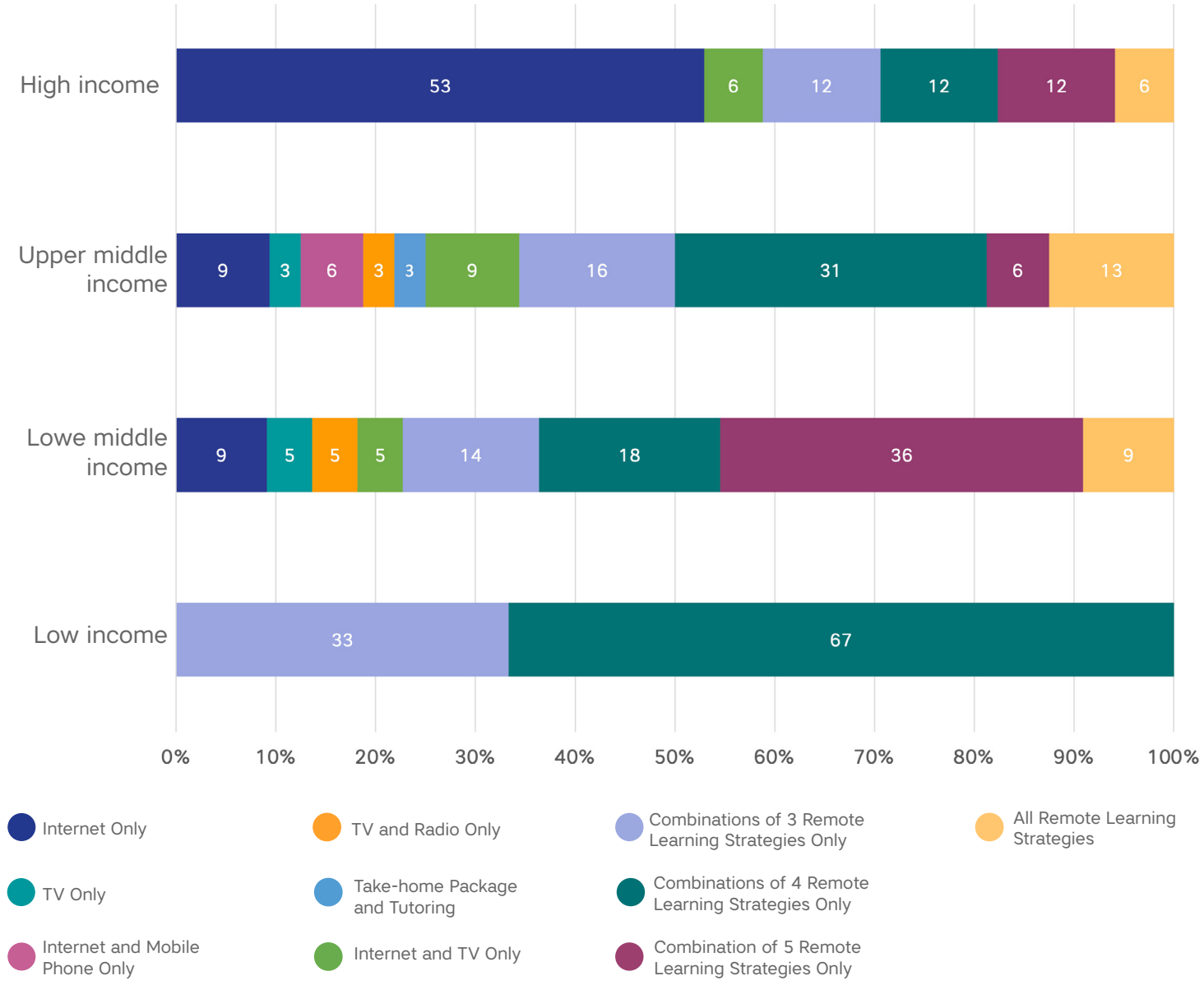
Figure 3.1 Provision of Remote Learning Strategies by Region



Source: World Bank. Calculations based on Johns Hopkins University et al. (2021) as of September 2021.
Note: Sample size of 74 countries. Data covers countries with remote learning strategies at any education level, including pre-primary, primary, lower secondary, and upper secondary education. Some countries offered one or more of remote learning strategies.

While high income countries could rely on internet-based solutions, poorer countries often combined a variety of remote learning modalities. Figure 3.2 shows how remote learning strategies differed among countries based on their income level. Fifty-three percent of high-income countries for which there is information – with high internet and mobile phone penetration - delivered remote learning strategies exclusively through the internet. In contrast, more than 85 percent of upper-middle-income countries adopted a variety of two or more remote learning strategies. Nine percent of lower-middle-income countries chose to deliver remote learning exclusively through the internet while 86 percent adopted a variety of two or more remote learning strategies. In low-income countries, 100 percent opted for providing remote learning through a combination of three or more remote learning strategies (Johns Hopkins University, World Bank, and UNICEF 2021; UNICEF 2021).

Figure 3.2 Provision of Remote Learning Strategies by Income Level



Source: World Bank. Calculations based on Johns Hopkins University et al. (2021) as of September 2021.
Note: Sample size of 74 countries. Data covers countries with remote learning strategies at any education level, including pre-primary, primary, lower secondary, and upper secondary education. No country was found delivering only mobile phone, only radio, only take-home packages, only tutoring, or combinations of two remote learning strategies that does not include internet and mobile phones, so these categories were excluded from the graph.

Figure 3.3 shows the diverse array of hybrid and remote learning strategies that have been deployed in various countries since school closures began in March 2020. The examples documented in this report have been taken from over 130 semi-structured interviews conducted for the report "Remote Learning During the Global School Lockdown: Multi-Country Lessons" between May and November 2020 with key informants such as Ministry of Education policy makers, teacher union officers, and leaders of nongovernmental organizations (NGOs). These examples are organized according to the following:

1. **Design features**
   The remote learning strategies documented in this report vary in terms of their design features; whether they rely on visual or audio elements, the extent to which they encourage parental involvement, and the extent to which they rely on school infrastructure. For example, consider Haiti, where an online platform was the only strategy pursued (a unimodal approach). This reached only a fraction of the student population. In Brazil, states such as Minas Gerais delivered remote learning via TV and teachers used a mobile app to follow up with their students (a multimodal approach). In Cambodia, the government provided paper-based learning materials for the most vulnerable students and complemented these with SMS and Telegram messages for teacher-student follow-up (also a multimodal approach).

2. **Usage features**
   The examples covered in this report also vary in terms of their usage features; whether they are asynchronous, interactive, or adaptive. Estonia is facilitating remote learning through online platforms that allows for an interactive and synchronous experience. Uruguay is using adaptive software on devices that have been provided to all students. In contrast, Kenya has primarily relied on one-way learning that is not synchronous, interactive, or adaptive, an approach that relies on radio, TV broadcasts, and pre-recorded online lessons. Other countries have used a variety of remote learning strategies with features that fall in between. For example, Sierra Leone is deploying strategies that are interactive but neither synchronous nor adaptive. These involve radio lessons followed by toll-free phone calls at the end of each radio segment to allow students to call in with their questions.

3. **Contextual factors**
   Lastly, each of the examples is heavily influenced by prevailing contextual factors. For instance, different modalities require different levels of parental involvement. Those in Estonia explicitly require parents to perform specific tasks to facilitate remote learning. On the other end of the spectrum, and more commonly, household infrastructure will play a key role in the success of any remote learning modality, even if this is not explicit in the design.

The consideration of design and usage features is particularly important when considering whether or not remote learning is reaching vulnerable populations. For instance, children with disabilities are often less likely to attend school or dropout before completing primary school. Learners with visual and hearing impairments, especially younger students, lack accessibility to remote learning unless they have instructions in their local sign language or in Braille, considerations that are not always factored into the delivery of remote learning. Parents might lack literacy in the language of instruction, inhibiting them to help their children at home (McClain-Nhlapo et al. 2020).

Figure 3.3 A Variety of Remote Learning Strategies Were Deployed During COVID-19

			Examples of Remote Learning Strategies							
		In-class lessons	Adaptive software + teacher involvement	Live online lessons + teaching-learning resources	TV + pre-recorded online lessons	TV + teacher / mobile follow-up	Radio + teacher / phone follow-up lessons	Take-home learning packet + SMS	Online platforms only	Radio + TV + pre-recorded online lessons
Design Features	Visual	●●●	●●●	●●●	●●●	●●●	●	●●●	●●●	●●●
	Audio	●●●	●●●	●●●	●●●	●●●	●●●	●	●●●	●●●
	Household Infrastructure	●●●	●●●	●●●	●●	●●	●●	●●	●	●●
	School Infrastructure	●●●	●●●	●	●	●	●	●●	●	●
Usage Features	Synchronous	●●●	●●●	●●●	●	●●	●●●	●	●	●
	Interactive	●●●	●●●	●●●	●●	●●	●	●●	●	●
	Adaptive	●●●	●●	●●	●	●	●	●	●	●
Contextual Factors	Learner Engagement	●●●	●●	●●●	●	●●	●●	●●	●	●
	Parental Engagement	●●●	●●	●●	●●	●●	●●	●●	●	●
	Examples Covered in this Report		**Uruguay** (Ceibal en Casa)	**Estonia** (E-Schoolbag)	**Peru** (Aprendo en Casa)	**Brazil** (Conexao Escola)	**Sierra Leone** (Radio Education Program)	**Cambodia** (All Children Learn)	**Haiti** (PR@CTIC)	**Kenya** (KICD Remote Learning)

Note: For Kenya, data collected as of May 2020; for Brazil, Peru, and Sierra Leone, data collected as of July 2020; for Cambodia, Estonia, and Haiti, data collected as of November 2020; for Uruguay, data collected as of February 2021. ●●● are features that were observed during the data collection process, ●● are inferred based on the interviews conducted, and for ● no data was available.

Most countries are implementing remote learning as a reaction to the pandemic

While some countries have been able to take advantage of preexisting technology infrastructure to deploy remote learning strategies, the majority have been forced to react to the pandemic without such infrastructure in place. Figure 3.4 shows countries that supplied remote learning through online platforms (UNESCO, UNICEF, World Bank, and OECD 2021b), taking into account the country's internet access and of education performance measured in terms of learning-adjusted years of schooling (LAYS).[2] The types of online learning platforms used by teachers and students while schools are closed can be open-source platforms such as Moodle and Canvas, domestic platforms managed by a local authority, opensource platforms such as Google Classroom, and paid commercial platforms such as Blackboard. At first glance, most of the countries providing online learning are those with relatively high internet access and relatively high LAYS, such as the Netherlands and Singapore in the upper-right of the figure. Yet countries in the lower-left of the figure also provide online learning. In fact, of the 155 countries shown in the figure, 95 (or around 60 percent) provide remote learning online. **Box 3.1** presents Peru's experience.

Some governments are falling victim to the "remote learning paradox"

Some countries are providing online remote learning even though they had limited technology infrastructure pre-COVID-19. This is the case for countries on the left of the vertical bar in **Figure 3.4**. These countries were not adequately prepared in terms of infrastructure and internet accessibility to supply remote learning online when the pandemic forced schools to close. This has been termed the "remote learning paradox", where governments provide online remote learning solutions but a majority of their students cannot access these solutions. This is creating a situation where take-up remains uneven due to lack of access to the devices or connectivity required for remote learning (Aedo et al. 2020).

For example, in Haiti, the government developed an education response plan for COVID-19 to support 350,000 children from disadvantaged communities to continue learning through different remote strategies (Global Partnership for Education 2020a). Education experts in the country urged policymakers to analyze the resources available to ensure education continuity while schools were closed to avoid exacerbating existing inequalities, especially for those students without access to connectivity (UNESCO 2020c). Yet in a country where less than 32 percent of the population has access to the internet (World Bank 2019b), Haiti's government prioritized the development of PRACTIC, an online learning platform to support students from the ninth and twelfth grades who have to sit for national examinations, while excluding the majority of the student population (Ministère de l'Éducation Nationale et de la Formation Professionnelle 2020). The examples from Nigeria's Edo state (**Box 3.2**) and Haiti show that countries that were not prepared in terms of infrastructure and internet accessibility when the pandemic arrived but still deployed remote learning strategies relying heavily on digital technologies have created a situation where student take-up has been unequal and yet preventable. Even though the COVID-19 pandemic spread at a limited pace in Haiti and did not result in protracted school closures, this was a missed opportunity to build an accessible remote learning strategy and use suitable technologies to ensure education continuity.

This is true regardless of whether countries have high LAYS and high internet penetration or vice versa. Despite relatively high internet penetration in pre-pandemic times, Kuwait and Jordan in the bottom-right of the figure have relatively lower LAYS and offer remote learning online. In such cases, deploying effective remote learning strategies for children most at risk of falling behind is even more critical to avoid students lagging further. Countries with low internet penetration and relatively lower LAYS, such as Ghana in the bottom-left of **Figure 3.4**, also chose to provide remote learning online. In such cases, remote learning may be hampered by households' relatively lower internet accessibility. Finally, countries with relatively high LAYS and low internet access also face challenges in reaching and engaging children through online instruction, such as Peru in the top-left of the figure.

Box 3.1 Peru: Combining Low-tech and High-tech Remote Learning Interventions During the Pandemic and the Critical Role of Teachers

Context

Peru's Ministry of Education (MINEDU) reacted quickly to the COVID-19 pandemic by planning, developing, and launching "Aprendo en Casa" (I learn at home), a comprehensive multimodal strategy to deliver remote learning at scale in less than two weeks. To implement a remote education program aimed at reaching all students, a team at MINEDU gathered to assess the current capacity and resources required for this program. The initiative considered the inputs needed to implement an effective remote education program: ensure multimodality of channels, create an inventory of existing content, make the program accessible to students from disadvantaged backgrounds and those with disabilities, and provide support to both teachers and parents. Furthermore, teachers received guidelines on observing learning sessions through the channel of their preference, communicating with students and parents, and subscribing to online learning courses through PeruEduca, the national online training platform.

