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COVID-19: Effects of School Closures on Foundational Skills and Promising Practices for Monitoring and Mitigating Learning Loss

Carolina Alban Conto, Spogmai Akseer, Thomas Dreesen, Akito Kamei, Suguru Mizunoya and Annika Rigole

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COVID-19: EFFECTS OF SCHOOL CLOSURES ON FOUNDATIONAL SKILLS AND PROMISING PRACTICES FOR MONITORING AND MITIGATING LEARNING LOSS

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EXECUTIVE SUMMARY

While remote learning measures are essential for mitigating the short-term and long-term consequences of COVID-19 school closures, little is known about their impact on and effectiveness for learning. This working paper contributes to filling this gap by:

1. exploring how disrupted schooling may affect foundational learning skills, using data from MICS6 (Multiple Indicator Cluster Surveys - round 6) in 2017–2019;
2. examining how countries are delivering and monitoring remote learning based on data from the UNESCO-UNICEF-World Bank's National Education Responses to COVID-19 School Closures survey; and
3. presenting promising key practices for the effective delivery and monitoring of remote learning.

CONTENTS

KEY FINDINGS AND RELATED RECOMMENDATIONS

1. **Mitigating the impact of school closures on children's foundational skills is critical.** Analysis for five low- and middle-income countries using data from the Multiple Indicator Cluster Surveys 6 (MICS6), confirms that missing school is associated with damaging reductions in foundational skills. Children aged 9-11 who were out of school at the time of the survey (but in school in the previous year) were between 11 and 43 percentage points less likely to acquire foundational reading skills than children staying in school. For ages 12-14, recently out of school children were between 5 and 54 percentage points behind those enrolled. Protecting and prioritizing foundational learning is key to reducing the potential damage that widespread school closures will have on children, as these skills are critical to developing children's competencies, subsequent learning and lifelong opportunities. They are also the most difficult to recover.

2. **Assessing the effects of the pandemic and the effectiveness of remote learning is a must.** Real-time assessments and specific analyses of the effects of school closures and remote learning are needed to enable informed decision-making in the highly dynamic situation that the COVID-19 pandemic presents. As access to different channels of remote learning vary, so too do their uptake and effectiveness when implemented. Innovative methods to monitor and assess learning, such as telephone-based assessments, should be invested in. As education systems prepare for further school closures during the COVID-19 crisis and beyond, understanding who has access and how effective remote learning programmes are will be critical to creating resilient systems.

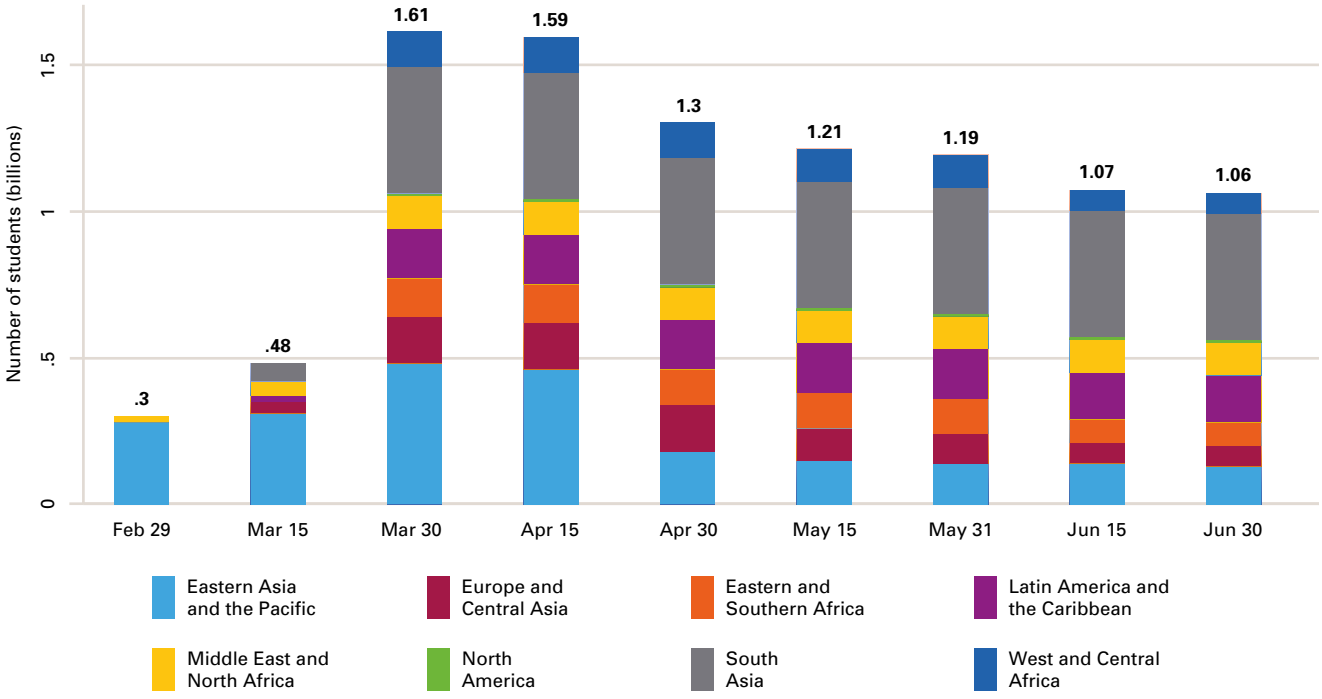
3. **Developing more inclusive remote learning means providing learning through diverse delivery channels.** While most countries are providing remote learning through both digital and non-digital channels to reach primary (68 per cent), lower secondary (71 per cent) and upper secondary students (74 per cent), only 36 per cent of countries are using both to reach pre-primary age students. Equity-focused strategies targeting the most vulnerable and youngest children should be prioritized to provide all children with access to quality learning, regardless of income level or access to technology.