Technology appropriateness

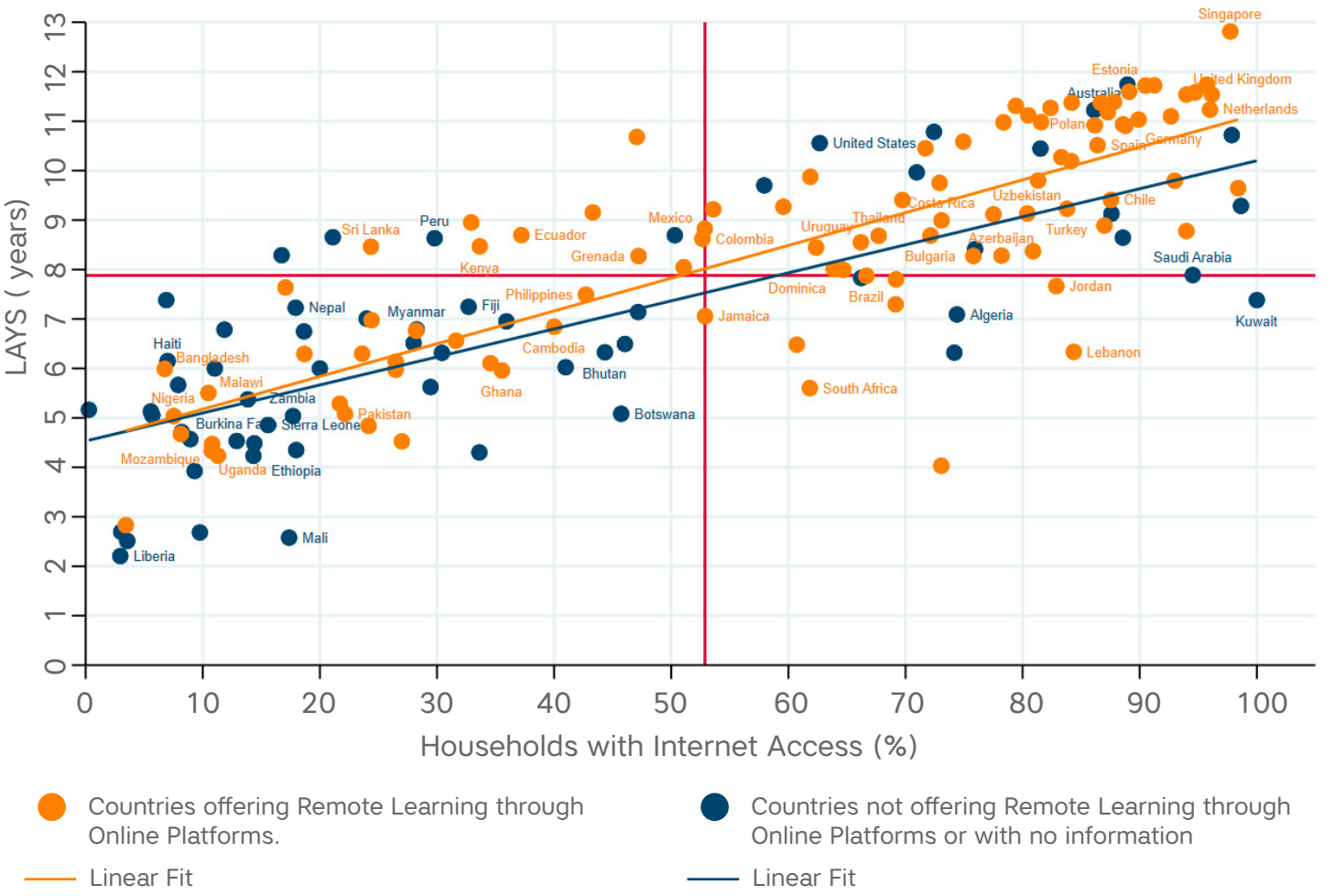
In Peru, access to devices and connectivity needed for remote learning varies across the country; about 80 percent of households possess a TV, 84 percent a radio, and only 24 percent have connection to the Internet at home.[3] Thus, the authorities deployed a multimodal strategy that used all three channels to deliver remote learning solutions. It was felt that this could be scaled up to reach all students while schools were closed. As a result, Aprendo en Casa reached almost 85 percent of students. Take-up has been relatively high due to the appropriateness of technologies to the local context. With its radio learning program, Peru's government partnered with over 1,100 local radios to reach students in remote areas and created content delivered in nine native languages. The Ministry of Education also curated external content for Aprendo en Casa's TV learning program and created engaging content that was broadcast for free on the main TV channels. Moreover, telecommunication operators agreed to zero-rate Aprendo en Casa's core digital site so that students, parents, and teachers could access all available educational resources, from any device, without paying for the bandwidth. This strategy was complemented with constant communication of weekly schedules for learning sessions, frequent teacher-student follow-up, and a strong monitoring system to understand the program's coverage and engagement.

Teacher effectiveness and learner engagement

Regular teacher-student interaction has been key to ensure high take-up and engagement. MINEDU's pedagogical team hypothesized that just providing engaging content through a one-way approach was not going to be as effective as ensuring regular interaction with the students. Teachers needed to communicate and provide feedback to students and their families through other means, including phone calls, text messages, and social media (Accinelli 2020). According to the Monitoring and Evaluation (M&E) Unit phone survey conducted in May 2021, 77 percent of students and parents have received support from teachers at least once in the past week and 89 percent of students and parents were satisfied with the communication. Moreover, 95.5 percent of parents said that at least one teacher requested students to complete and send homework in the past week. Students complete those activities and send them back to teachers mainly through WhatsApp. According to the survey, among teachers who contacted parents and requested students to complete the learning activities, 95.3 percent ended up providing feedback. Frequent teacher-student interaction and quality learning materials for remote learning allowed for moderate to high satisfaction rates: 66.8 percent of students were satisfied with the TV learning program, 47.7 percent with the radio program, and 79.6 percent with the content and learning materials accessed from the initiative's website.

Source: Information taken from interviews conducted by the World Bank EdTech team with Peruvian government officials, MINEDU's monitoring and evaluation dashboard for 2020 and 2021, and the following secondary sources: Accinelli 2020 and Munoz-Najar 2020.

Figure 3.4 Remote Learning Provision, Learning-Adjusted Years of Schooling (LAYS) and Households' Internet Access



Source: World Bank. Calculations based on UNESCO, UNICEF, World Bank, and OECD (2021a) as of June 2021; LAYS database from WBopendata as of October 2021; and Technologies database extracted from International Telecommunication Union (2021). *Note:* Sample of 155 countries (95 countries providing remote learning through online platforms, and 60 countries either not providing remote learning through online platforms or without information). Governments responded to the survey question "S4 Q1. Which distance learning solutions were or are being offered in your country during the pandemic in 2020 and/or 2021?". It considers at least one of the education levels (pre-primary, primary, lower secondary, and upper secondary). The y-axis reports learning-adjusted years of schooling (LAYS), understood as "average years of schooling measured in terms of productivity of the top performer" (Filmer et al. 2018). While the x-axis reports the estimated proportion of households with access to internet at home. The horizontal red line represents the LAYS country median (percentage) for all countries with latest available data: countries falling above the median are classified as having relatively higher LAYS, and countries falling below the median are classified as having relatively lower LAYS. The vertical red line represents the median percentage of households with internet access for all countries with available data. See Annex figure A.2 for a similar analysis using learning poverty instead of LAYS.

Box 3.2 State of Edo in Nigeria: The Challenge of Scaling-up a Mobile Learning Solution

Context

The Edo Basic Education Sector Transformation (EdoBEST) program has demonstrated transformational learning outcomes for more than 250,000 children across over 800 public primary schools in Edo State in Nigeria. Schools that are part of the EdoBEST program score 6 percent higher on English and 7 percent higher on mathematics than those not in the program. During the COVID-19 pandemic, the state of Edo in Nigeria launched Edo-BEST@Home, a public-private partnership between Edo state, the World Bank, and Bridge International Academies. This initiative provides a fully online remote learning program that can be accessed through a computer or mobile phone and includes interactive audio lessons, digital self-study activity packets, digital storybooks, mobile interactive quizzes, and virtual classrooms. The program provides:

1. **Engaging programming with content aligned to the curriculum**
2. **Constant support from teachers and parents to students**
3. **Automated formative assessment in the form of interactive quizzes**
4. **On-going support to teachers through virtual coaching**

Technology appropriateness

Access to devices and connectivity needed for remote learning varies across Edo state; 46 percent of households possess a radio, 69 percent have a television, and 91 percent have a mobile phone (NPC/ Nigeria and ICF 2019).4 The Edo-BEST@Home program took these constraints into consideration by focusing on delivering content and learning activities through mobile phones (De Simone et al. 2020).[4]

By mid-July 2020, Edo's remote learning program reached 930 out of 1,000 primary schools in the state and over 7,000 virtual classrooms were created to deliver remote education. However, only 29 percent of Edo's primary school population had accessed the program's interactive mobile-based platform. According to government officials, the main reason for the low take-up was that working parents have to use their mobile phones for their jobs and, if they have more than one child, it can be unfeasible to share one device among many children (Munoz-Najar and Oviawe 2020).

Despite this, between October 2020 and February 2021, 122,760 users or 49 percent of total student enrollment accessed the state's mobile interactive quizzes. It remains a challenge to better understand what constrains students from engaging with each of Edo-BEST@Home's resources (interactive audio lessons, digital self-study activity packets, digital storybooks, mobile interactive quizzes, and virtual classrooms) as well as to identify the engagement level and total learning time while students are using these remote learning resources.

Teacher effectiveness and learner engagement

Before COVID-19, more than 11,000 teachers and school leaders had already gone through a pedagogical and digital training program to develop skills to support students to use digital technologies in the classroom. Moreover, an existing coaching program for teachers was strengthened and adapted for remote delivery. Coaches support teachers while they are using Edo-BEST@Home platform and the virtual classrooms. Teachers can answer students' questions through the virtual classrooms, grade students' homework and provide feedback, and communicate with both students and parents through phone calls, text messages, and WhatsApp.

Source: Interviews conducted by the World Bank EdTech team to Edo's State Universal Basic Education Board (SUBEB) government officials, World Bank task team leaders (Martin De Simone, Aisha Garba Mohammed, and Gloria Aitalohi Joseph-Raji), World Bank team members (Andrew Ragatz) as well as from the following secondary sources: De Simone et al. (2020); Munoz-Najar et al. (2020); and Obaseki (2021).

Countries leveraged partnerships in a variety of ways

Governments partnered with the private sector or delivered targeted aid directly to households to facilitate children's access to remote learning. For example, among the 143 countries that participated in the Joint Survey,4 70 percent of countries declared having plans for subsidizing or providing internet access at zero cost in 2021 and beyond (UNESCO, UNICEF, World Bank, and OECD 2021b). However, there is great variability across richer and poorer countries with 68 percent of high-income countries and only 25 percent of low-income countries subsidizing internet access. This strategy consisted of granting free access to national online platforms or providing funds for internet subscriptions, as was done by Chile, Colombia, Thailand, and Saudi Arabia. Governments also entered into agreements for zero-rated data tariffs with service providers. Governments have also partnered with radio and TV broadcasters to reach students in remote areas. Sierra Leone partnered with 12 community radio stations and Peru collaborated with over 1,100 broadcasters to retransmit the Ministry's radio learning program to reach students in remote areas. Other measures included providing subsidized devices, as in Algeria, Bhutan, and Iran; and supporting access to online learning platforms through mobile phones, as in Botswana, Mozambique, and Zambia, and through landlines, as in Azerbaijan, Egypt and Poland. Similarly, in Peru, the government partnered with Khan Academy to allow students to practice math exercises with content that is aligned to the National Curriculum. As a result, total learning time on the platform and monthly active users have increased approximately 50 percent as compared to before the pandemic.[4] **Box 3.3** provides a brief overview of how education systems partnered with the World Bank during COVID-19.

Some countries adjusted curricula in response to the shortened school year

A number of countries adjusted curricula to reflect the reduction in school days. Countries considered the following characteristics for adjusting the curriculum: the national or subnational curricula characteristics; the country's resources and institutional capacities to deploy remote learning; and the point in the academic year when schools were closed (ECLAC and UNESCO 2020). For example, Chile, which was at the beginning of the school year when the pandemic arrived, reorganized their school year by bringing forward the winter break (Schleicher 2020). Other countries prioritized subjects or focused the curriculum on certain disciplines. India decided to reduce curricular content for upper-secondary students for the academic year 2020-2021 to reduce course load (Nagari 2020). Similarly, the Punjab government in Pakistan also opted to reduce the curriculum by 40-50 percent (The News International 2020). In some cases, these curricular adaptations suffered from delayed ministerial guidelines, hindering class preparations.

Most countries supported teachers with remote teaching, although the effectiveness of this support is uncertain

Teacher training and support with remote learning is key. According to the Joint Survey, 73 percent of countries reported providing teachers with special training, 89 percent reported providing instructions on distance instruction, 80 percent reported providing teaching content for remote learning, 78 percent reported providing professional, psychosocial and emotional support, and 59 percent reported providing information communication technology (ICT) tools and connectivity. A 2021 national survey of school principals from public schools from Brazil showed that 83 percent of teachers received assistance to work on digital platforms, such as online support, courses or training, and guidelines and structures for pre-recorded and live classes, among others. Additionally, in over 40 percent of schools, all teachers were trained for remote teaching. In only 2 percent of the schools were no teachers trained (Secretaria de Educação Básica and Ministério du Educação 2021).

Despite this strong focus on teacher support in remote instruction, there is no hard evidence on the effectiveness of these programs.

What evidence does exist suggests limited impacts, particularly as programs faced implementation hurdles and teachers struggled with burnout and anxiety.

Box 3.3 World Bank Support to Education Systems During COVID-19

As of May 2021, the World Bank Group's Education Global Practice had channeled US$1.6 billion to supporting countries in their responses to COVID-19. This includes but is not limited to activities focused on remote learning. This box provides highlights from this portfolio of operations delivering remote learning opportunities during the pandemic.

In Egypt, the World Bank, together with the OECD, Harvard Global Education Innovation Initiative, and Hundred, have been working with the Ministry of Education and Technical Education on expanding a Knowledge Bank Study Portal.[5]

In Nicaragua, the Ministry of Education is implementing the National Strategy for Basic and Secondary Education in response to COVID-19. The World Bank has been supporting this strategy with a US$6.7-million project. Among other activities, the project considers reinforcing remote learning and blended learning in schools through mobile digital classrooms and adaptive learning, as well as assisting in the development of tools and capacity building activities.

In Sierra Leone and Liberia, the World Bank, together with the OECD, Harvard Global Education Innovation Initiative, and Hundred, have been working with both countries in a project called Rising Academy Network on air. The nationwide project adapted their curriculum in response to school closures caused by COVID-19 and created a radio program of 20 weeks, free of charge, that uses using radio scripts and SMS content for parents. The project was implemented swiftly due to pre-existing relationships with the education ministries in both countries.

In Sierra Leone, the World Bank has been working with the Ministry of Education, Science and Technology on the Free Education (FREE) Project, a US$50-million grant approved by the International Development Association (IDA) in June 2020 that aims to mitigate student learning losses during COVID-19 through: "Distance learning to 1.4 million children; sensitization campaigns, gender-responsiveness and back-to-school arrangements; school safety protocols and psychosocial support guidelines to all of the 11,000 primary and secondary schools, as well as training for 22,000 teachers; hygiene and safety products for all 11,000 schools; annual School Census 2020; and a legal and policy framework to support the inclusion of all children in Sierra Leone."

Turkey, in response to pandemic-induced school closures, introduced remote learning in March 2020 through its online digital education system (Eğitim Bilişim Ağı or EBA) and EBA TV. EBA virtual classrooms followed in April 2020. To support these efforts, the World Bank has been working with the Ministry of National Education in the Safe Schooling and Distance Learning Project, approved in June 2020 with funding of US$160 million. The project consists of three components: 1. Emergency connectivity and information technology (IT) infrastructure for education in emergencies, which supports the expansion of the EBA and the development and rollout of a new digital education system; 2. Digital content for safety and quality, which supports the distance education content, aiming at a gradual return to in-person schooling, and to strengthen hybrid teaching and learning (in-person and online); and 3. Institutional capacity for education technology resilience, supporting coordination, management, monitoring and evaluation during the project and after its conclusion (World Bank 2020g). As of October 2020, the EBA platform had reached 18 million students and over one million teachers.

Source: El Zayat (2020); Lamba and Reimers (2020); World Bank (2021a); World Bank (2021b); and World Bank (2020f).

Notes

1. As reported in a survey of education ministries conducted by UNESCO, UNICEF, the World Bank, and OECD, henceforth referred to as the Joint Survey. See UNESCO, UNICEF, the World Bank and OECD (2021b).
2. LAYS is understood as the average years of schooling measured in terms of productivity of the top performer, combining quantity (years) and quality (learning) of schooling into a single indicator. Filmer et al. (2018).
3. TV, radio and mobile penetration obtained from UNICEF Data and Internet penetration obtained from World Bank tcdata360
4. Based on discussions with the Khan Academy team in Peru.
5. Other World Bank educational projects in Egypt can be found in: https://documents1.worldbank.org/curated/ar/346091522415590465/pdf/PAD-03272018.pdf

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4. WHAT ARE WE LEARNING FROM COUNTRY RESPONSES?

RALSTON-SMITH

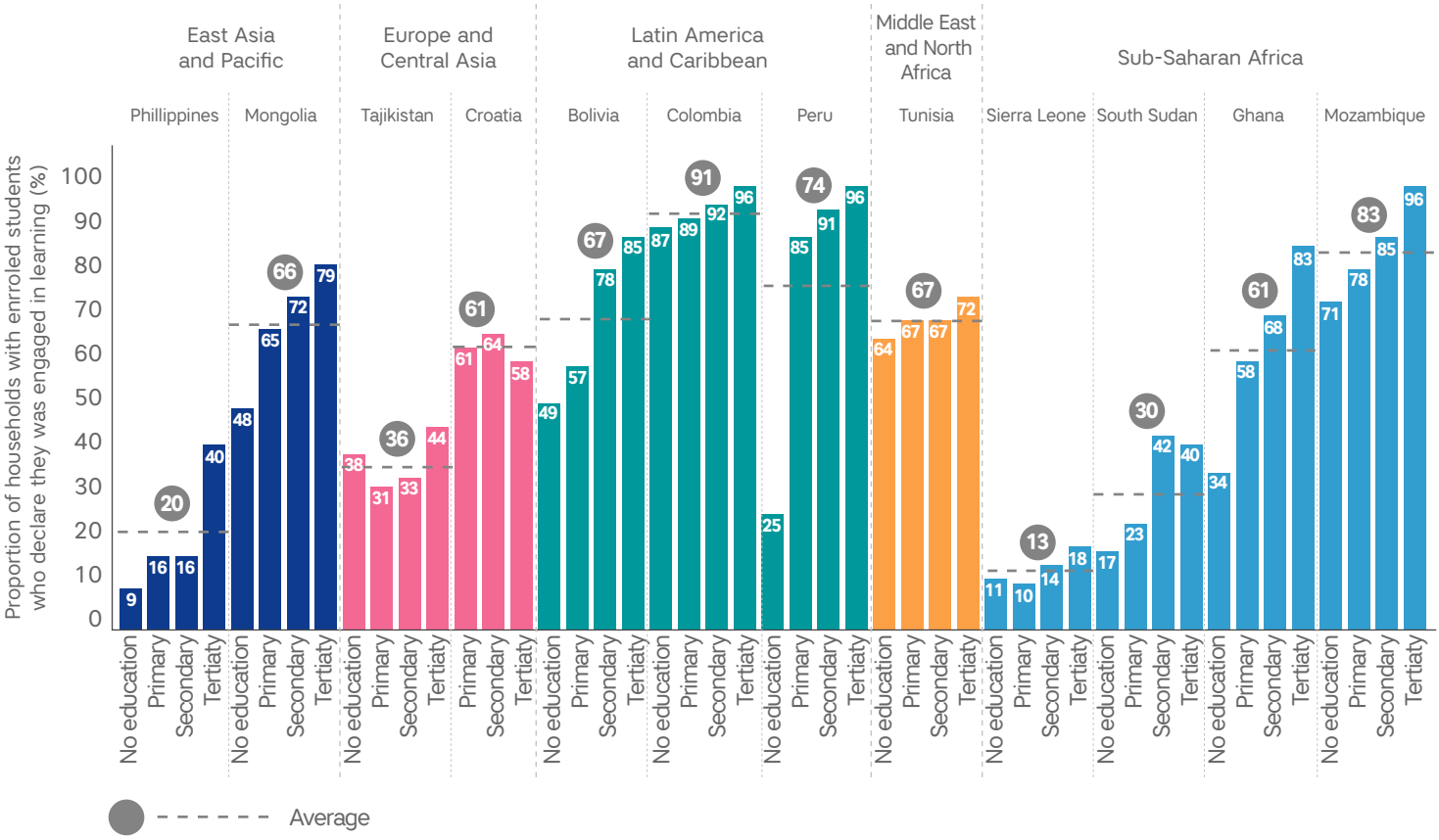
4. WHAT ARE WE LEARNING FROM COUNTRY RESPONSES?

This section presents a summary of ongoing lessons emerging from global experiences of remote learning during COVID-19. Given that the pandemic is ongoing, this list of lessons is necessarily a 'live' one.

Pre-existing socioeconomic inequalities are hampering take-up of remote learning

Take-up of remote learning during school closures is being hindered by pre-existing inequities prevalent in most systems. Data from household surveys collected by the World Bank between April and September 2020 suggest that the level of learning engagement during the pandemic is higher for children of more educated parents. While more than 80 percent of students from households with more educated adults (i.e., tertiary education) have remained engaged in remote learning during school closures, engagement is much lower among households where adults have lower education levels, as seen in countries such as Bolivia, Mexico, Peru, Ghana, and Mozambique. Children's engagement with remote learning is generally low where parents or caregivers lack any type of education and, in several countries, these children were three-to-four times less likely to engage in a learning activity compared to households where parents have tertiary education (Azevedo et al. 2022), as seen in the Philippines and Peru (**Figure 4.1**).

Figure 4.1 Children Engaging in Any Remote Learning Activity Since School Closures, Selected Countries by Highest Adult Educational Level in the Household



Source: World Bank. Calculations based on High-Frequency Phone Survey (World Bank 2020d) as of March 16, 2021.

Note: Survey respondents were at the household level. Household responses refer to the last 7 days before the date of interview. Latin American and the Caribbean responses from Wave 1 were removed to avoid a different reference window. Countries were selected from various regions and a subset of all countries is shown to facilitate presentation. Data from all countries suggests similar patterns.

Remote learning materials produced during COVID-19 are often in the most commonly-spoken national or international languages, leaving out around 40 percent of students worldwide who are unable to access education in the language they speak or understand (UNESCO 2021b).[1] Similarly, students in remote areas, learners with disabilities, and migrant and displaced students need tailored support to recover learning losses. Some countries have supported these groups during the pandemic in the form of improved access to infrastructure, design of learning materials in different minority languages and providing flexible and self-paced platforms (UNESCO, UNICEF, and World Bank 2020). However, these measures only partly mitigate the higher learning losses that these students face compared to students from more advantaged backgrounds.

Not all parents have been able to support their children's remote learning during COVID-19 in equal measure. A study from the Netherlands reports that 75 percent of the parents with a graduate degree felt capable of helping their children in secondary education with schoolwork, compared to 40 percent of the parents with lower levels of education (Bol 2020). Another study in the United Kingdom in 2020 determined that economically better-off parents were spending on average 30 percent more time with their children's home schooling compared to economically disadvantaged parents (Andrew et al 2020). This means that students from disadvantaged backgrounds have less parental support and reinforcement of positive attitudes towards learning, which is affecting their learning experiences while schools are shut down (OECD 2020). Furthermore, better-off parents can provide learning resources (such as learning pods, which consist of families collectively paying for private tutors and other materials) that less well-off parents may not be able to afford.

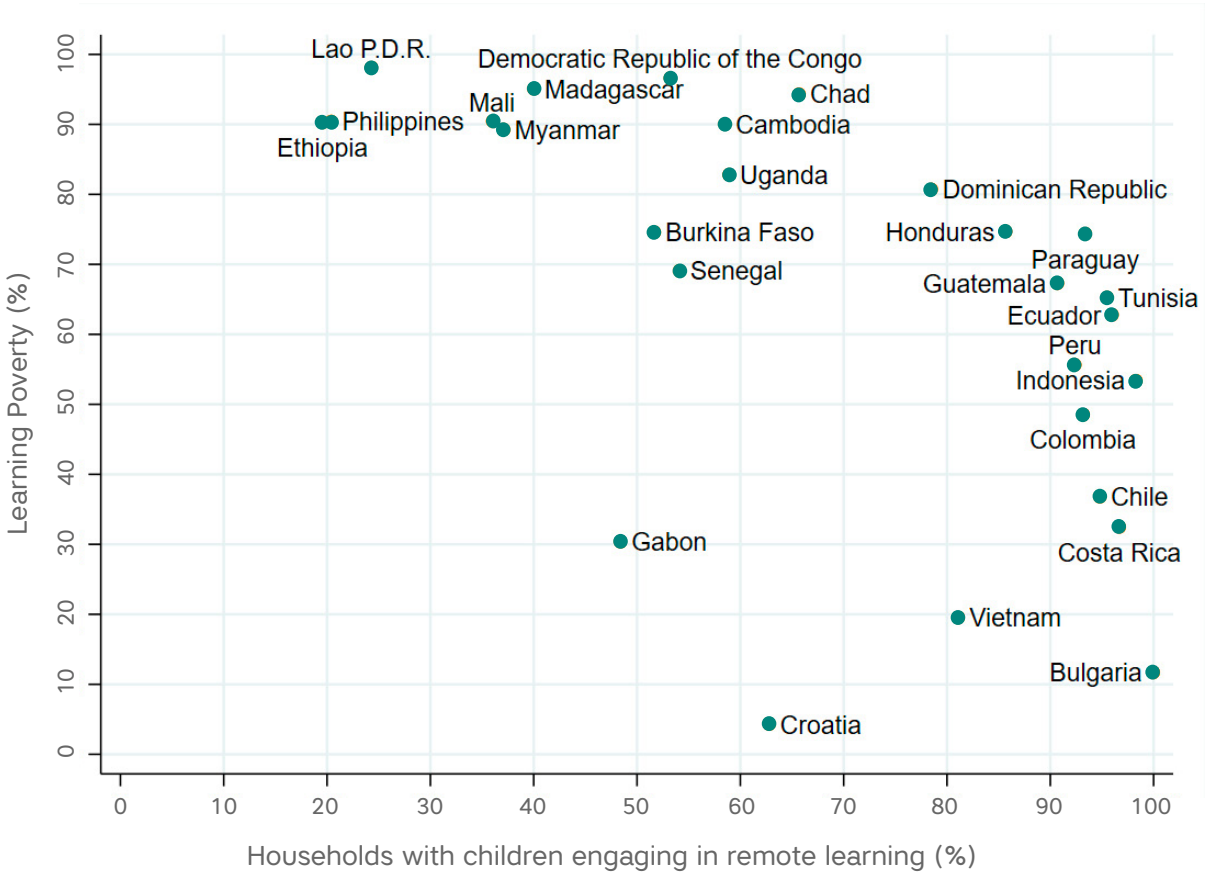
Home schooling is putting a higher burden on women. A study in March 2020 in Catalonia, Spain, revealed that 79 percent of female parents or caregivers reported supporting their children with schoolwork. In contrast, only 43 percent of male adults reported doing so. Support also varied by the age of the student, as parents reported supporting children in primary education more often compared to those in secondary education (Bonal and Gonzales 2020).