4. **Strengthening communication between teachers, families and learners must continue.** As education systems reopen schools and plan for the use of hybrid approaches that combine both in-school and remote learning, enabling and encouraging communication between education actors, families and learners must be a priority. Survey results from educators in 48 centres delivering remote learning for refugees in Lebanon indicate that consistent communication between teachers, communities and caregivers is vital for remote learning to be delivered and taken-up effectively.

1. INTRODUCTION

One of the most pressing societal consequences of the global response to COVID-19 is the escalation of school closures globally, which has deprived millions of children from equitable learning and reduced their overall well-being. UNESCO estimated that by late March 2020, more than 190 countries had shut schools in order to slow the spread of COVID-19, disrupting the schooling of approximately 1.6 billion students, above 90 per cent of total enrollment (see *Figure 1*).[1]

Figure 1. Number of students (billions) affected by COVID-19 school closures by date and region



Source: Authors' calculations based on UNESCO COVID-19 school closures and latest UNESCO - Institute for Statistics enrollment data (pre-primary, primary, secondary, post-secondary and tertiary levels).

Note: Only countries with national closures are included.

To ensure continuity of learning while schools are closed, countries have utilized various remote learning delivery channels, including television, radio, online platforms, and take-home packages (Dreesen et al., 2020).[2] In addition, governments and education actors have begun to plan accelerated learning and catch-up programmes to recover learning lost due to these interruptions (Nugroho et al., 2020).

1 These numbers correspond to students enrolled in pre-primary, primary, secondary and tertiary programmes in countries with national closures according to the most recent data from UNESCO-UIS. The figure for only primary and secondary education is 1.27 billion students affected.

2 See this link for a compilation by UNESCO of different distance learning solutions utilized worldwide during the COVID-19 school closures: https://en.unesco.org/covid19/educationresponse/nationalresponses

2. MEASURING THE EFFECTS OF SCHOOL CLOSURES ON LEARNING

Although there is consensus that school closures may cause irreparable damage to children's educational outcomes, there is limited specific evidence on the extent of this harm. Also concerning is that the school closures could further reinforce existing inequalities that were already worrying before the pandemic. The World Bank's pre COVID-19 learning poverty measures revealed that only 10 per cent of children in low-income countries were able to read and understand a simple story by the age of 10, in contrast to 90 per cent of children in high-income countries (World Bank, 2019). Unequal access to continued learning during the COVID-19 school closures and once schools reopen may exacerbate this gap.