Income losses during the pandemic have only exacerbated these inequalities. Ability to afford new devices or to cover extra costs for remote learning connectivity varies by parental background. For instance, parents with incomplete schooling in South Africa need to allocate 10 percent of their monthly expenditure to afford 1 gigabyte of internet data, which is a substantial burden for families already experiencing financial constraints (World Bank 2020a). Therefore, while the most advantaged children may continue to access learning opportunities as school systems transition to remote learning, children whose families cannot afford these additional expenses are likely falling further behind.

Take-up is also influenced by constraints in both supply and demand

Emerging data on take-up during remote learning suggests a great deal of variation among countries. High-frequency phone surveys to monitor the impact of the pandemic on remote learning take-up from April 2020 and June 2021 gathered data on remote learning activities such as completing teachers' assignments, using mobile learning apps, watching or listening to educational TV or radio programs, and tutoring sessions. According to the data as of March 2021, take-up of remote learning greatly varies by country, ranging from as high as 100 percent of children engaging in remote learning since school closures in Bulgaria to 52 percent in Burkina Faso, to as low as 20 percent in Ethiopia and the Philippines (**Figure 4.2**). Some countries , such as Lao P.D.R. and Ethiopia, that faced relatively higher levels of learning poverty prior to the pandemic or relatively lower quality of education expressed in learning-adjusted years of schooling also struggled with low student engagement with remote learning (see **Annex Figure A.3**). This poses an urgent need to engage children already at high risk of experiencing learning losses during school closures.

Figure 4.2 Remote Learning Take-Up was Lower in Countries that Already Had High Rates of Learning Poverty



Source: World Bank. Calculations based on High-Frequency Phone Survey (World Bank 2020d) as of March 16, 2021, and Learning Poverty database from Azevedo et al. (2019) as of August 2021.
Note: Sample size of 27 countries.

Uruguay, like Chile and Costa Rica, has managed to ensure high take-up of its remote learning program. In the specific case of Uruguay, prior experience with educational technologies has played a key role in ensuring high usage of online learning platforms while schools were closed during the COVID-19 pandemic (**Box 4.1**).

These data point to a few patterns on both the supply and demand sides. On the supply side, the chosen remote learning strategy might be unable to reach a majority of students in some settings. In others, the technology used may be unreliable and the resulting irregular access could discourage take-up. In still others the choice of content offered for remote learning may not be aligned with student needs.
On the demand side, parents who cannot afford internet or mobile subscriptions or devices could be left out. Geography also limits the availability of stable internet or phone signals. Similarly, informational constraints can also hamper take-up: parents and children with low awareness of recently created programs for remote learning can be at a disadvantage. Even when households have device access, parental involvement in facilitating remote learning may vary depending on:

- Digital skills required to maneuver the device (e.g., parents with little or no education may be less likely to operate a laptop.)
- Complexity of the digital device (e.g., laptops might require higher parental involvement than a TV or radio).
- Parental work status (e.g., working parents might have less time to be involved in the children's remote learning).

- Age of the children (e.g., younger children might need more frequent or sustained parental support compared to older students).

For example, Malawi has leveraged an existing interactive radio instruction program adapted to the COVID-19 context (Gondwe 2020). Malawi's government worked with national radio broadcasting corporations to ensure remote learning initiatives are accessible to students as well as to provide solar-powered radios for vulnerable children with limited access to electricity (Global Partnership for Education 2020b). Nevertheless, according to phone-based surveys and U-Reports,[2] only 36 percent of respondents claimed that school-age children have been accessing remote learning programs. See **Box 4.1** for a similar disconnect between supply and take-up in Kenya.

Box 4.1 Kenya: A Case Study of Mismatch Between Supply and Take-Up

Context

In Kenya, the government partnered with private providers to increase the availability of an existing multimodal remote learning program that included radio, TV, and online learning programs, rather than developing new programs in response to the pandemic. During the first months of the pandemic, the Kenya Institute for Curriculum Development (KICD) worked to increase the availability of an existing remote learning program. First, a partnership was developed with the main national radio station and 42 community stations to broadcast KICD's radio learning program to reach students in remote areas and broadcast hours were also extended from four hours to eight hours per day. Second, all TV signal providers agreed to carry the government's television "EDU TV" content for free so that families that have a TV do not have to pay to see the channel. Furthermore, programming was extended to run from Monday to Saturday from 6:40 AM to 7:00 PM, depending on the grade. Third, the digital site was enhanced to be device-neutral, "web-light", and with enough capacity to support a large number of users at the same time.

Technology appropriateness

As access to devices and connectivity needed for remote learning varies across the country: about 90 percent of households have access to a mobile phone, 71 percent possess a TV, 37 percent a radio, and only 17 percent have connection to the Internet at home. Kenya's multimodal remote learning strategy seemed to have implemented the appropriate technologies to scale up remote learning solutions to reach a maximum number of students while schools were closed. However, a survey conducted by the Kenya National Bureau of Statistics found that about 25 percent of households were not using any method to learn at home and an Uwezo report showed that only 22 percent of school-going children in Kenya were accessing digital resources for remote learning. Among these children, 42 percent accessed learning through a TV program, 27 percent through WhatsApp, 19 percent through a radio program, and 10 percent downloaded materials from the Kenya Education Cloud (Uwezo 2020). From the technology appropriateness aspect, take-up was low because the ways in which technologies were implemented were not suited for the context. While most Kenyans have mobile phones, only half can access the Internet that way and computers are available in just one-fifth of households. Thus, solutions offered through the Kenya Education Cloud only worked for a select group of students. Furthermore, only 44 percent of Kenyans said they receive reliable electricity from the national grid, making it challenging to access remote learning solutions through electronic means.

Source: Interviews conducted by the World Bank EdTech team with Kenyan government officials as well as from Uwezo (2020).

Evidence on the effectiveness of remote learning during COVID-19 is mixed

While limited, emerging research on the effectiveness of remote learning during the pandemic is mixed at best (See **Annex Table A.1**). Given the myriad ways in which the pandemic has wreaked havoc on school systems, students and parents, this should come as no surprise.

Evidence from a study of Dutch students' learning outcomes before and after COVID-19 school closures suggests learning losses equivalent to one-fifth of the school year (3 percentile points) after a relatively short period of school closure (8 weeks), particularly for children in primary school. Researchers also find that losses were up to 60 percent larger among students with less-educated parents. This evidence suggests that even children studying in a technologically-advanced remote learning setup made little or no progress on learning outcomes (Engzell et al. 2020). Another study in Belgium, focused on the Flemish region, found that mathematics and language scores decreased by 0.19 and 0.29 standard deviations respectively for students in grade 6 compared to previous cohorts. Moreover, the researchers found that inequality both within and between schools increased between 7 percent and 20 percent for both subjects, varying by students' socioeconomic status. This suggests that schools with a higher proportion of students from households with higher socioeconomic status may suffer lower learning losses from school closures (Maldonado and De Witte 2020).

Similarly, a study conducted in Germany, largely focusing on Baden-Württemberg, found that children in primary education suffered from learning losses in 2020 scores compared to previous years, of around 0.07 standard deviation for reading and 0.09 for maths. Learning losses were more important for lower-achieving students (Shult et al. 2020). A natural experiment in Switzerland comparing learning progress 8 weeks before and during school closures concludes that secondary school students were able to sustain learning progress in a remote learning environment, while learning gains for primary school children slowed and became more varied depending on the remote learning setup. Children attending in-person instruction learned twice as fast compared to remote instruction, with differences being driven by factors such as household's socioeconomic background, and pupils' and teachers' digital divide (Tomasik et al. 2020).

In the US, there is mounting empirical evidence on the negative impacts of schooling disruptions on learning outcomes. For early learners, the absence of unstructured social activities that typically occur in a preschool setting and the fact that remote learning does not adequately replace preschool activities suggests that learning losses could be double what is expected during a typical summer break (Barnett and Jung 2020). T his is in part due to the disruption of in-person schooling as well as a lack of parental activities to replace preschool learning. For older students, disparities in the underlying schooling conditions are reflected in emerging assessment data. A recent study finds that students learned "only 67 percent of the math and 87 percent of the reading that grade-level peers would have typically learned by the fall." This suggests that children have lost about 3 months of learning in mathematics and 1.5 months in reading. These averages mask disparities by race: in schools that predominantly serve non-white students' scores were 59 percent of the historical average in math and 77 percent in reading (Dorn et al. 2020).

Data from Sao Paulo, Brazil obtained at the beginning of 2021 confirms previous trends found in learning outcomes. Assessments of more than 20,000 students in grades 5, 9, and 12 in language and mathematics show a 10-year setback in learning outcomes in language when comparing different cohorts of students in grade 5. For mathematics students in the same grade, learning outcomes were comparable to the cohort of fifth graders 14 years ago. The study concludes that COVID-19 caused children in fifth grade to have an equivalent pre-pandemic learning level of a child in third grade. In the case of Chile, almost 1.9 million students from grades 2 to 12 were assessed, equivalent to 81 percent of the total enrollment. Results show that after a full academic year under COVID-19, both girls and boys between grades 6 and 12 failed to reach 60 percent of the minimum expected knowledge in language. This is a particularly alarming result considering that the assessment was based on a prioritized subset of the general curriculum. Here too, the lowest learning outcomes were found in mathematics. Students in grade 10 only reached 27 percent of

the minimum expected knowledge. Learning gaps were found between vulnerable and better off students, particularly among those above grade 6.

However, not all places experienced learning losses with remote learning during the pandemic. Recent data from Australia and Uruguay suggests that despite long periods of remote learning, on average, student test scores stayed the same. In Australia, recent student test scores were on par with results from 2019 (Karp 2021). Similarly, in Uruguay, a national evaluation for third and sixth grades did not find relevant differences in students' achievement between 2017 and 2020. Moreover, results show promising evidence that, when controlling for socioeconomic context, student performance improves as the usage of digital platforms that allow for teacher-student interaction increases (INEEd 2021).

What was a digital divide for some groups is now a digital chasm for many

Digital divides are more visible than before. COVID-19 has highlighted the growing gap between the underprivileged and privileged members of society in terms of access to infrastructure (electricity, reliable connectivity or devices), resources (access to learning materials, textbooks, platforms, education software, among others), and capacities (technical skills to learn how to use different technologies, media literacy, higher-order skills, among others). Data from Maths-Whizz, a virtual tutoring platform, suggests that increases in the number of users between April and May 2020 compared to before COVID-19 are higher in countries with high levels of internet or mobile phone access, such as New Zealand or the United Kingdom. On the contrary, when partner schools in rural Kenya closed due to COVID-19, student use of the platform fell to almost zero (Whizz Education 2020). This is likely due to the fact that only 51 percent of Kenyans have internet access at home.[3] School ICT labs are an important source of internet access for many rural Kenyan students and school closures hinder digital remote-learning approaches. Similarly, Nepal introduced an online portal for grades 1-10 and a YouTube channel to deploy remote learning. However, household internet access in the country, as of 2017, was just 18 percent (ITU 2021). Furthermore, the adult literacy rate was nearly 70 percent as of 2018, which can limit parental ability to utilize digital tools and therefore their ability to help children with schoolwork (McClain-Nhlapo et al 2020).

Teachers will need tailored and ongoing support if remote learning is going to work

The variety of remote learning modalities possible require different skills and proficiencies from teachers. The complexity of remote learning varies by the amount of learning resources used. For example, TV lessons with follow-up calls from teachers will be more complex than delivering remote learning through TV lessons alone, as the former would involve teachers to record the lesson and make follow-up calls. It is possible that more advanced technological systems (e.g., remote, collective, synchronous systems such as videoconference or real-time collaboration online) may require more advanced skills from the teacher, such as digital literacy to use remote modalities, adapting teaching content and preparing lessons suitable to online delivery, keeping a remote classroom engaged, and assessing progress and communicating feedback remotely, among others. This is not only because of the requisite technical skills needed to use these tools (a key condition), but also because of the variety of actions teachers may need to take remotely to maximize learning; for example, managing time usage, facilitating interactions, adjusting content depending on progress, mediating relationships, managing student attention, providing support and personalized attention, to name but a few (Wilichowski and Cobo 2020). In the case of South Korea, the country swiftly increased the digitalization of education during the COVID-19 pandemic. However many teachers had not experienced online teaching before and, facing the lack of skills to prepare online classes, had difficulties in supporting children in the remote environment and providing interactive tasks. As support, the government put in place remote learning training videos for teachers, a network of experienced teachers to support and guide other teachers in remote learning, and helplines to address any technical issues in online classes (UNICEF ROSA et al. 2021).

The risk of burnout despite support is real. In Brazil, more than 60 percent of school principals across the country felt insufficient training of teachers

was a key hurdle for implementing and developing remote learning (Secretaria de Educação Básica and Ministério du Educação 2021). One study, conducted by Instituto Peninsula found that 67 percent of teachers were anxious about remote teaching, 38 percent felt tired, while less than 10 percent were happy or satisfied (Instituto Peninsula 2020). In England, headteachers' job satisfaction has fallen because they are worried about school budgets, keeping staff and students safe from COVID-19, and finding cover for teachers off sick or self-isolating. In Chile, the quality of life perception among female teachers has been affected due to the COVID-19 confinement and several studies have reported that female teachers in the region do more hours of housework than male teachers. In Peru, as of November 2020, 65 percent of teachers were stressed and anxious due to remote learning work and administrative reporting.

Communication with parents and students is key for remote learning interventions to operate at scale

Parents are important allies in ensuring take-up and effectiveness of remote learning. During COVID-19, the government of Pakistan set up a comprehensive remote learning program that involves content broadcast on TV (through a program called TeleSchool) along with SMS messaging to deliver schedules, updates, and quizzes. Yet, in Punjab, the most populous province of the country, only 30 percent of households were aware of remote learning opportunities and only 10 percent used these programs while schools were closed (Geven et al. 2020). At a national level, Brazil deployed remote learning through TV programs and pre-recorded and live classes, among other strategies. However, only 12 percent of 58,000 school principals reported that all students in their schools were engaging in remote learning (Secretaria de Educação Básica and Ministério du Educação 2021). In Bangladesh, from a sample of students who were eligible to receive poverty-targeted stipends, 86 percent were aware of "Sangsad", a TV learning program implemented by the Ministry of Education, but only 43 percent had watched it in the past week (Biswas et al. 2020). In Sierra Leone, recorded lessons were aired daily at a fixed time, leaving out students who had household or labor responsibilities.

Nepal showed positive evidence of increasing foundational numeracy via phone calls and SMS messages during COVID-19 as revealed by a randomized trial including 3,700 households with children in public school, grades 3-5. The study highlights that mobile phone-based tutoring (by reaching caregivers and students) led to a 30 percent increase in foundational numeracy. This study suggests that instructional support through mobile phones can be a high-access and low-cost approach to providing instruction at scale (Radhakrishnan et al. 2020). In addition, the language of instruction used for remote learning has not always been inclusive; only one in three of the 101 countries that reported the languages of instruction of their remote learning curriculum have remote learning available in multiple languages (Center for Global Development 2020). See **Box 4.2** for the Uruguayan experience.

Box 4.2 Uruguay: The Ceibal en Casa Program

Context

Uruguay's government created Plan Ceibal in 2007 with the aim of supporting education with technology (Plan Ceibal 2021a). Since its implementation, every child who enters the public education system is given a computer for personal use with a free internet connection at school. Thus, over 80 percent of households in rural areas have a computer (Rieble-Aubourg et al. 2020)7 and the program has been successful in increasing digital inclusion in Uruguay, reducing the digital divide and implementing a comprehensive remote learning program while schools were closed during the COVID-19 pandemic (Caballero 2018). Equally important, Ceibal's Mathematics Adaptive Platform has improved student test scores by 0.2 standard deviations prior to the pandemic.

The Ceibal en Casa (Ceibal at home) program launched immediately after school closures were announced because it could draw on the pre-existing systematic deployment of Plan Ceibal's digital resources (Ripani 2020). Even though Uruguay is the one of the few countries in the region where education technology is highly developed, the government continued to strengthen its technological infrastructure and remote services during the pandemic: telecommunication operators agreed to zero-rate access to the main education technology (EdTech) platforms, server capacity increased by 400 percent, computers were provided to students who lacked access to devices required for remote learning, and a help desk was established to address student and teacher concerns.

Technology appropriateness

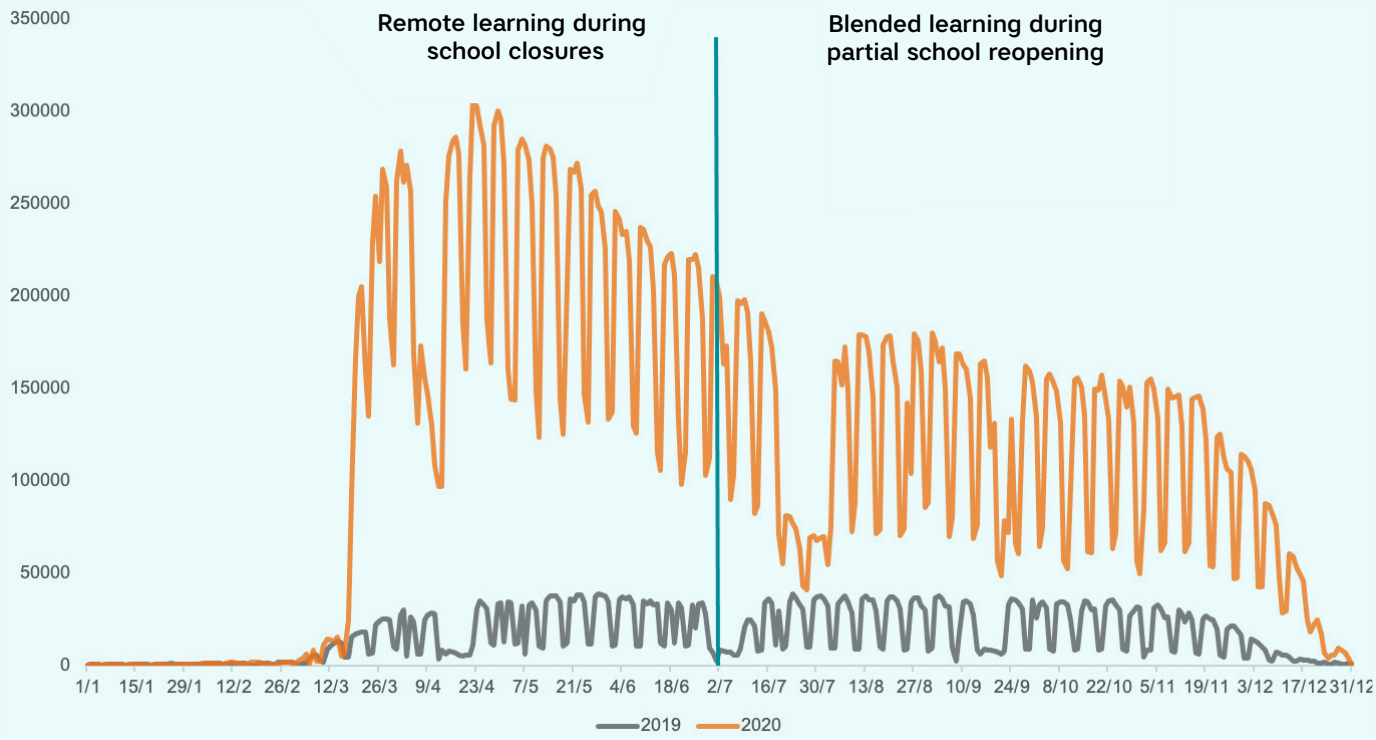
Uruguay's vast experience with EdTech platforms, the government's investment in technological infrastructure in the last decade, and the selection of appropriate technologies and content to deliver remote learning while schools were closed during the pandemic allowed for high take-up. Student usage of Ceibal's online platforms during COVID-19 increased 2,454 percent in March 2020 in comparison to March 2019. Average daily access to Ceibal's online platform (CREA) was 206,000 users when schools were fully closed and remote learning was in place (March 15, 2020 – June 30, 2020). As schools partially reopened, average daily access to this online platform was 108,000 users (**Figure 4.3**, *on next page*). Use of the CREA platform has decreased as schools reopened given that teachers, students, and caregivers were "very exhausted" from remote learning and were in need of human interaction. That said, teachers believe that even when schools fully reopen, they will continue to use the CREA platform and other Ceibal's EdTech resources. Students have also been engaging withonline formative assessments implemented by SEA (Sistema de Evaluación de Aprendizajes in Spanish). While schools were closed, 96 percent of primary school students voluntarily underwent formative online assessments through an evaluation platform that was implemented prior to the pandemic (Ripani 2020).

Teacher effectiveness and learner engagement

Uruguay's Institute for In-service Teacher Training adapted a pre-COVID-19 coaching program that provides pedagogical support to teachers to an online format to continue supporting teachers (ANEP 2020). Uruguayan teachers have been able to access teaching resources such as discussion forums, virtual training, and guidelines for remote teaching through the CREA learning management system that teachers have been using for several years. Over 90 percent of Uruguayan teachers were satisfied or very satisfied with the remote training received during the pandemic. Thus, prior training and coaching have worked to pivot towards remote teaching-learning during COVID-19. Teachers were also expected to provide administrative information, but instead of requesting new information from them, the government decided to turn to GURI, a digital platform that has been used by Uruguayan teachers for over 10 years to report data such as student attendance and grades (Plan Ceibal 2021b). Moreover, the platform already contained parents' contact information, allowing teachers to easily

reach out to them during school closures. Teachers have played a critical role in ensuring Ceibal's online learning platforms are used effectively. Researchers have observed that students benefit more when the national Mathematics Adaptive Platform is used at a group level in the classroom, suggesting the critical role that both teachers and peers play when using digital platforms for learning (Perera 2018).

Figure 4.3 Use of CREA Virtual Classrooms (2020 vs 2019)



Source: Interviews conducted by the World Bank EdTech team to Uruguay's government officials as well as from the following secondary sources: Ripani (2020); ANEP (2020); Instituto de Formación en Servicio; and Plan Ceibal (2020a; 2020b).

Notes

1. Challenges are most prevalent in regions where linguistic diversity is notable, such as Sub-Saharan Africa, and Asia and the Pacific.

2. U-Report is a social messaging tool and data collection system developed by UNICEF. The program sends SMS polls and alerts to its participants, collecting real-time responses, and subsequently publishes gathered data. Malawi information referenced here retrieved from https://ureport.mw/opinion/4395/

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5. FIVE PRINCIPLES FOR REIMAGINING LEARNING

SHARON MCCUTCHEON

5. FIVE PRINCIPLES FOR REIMAGINING LEARNING

Despite the challenges noted in this report, in the course of more than 18 months a variety of experiences have been documented, capacities created, and new forms of education delivery adopted at a scale. This presents a number of possibilities for reimagining how education can be offered and enriched in the years to come. This is especially pertinent as governments around the world continue to implement school closures and are offering multiple remote learning strategies. In some countries, schools remain fully or partially closed. In others, schools are open in some regions, for some grades, some of the time. Remote learning remains a key means of ensuring continuity of learning as school systems return to increased in-person learning.

The lessons of this pandemic provide countries with an opportunity to refocus attention on an urgent and as-yet incompletely answered policy conundrum: What needs to be done to make remote learning work for all? This section offers five principles for hybrid learning strategies that policymakers might use to reimagine learning going forward. These principles are aligned with the conceptual framework of this report, which calls for an alignment between effective teachers, suitable technology, and engaged learners to harness the untapped potential of remote learning. Given the ongoing nature of the pandemic, these principles are intended as foundations on which to build reimagined learning.

Table 5.1 offers a forward-looking assessment of four hybrid learning strategies—combining in-person and remote learning—that can be implemented during the process of school reopening to increase resilience. These build on the conceptual framework in **Figure 2.1** and the variety of remote learning strategies highlighted in **Figure 3.3**. **Table 5.1** illustrates a range of combinations of in-person and remote learning and sketches the advantages and limitations of each. As this report underscores the effectiveness of hybrid learning does not stem from the mere availability of technology; rather it is critically dependent on the quality of teacher-student interaction, how prepared teachers are to teach in these contexts, regular monitoring, and support from parents.

Table 5.1 Hybrid Learning Strategies for Today and Tomorrow

Strategy	Description	Advantages	Limitations
In-person learning + Paper, radio and/ or TV lessons	In-person learning in classrooms following safety protocols combined with one-way interactions such as paper take-home packages, radio learning sessions and/or television education programs that students can use as a complement to what they learned in class.	• Low barrier of adoption as students are already familiar with paper, radio, and/or TV. • Low media literacy or digital skills required. • High accessibility through paper-based material or partnerships with national and local community radios as well as with TV broadcasters.	• Both teacher-student and peer interaction are limited to in-person learning. • Requires ministries of education to have partners with adequate infrastructure and expertise to deliver remote learning – especially in the realm of radio and/or TV media outlets. • Remote learning is limited to an asynchronous modality when students use radio and/or TV.
In-person learning + Paper, radio and/ or TV lessons with mobile follow-up	In-person learning in classrooms following safety protocols combined with one-way interactions such as take-home packages, radio, and/ or television education programs. Additionally, to ensure two-way interactions, teachers follow-up either through phone calls, SMS, or WhatsApp messages.	• Low barrier of adoption. • Low media literacy required. • Basic digital skills required for interaction with teachers through mobiles. • High accessibility though partnerships with national and local broadcasters. • Meaningful two-way teacher-student interactions.	• Peer interaction is only limited to in-class sessions. • Requires ministries of education to have partners with adequate infrastructure and expertise to deliver remote learning, especially in the realm of radio and/or TV media outlets. • Remote learning is limited to an asynchronous modality when students use radio and/or TV. • Limited channels and options for remote teacher-student interaction.
In-person learning + Pre-recorded online lessons with mobile follow-up	In-person learning in classrooms following safety protocols combined with one-way interactions such as pre-recorded lessons that can either be accessed by using YouTube or a government website. Also, teachers provide feedback to students to ensure meaningful two-way interactions either through an online platform or via mobile messaging.	• Basic digital skills required to use online platforms to watch pre-recorded lessons and interact with teachers. • Online asynchronous approach allows students to access learning sessions at any moment (flexible use of time). • Meaningful two-way teacher-student interactions.	• Peer interaction is only limited to in-class sessions. • In low-income settings, families might not have access to devices required for digital learning. • Remote learning is limited mostly to asynchronous modality when students use radio and/or TV. • Teachers need a set of digital and pedagogical skills to teach effectively in remote learning settings.
In-person learning + Adaptive software and/or live online support sessions	In-person learning in classrooms following safety protocols combined with two-way digital learning solutions such as interactive and/ or adaptive software for students to practice what was learnt during class and strengthen specific skills. Live online sessions can be used as a complement to provide teacher-student feedback and reinforce meaningful two-way interactions.	• Meaningful two-way interactions are ensured both in-class and remotely with teachers and peers. • Learning is mostly synchronous and allows for immediate feedback. • Adaptive software ensures personalized learning for a heterogeneous group of students and supports them to focus on areas of weakness with efficient remediation.	• Available only for contexts with high access to digital devices and Internet connectivity. • Costly to set-up and incorporate adaptive software for student learning. • Relatively advanced digital skills required from both students and teachers. • Teachers need a set of digital and pedagogical skills to teach effectively in remote learning settings.

Adopt Suitable Technology

1. Ensure remote learning technology is fit-for-purpose

Remote learning during COVID-19 has underscored the fact that it is no longer sufficient to simply consider how many teachers and students have access to the Internet. Today's policymakers must aim for enabling "meaningful connectivity", which means that students, teachers, and parents can use the Internet every day via an appropriate device with enough data and connection speed to enable learning. To reduce the risk of a "remote learning paradox", countries need to determine what is the minimum data consumption needed to enable remote learning, with a special focus on getting more women and girls online.1 As countries do so and strive to strike a balance between in-person and remote-learning, some guiding questions policymakers must consider include:

a. What critical factors must be accounted for when deciding which technology is appropriate to deliver remote learning? These include but are not limited to access and availability of the technology, the appropriate contents, teachers' technical competence, and pedagogical relevance. For example, Estonia has set up a hotline that teachers can access to receive targeted support. In both Cambodia and India, rural teachers have been provided with video lessons that provide a model for them to follow (World Bank 2021c).

b. What strategies can be adopted to evaluate quickly and efficiently whether an educational technology will be useful for the majority of students? An emerging body of evidence summarizes the state of cost-effective investments in education. This can provide a useful start, especially in settings where context-specific data are scarce (World Bank, FCDO, and Building Evidence in Education 2020).

c. How can digital technologies be used not only for passive content consumption but also to help students learn to think critically? In addressing this question, it is imperative that decisionmakers consider the readiness of the teacher and the support available to them. For example, given the limited remote learning time, countries may choose to focus on core subjects, such as literacy and numeracy and, within the core subjects, focus on fundamentals that are prerequisites to developing strong critical thinking skills (World Bank 2021c). Now, more than ever, ensuring that all students learn must be prioritized over the need to complete all material in the curriculum.

As **Sierra Leone** has a low penetration of internet and TV, policymakers prioritized **technology that was fit-for-purpose** by delivering remote learning through printed material and a radio learning program. The Ministry of Education partnered with 12 community radio stations that retransmit the radio learning program to reach students in remote communities. As this radio program was already in place during the Ebola crisis, existing content was curated and launched on April 6, 2020, less than one week after schools were closed. New learning sessions were created with support from teachers of top public and private schools, who were selected based on assessment results. To allow for two-way interaction, a 'live' phone line is open to allow children to call in with their questions and all calls to the radio learning program are toll-free.

→ From principle to action

In order to ensure that learning technology is fit-for-purpose, better data about EdTech is needed. The World Bank has developed an EdTech Readiness Index (ETRI) to inform related policies. The ETRI goes beyond measuring the availability of devices and the level of connectivity to capture key elements of the larger education-technology ecosystem in a country, guiding efforts to increase learning opportunities and reduce inequalities.

Prioritize Effective Teachers

2. Use technology to enhance teacher effectiveness

Regardless of the learning modality and available technology, teachers will play a critical role. Teachers can motivate students to find positive value in the learning process, provide incentives to perform, give targeted feedback in the areas where students experience difficulties, and provide socio-emotional support. This is especially true during the pandemic, as many students have been exposed to an array of challenging situations. The pandemic has reinforced the need to better support teachers. Although this challenge is certainly not new, the importance of teachers in high- and low-tech environments is more evident than ever (and parents and families globally are coming to realize this truth). The skills needed to effectively teach remotely are not yet taught to all teachers, everywhere. Doing so requires structural changes to pre- and in-service teacher professional development and would include pedagogical skills for remote teaching alongside in-class pedagogical skills. It would also build digital skills to allow teachers to be native users of the remote learning technologies available to them. At the same time, it is critical to implement technologies for teaching, for professional development, and for tutoring and coaching as regular practices during and after the pandemic. Teachers could be supported through structured teacher guides and additional guidance to facilitate effective remote learning (World Bank 2021c). As has been done in Uzbekistan, teachers could be provided with free SIM cards to ensure that they can access educational material online and through media such as WhatsApp (World Bank 2021c). This crisis should be taken as an opportunity to reimagine with teachers their role in education for the years to come.

Uruguay, for example, leveraged digital **technologies to enhance the effectiveness of teachers**. The Institute for in-Service Teacher Training has taken online a coaching program that was providing pedagogical support to teachers prior to COVID-19. The government has also enhanced a comprehensive toolkit of teaching resources such as discussion forums, virtual training, and guidelines for remote teaching that teachers can access for free through its CREA learning management system.

→ From principle to action

"Technology for Teaching" is the World Bank's program to enhance and scale-up teacher professional development (TPD) opportunities using tech-based solutions. This initiative aims to support governments' COVID-19 recovery and resilience efforts by: i) Utilizing existing research and anecdotes for development of a tool to help policymakers and practitioners assess and compare contextual and technical factors for successful implementation of TPD programs using technology; ii) Identifying scalable and replicable TPD interventions that utilize low and high-tech solutions to train teachers and pedagogical leaders; iii) Developing global public goods including technical and operational guidance notes with lessons learned on how to design, implement, and evaluate TPD approaches using tech-based solutions; and iv) Providing technical assistance to country teams involving hands-on support to countries implementing TPD.

Prioritize Effective Teachers

3. Establish meaningful two-way interactions

For remote learning to be successful it needs to allow for meaningful two-way interaction between students and their teachers (Barron et al 2021). Such interactions can be created by using the most appropriate technology for the local context. Indeed, in many settings this does not necessarily mean that governments need to seek out the most advanced technology. Especially where connectivity is limited, the combination of low-tech modalities with devices that allow students to interact with each other and their teachers will likely be a more effective way of ensuring that remote learning is able to deliver on its promise. This is especially critical in remote and rural environments where two-way teaching and learning interaction is a privilege that not all can afford. Where feasible, technologies that allow students to interact with teachers via internet-enabled devices, if appropriate, should indeed be used.

In Brazil, state education secretaries have combined low-tech and high-tech modalities to establish meaningful two-way interactions; for example, a mobile application has been developed to encourage teacher-student interaction for a limited amount of time after each TV learning session; telecommunication operators zero-rate this mobile application so that students and teachers access from any device, without paying for the bandwidth. This application is combined with printed take-home material.

→ From principle to action

The World Bank's Education Global Practice has: created short notes to curate evidence and examples and provide links to materials that countries have used to support various stakeholders (students, teachers, parents, school management) during both remote and in-person instruction; developed Excel-based costing tools to identify the resources required for delivering remote instruction, including social-emotional learning, and for implementing the activities implied by the joint framework; testing different approaches that employ digital technologies to support learning at home or to assist educators in the classroom.

4. Engage parents and students as partners in the teaching and learning process

High levels of isolation, disconnection, and frustration at the start of the pandemic meant that teachers needed to not only deliver their lessons and provide cognitive support to their students, but they were also the main form of social contact for many students. These "side effects" of remote or hybrid learning will need to be addressed by the education community. For example, some countries, such as Chile, have moved to emphasize socio-emotional competencies in their curriculum to facilitate socio-emotional learning and well-being of students (World Bank 2021c). Students also need help with overcoming the learning loss they are experiencing. An individualized, paper-and-pencil self-learning program in Bangladesh was found to significantly improve students' mathematical abilities. The program was designed to ensure that each student works at the level that is appropriate for their individual skills, advancing and learning new concepts in small steps through easily understandable hints and examples. In terms of technology, examples from India and Uruguay show that that computer-assisted instruction can increase learning, with suggestive evidence of positive impacts that were larger for students from disadvantaged backgrounds (World Bank, FCDO, and Building Evidence in Education 2020).

However, teachers and students are not in this alone. Parents are willing and eager allies that can be enlisted to help support students as they continue to engage with the teaching and learning process. As countries prepare for transitioning to a more consistently remote learning model, it is necessary to prioritize design strategies that can secure the social and emotional well-being of students and teachers. A host of resources exist to support this. Sesame Workshop, through Sesame Street, has created materials ("Caring for Each Other") for parents of young children to engage their children in play-based learning activities and discuss emotions. Materials are currently available in Arabic, Bangla, English, Hindi, and Spanish. Parenting for Lifelong Health has also created open source tip sheets for parents in more than 100 languages. These resources cover a range of topics including structuring a child's day, stress management, and family budgeting.

In Peru, a remote learning program is constantly communicated to ensure parents have the information needed during the distance learning period. For example, guidelines for remote learning and weekly schedules for a specific week of 2021 can be found in the national remote learning platform. Moreover, the Ministry of Education has been regularly supervising the adoption, perceived effectiveness, and satisfaction of Peru's remote learning program through phone calls with parents once a month. According to the Ministry's Monitoring and Evaluation (M&E) Unit survey, 85 percent of parents had received support from teachers at least once in the past week, showing the Peru has made efforts to engage parents as partners in the teaching and learning process through constant teacher-parent communication.

→ From principle to action

The World Bank's Read@Home has developed global public goods to help countries select storybooks, engage parents to read with children at home, and use innovative approaches to deliver and procure books. The Read@Home initiative aims to deliver reading and learning materials to hard-to-reach homes, as quickly and efficiently as possible, along with support for parents and other caregivers to engage with children's learning. Read@Home is working to support countries with: (i) just-in-time technical assistance to complement country-efforts and operations to source and select quality reading and learning materials for children and accompanying materials for parents/caregivers to support children's learning; (ii) just-in-time and longer-term technical assistance to complement country-efforts and operations to improve efficiency and reduce costs to procure and distribute learning materials; and (iii) funding to close gaps at a country level and incentivize resource allocations (on a matching basis).

5. Rally all actors to cooperate for learning

This pandemic has made it clear that governments in general and ministries of education in particular cannot operate in isolation. Given the interdisciplinary nature of the digital education endeavors it is critical that ministries instead of leading each one of the critical services needed (e.g., financing, deploying connectivity, acquisition of devices and learning materials, training teachers, monitoring, etc.), they work in close coordination with other entities (public, private, academic) to effectively orchestrate different players and to secure the quality of the overall learning experience. In some countries, the preferred institutional model for managing educational policy is defined as high levels of centralization, while in others the preference is for a more decentralized approach. Ministries of education need to become "learning organizations", in order to distill what has worked (and from what hasn't) during the pandemic. This requires not only higher levels of adaptability but more effective monitoring and real-time assessment. In order to become "learning organizations", ministries of education will need to build a variety of capacities including but not limited to drawing on the consolidated strengths of their remote- and blended-learning technical teams, increasing the quality and relevance of their EdTech policies, and implementing a robust impact evaluation strategy. This will require convening key players (product and service providers) and supporting an inclusive ecosystem of stakeholders to both mobilize financial and human resources and to solve logistical problems. The challenges facing education systems during this global disruption can be considered an opportunity to better collaborate and liaise with local and international partners.

→ From principle to action

The World Bank's Education Global Practice supports countries in the deployment of the Global Education Policy Dashboard. This tool helps to identify priorities for investment and policy reforms that are suited to each country by highlighting gaps between what the evidence suggests is effective in promoting learning and what is happening in practice, and allowing governments to track progress as they take action to close those gaps.

Despite the challenges that this report notes, in the course of just 18 months, a variety of experiences have been documented, capacities created, and new forms of education delivery adopted at a scale. This presents a number of possibilities for reimagining how education can be offered and enriched in the years to come. Remote learning remains a key means of ensuring continuity of learning as school systems return to increased in-person learning while at the same time prepare for unplanned closures as the pandemic lingers. When its three complementary components–teachers, students and technology–are well-aligned, remote learning has the potential to address the inequality in learning that has held back global progress on learning poverty for far too long.

Note

1. See more information see the World Bank brief on minimum data consumption, Alliance for Affordable Internet, and Worldwide Web Foundation.

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ANNEX

Figure A.1 Time-series of School Closure Status from February 2020 to October 2021, by Region

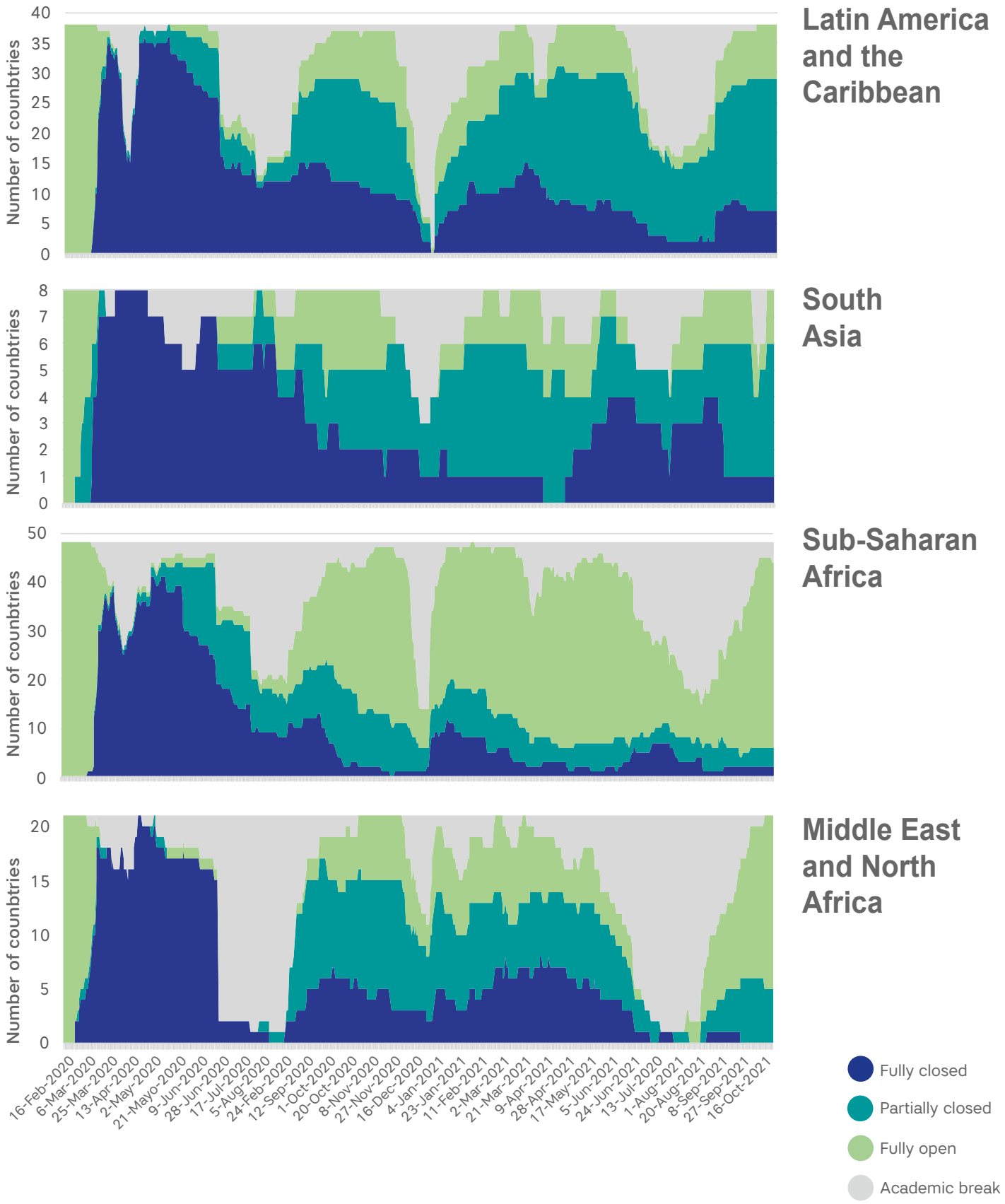
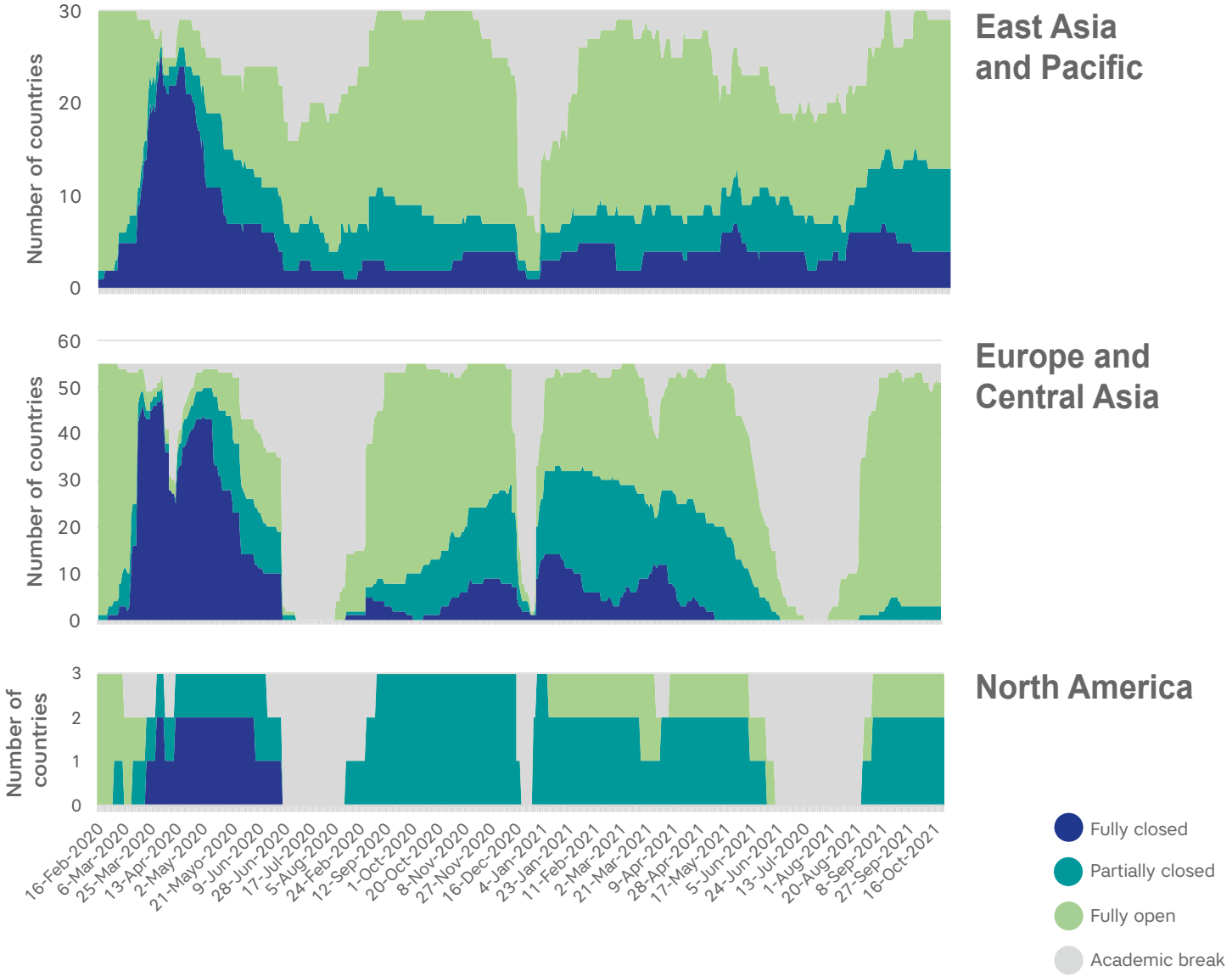


Figure A.1 *(Continued)* Time-series of School Closure Status from February 2020 to October 2021, by Region



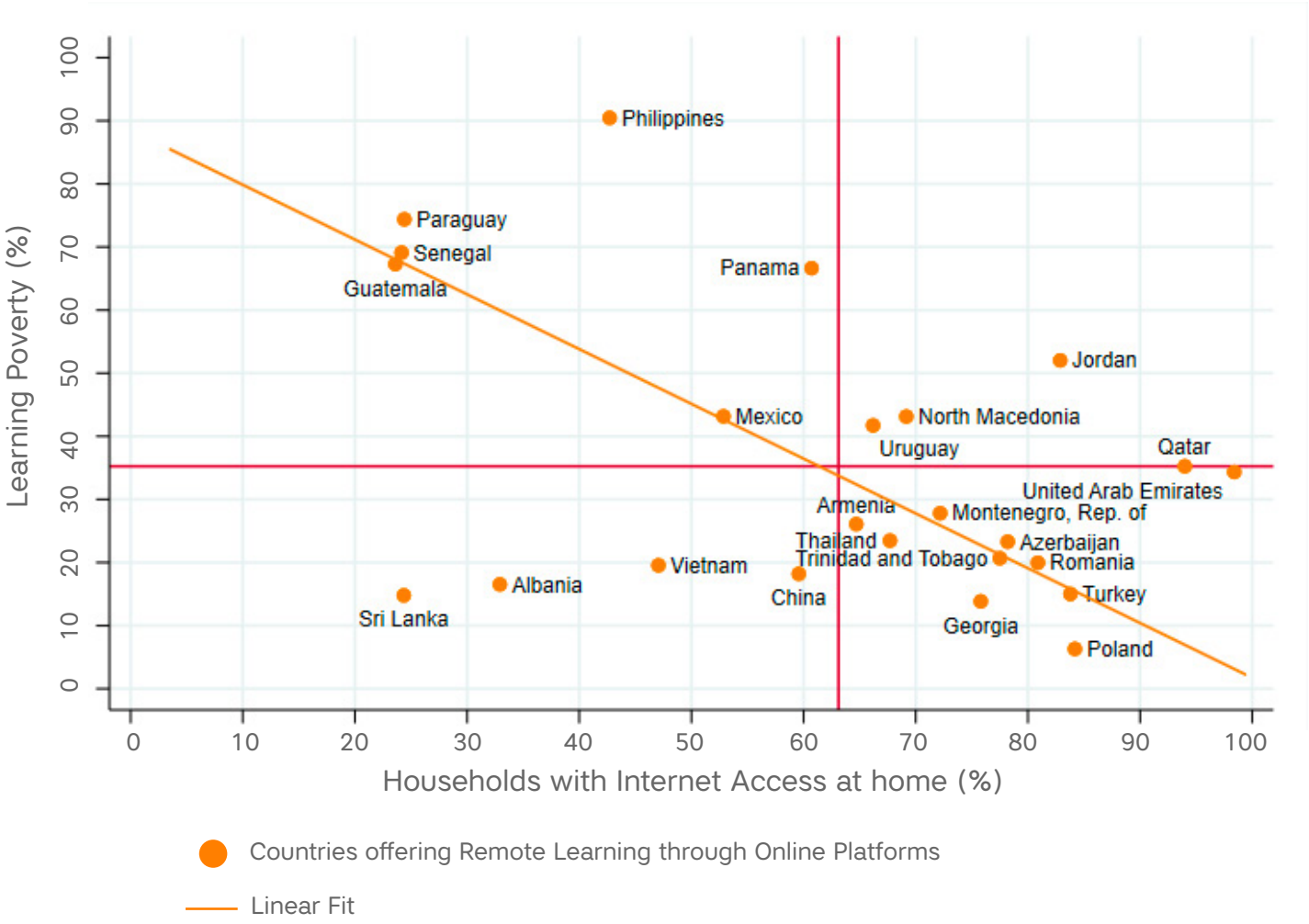
Source: World Bank. Calculations based on UNESCO global monitoring of school closures caused by COVID-19.

Note: The analysis covers schools from pre-primary to upper secondary level.

Table A.1 Summary of Empirical Evidence on Learning Losses

Source	Country	Closure Length	Education Level	Subject	Learning Loss	Sample Size
Dorn et al., 2020	USA	Not specified	Primary (Grade K–5)	Math	33 percent	Not specified
			Primary (Grade K–5)	Reading	13 percent	Not specified
Engzell et al.,2020	Netherlands	8 weeks	Primary (Age 8)	Math	0.063 SD	92 180 students
			Primary (Age 8)	Reading	0.057 SD	76 397 students
			Primary (Age 8)	Spelling	0.094 SD	90 403 students
			Primary (Age 9)	Math	0.073 SD	93 417 students
			Primary (Age 9)	Reading	0.098 SD	79 016 students
			Primary (Age 9)	Spelling	0.071 SD	91 567 students
			Primary (Age 10)	Math	0.094 SD	93 769 students
			Primary (Age 10)	Reading	0.084 SD	68 412 students
			Primary (Age 10)	Spelling	0.076 SD	91 315 students
			Primary (Age 11)	Math	0.050 SD	73 263 students
			Primary (Age 11)	Reading	0.074 SD	48 537 students
			Primary (Age 11)	Spelling	0.076 SD	69 841 students
			Primary (Grade 4-7)	Math, Spelling, Reading	0.08 SD	350 000 students
Maldonado & De Witte, 2020	Belgium	9 weeks	Primary, Grade 6	Math	0.19 SD	856 students
			Primary, Grade 6	Dutch	0.29 SD	982 students
			Primary, Grade 6	Social Science	Insignificant	755 students
			Primary, Grade 6	Science	0.33 SD	588 students
			Primary, Grade 6	French	0.30 SD	880 students
Schult et al., 2021	Germany	8.5 weeks	Primary (Grade 5)	Math (operations)	0.09 SD	> 80 000 students
			Primary (Grade 5)	Math (numbers)	0.03 SD	> 80 000 students
			Primary (Grade 5)	Reading	0.07 SD	> 80 000 students
Tomasik et al., 2020	Switzerland	8 weeks	Primary (Grade 3-6)	Math, German	2X	13 134 students
			Secondary (Grade 7-9)	Math, German	Insignificant	15 551 students

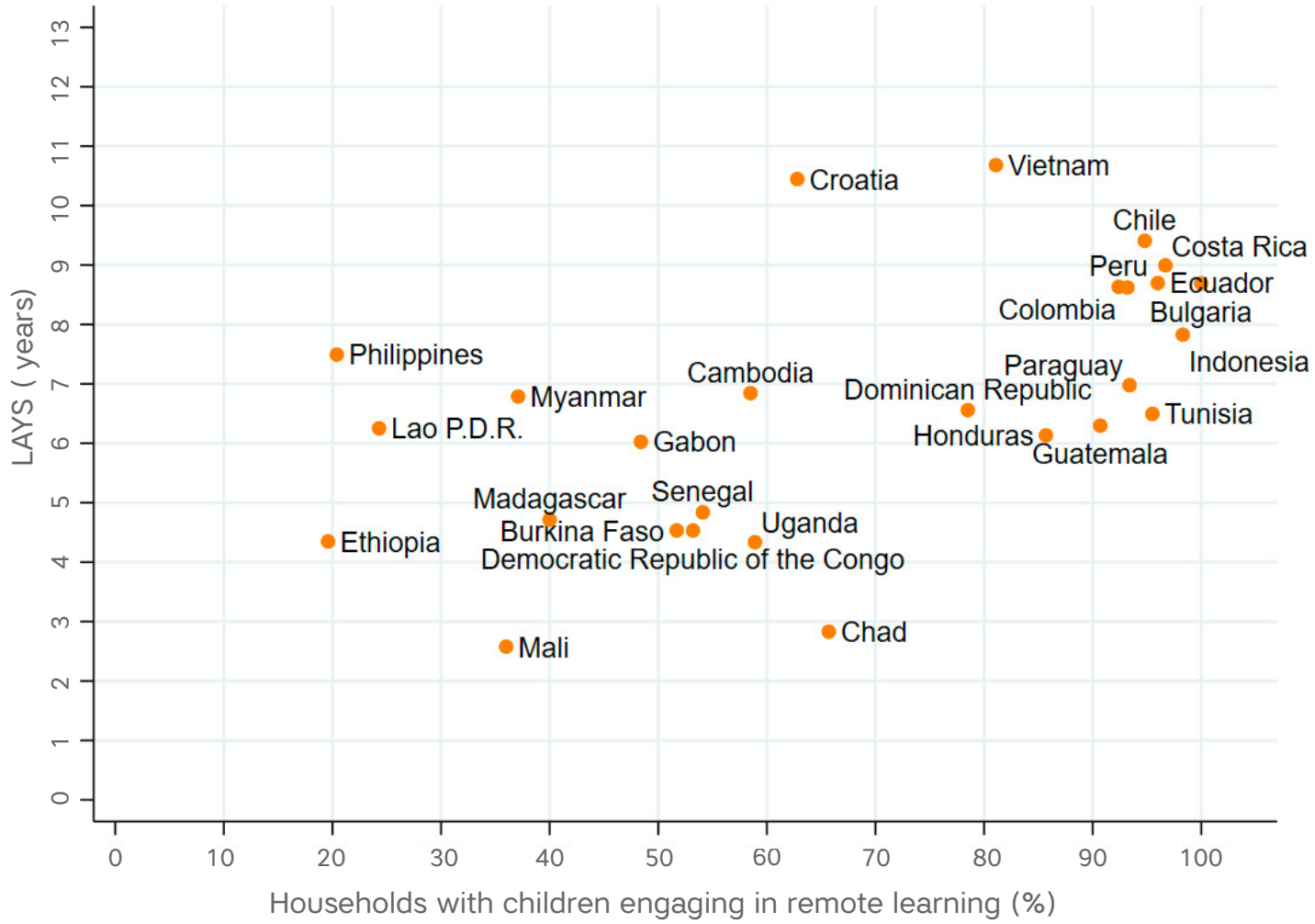
Figure A.2 Learning Poverty and Households' Internet Access, for Countries Providing Remote Learning Strategies Through Online Platforms



Source: World Bank. Calculations based on UNESCO, UNICEF, World Bank, and OECD (2021a) as of June 2021; Learning Poverty database from Azevedo et al. (2019) as of August 2021; and information on internet access is from Technologies database extracted from International Telecommunication Union (2021).

Note: Sample size of 24 countries. Governments responded to the survey question "S4 Q1. Which distance learning solutions were or are being offered in your country during the pandemic in 2020 and /or 2021?". It considers at least one of the education levels (pre-primary, primary, lower secondary, and upper secondary). The y-axis reports Learning Poverty, understood as the percentage of children of 10 years old that are unable to read and understand a short age-appropriate text. This global indicator combines the share of learners who haven't achieved minimum reading proficiency and the share of out-of-school children, who are assumed as not being able to read proficiently (World Bank 2019a). The x-axis reports the estimated proportion of households with access to internet at home. The horizontal red line represents the learning poverty country median (percentage) for all countries with available data of learning poverty (Azevedo et al. 2019): countries falling above the median are classified as having relatively higher learning poverty; countries falling below the median are classified as having relatively lower learning poverty. The vertical red line represents the median for percentage of households with internet access for all countries with available data.

Figure A.3 Children Engaging in Any Remote Learning Activity Since School Closures, by Learning-Adjusted Years of Schooling (LAYS)



Source: World Bank. Calculations based on High-Frequency Phone Survey (World Bank, 2020d) as of March 16, 2021, and LAYS database from WBopendata as of June 2021.

Note: Sample size of 27 countries.

Figure A.4 Children Engaging in Any Remote Learning Activity Since School Closures Began, by Remote Learning Strategies (Over Time)

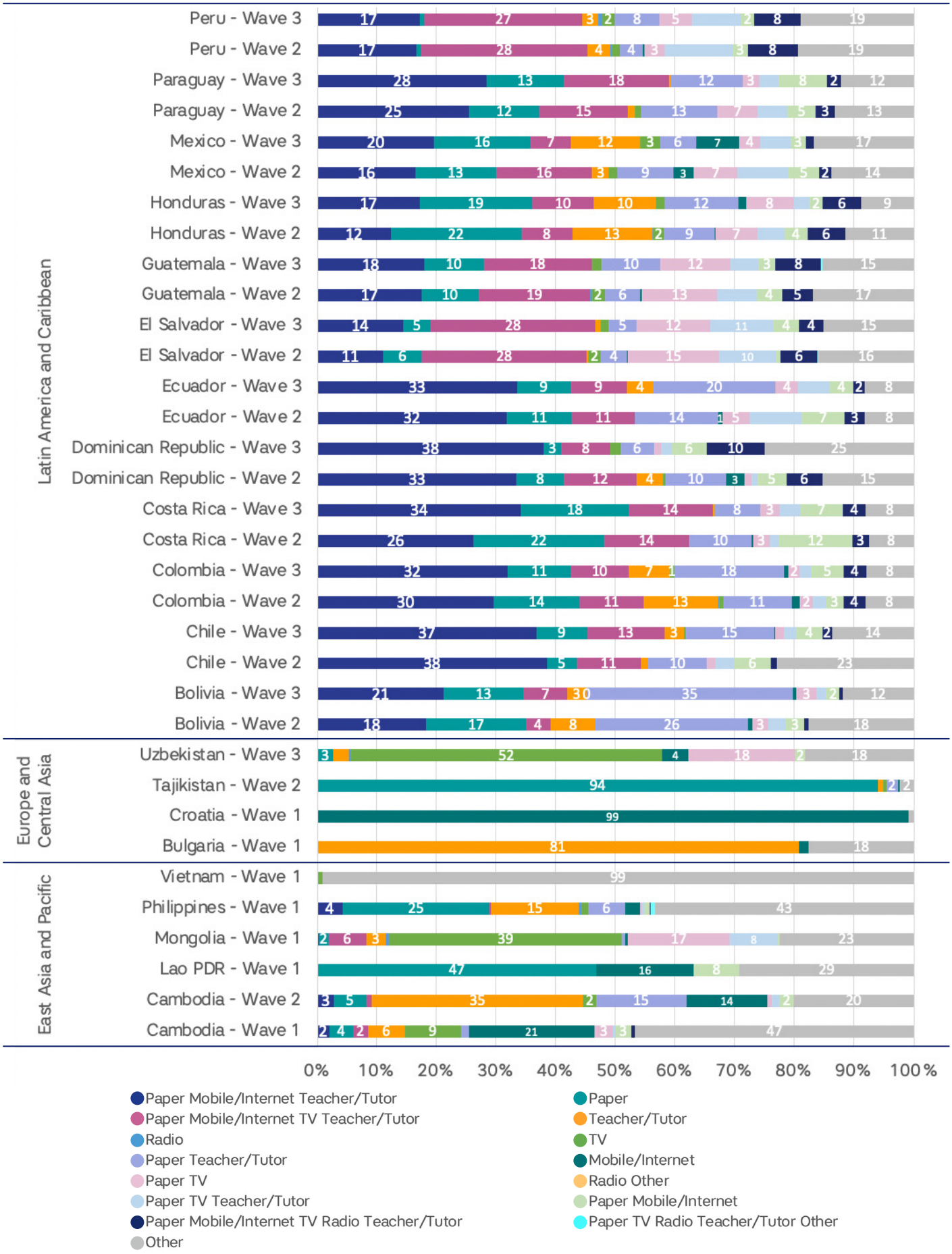
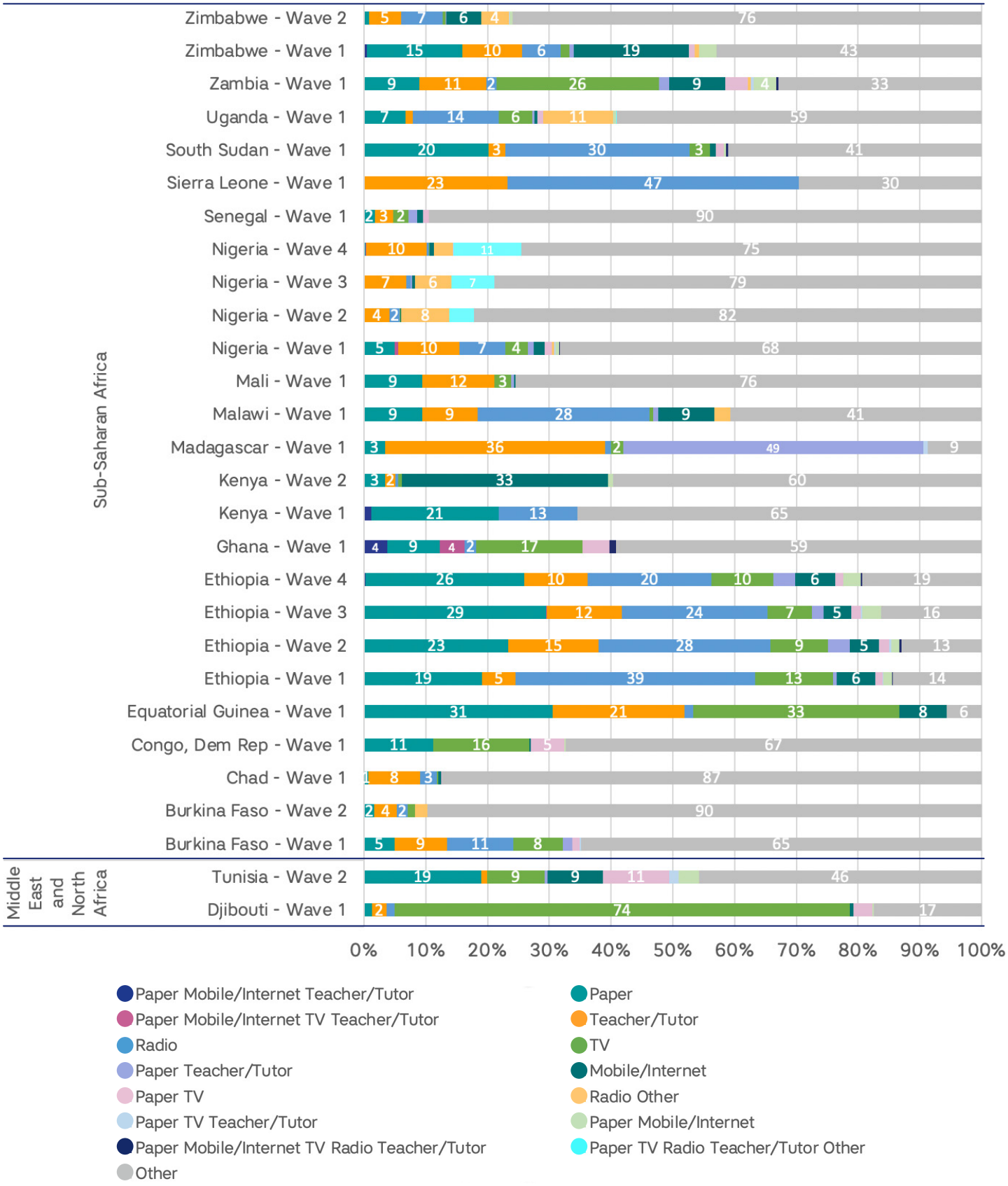


Figure A.4 (Continued) Children Engaging in Any Remote Learning Activity Since School Closures Began, by Remote Learning Strategies (Over Time)



Source: World Bank. Calculations based on the High-Frequency Phone Survey (World Bank, 2020d) as of March 16, 2021.

Note: Survey responded at the household level. Responses reference 7 days when children were engaging in any learning activity. Responses from Wave 1 for Latin America and the Caribbean were removed to avoid a different reference window.

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