What we know about past school closures

Research on past school closures indicate that any interruption in schooling, including regularly scheduled breaks, can result in significant learning loss. Slade et al., (2017) show that in Malawi, transitional breaks from grade 1 to 2 and grade 2 to 3 lead to an average reduction of 0.4 standard deviations on four different measures of reading skills.

School closures due to teachers' strikes can also lead to reduced learning. Baker (2011) points out that closures caused by teachers' strikes in Ontario, Canada (approximately 20 days a year), are associated with a loss equivalent to half (0.5) of a standard deviation in math test scores. Likewise, Wills (2019) finds that, for South Africa, a student's performance in subjects taught by a striking teacher was approximately 0.1 standard deviations lower than in subjects taught by a non-striking teacher.

Studies measuring the impact of school closures due to extreme weather conditions and natural disasters point to serious consequences for learning. Marcotte and Hemelt (2008) found that in Maryland, United States, for each day schools were closed due to snow, the number of students who performed satisfactorily on state reading and mathematics assessments decreased by 0.5 per cent (or almost 3 per cent less in a year with five snow days). Likewise, Andrabi et al., (2020) found that the 3.5-month school closure after the 2005 earthquake in Pakistan resulted in learning loss equivalent to 1.5 school grades.

Prolonged school closures following the 2013–2014 Ebola outbreak in West Africa also highlight the severity of its impact on education. These included reduced school attendance, increased dropouts and effects on other critical child-related outcomes such as increased risks of violence and abuse, orphan hood, teenage pregnancy, child labour and malnutrition (Bakrania et al., 2020; Bandiera et al., 2019; Evans and Popova, 2015; Raluca et al.; 2020; Selbervik, 2020; and UNDG, 2015). It appears, however, that six years later, empirical analyses of learning loss resulting from the crisis are still scarce (*see Box 1*).

Moreover, shocks prompting school closures (e.g. extreme climate events, epidemics, etc.) may be accompanied by economic disruptions. These increase risks and further deepen existing learning inequalities in vulnerable households, where the resources to support children are scarce (Duryea and Levinson, 2007; Glick et al., 2016; Grimm and Schooling, 2008), and in low-income countries, where such disruptions can lead to large drops in public education spending (Duncan et al., 2004; Shafiq, 2010).

Box 1. Evidence on the effects of Ebola on learning in West Africa

The closure of schools was a common response in the different countries of West Africa that faced the Ebola crisis. In Guinea, Liberia and Sierra Leone (the epicenter countries), an estimated 5 million children were affected by school closures during the epidemic (UNICEF, 2016).

The number of hours of learning lost per pupil has been estimated at 486 for Guinea, 582 for Liberia and 780 for Sierra Leone (UNDG, 2015). A reduction in attendance after schools reopened was also documented, ranging from a 7 per cent reduction in Guinea to a 25 per cent reduction in Liberia. In most cases, this was attributed to loss of household income (World Bank, 2016a, 2016b, 2016c).

Table 1. Indicators on the education crisis during Ebola in Guinea, Liberia and Sierra Leone

Indicators	Guinea	Liberia	Sierra Leone
Duration of school closures[a]	5 months	7 months	9 months
Learning hours lost per child[b]	486	582	780
Number of children affected[c]	2.4 millions	900 thousand	1.8 millions
Children who did not return to school when it reopened.[d]	7%	25%	13%

Sources: [a] UNICEF, 2017; [b] UNDG, 2015; [c] Authors' calculations based on UNESCO-UIS data on primary and secondary enrollment; [d] World Bank, 2016a, 2016b and 2016c.

Although assessments are needed to better measure the loss of learning due to this crisis, some studies suggest a significant decrease in time dedicated to learning activities and in the motivation to learn. For Sierra Leone, Bandeira et al., (2018) show a decline in girls' learning time of 12 hours per week, mainly because their time is taken up by income generation and household chores. Kostelny et al., (2018) document, through ethnographic analysis, that in some communities children lost interest in learning while schools were closed.

How do the current COVID-19 school closures affect learning?

While the full impact of the COVID-19 school closures on learning may not be known for several years, forecasting exercises and statistical simulations point to a dire situation. Kuhfeld et al., (2020) have undertaken a prospective analysis using data from 5 million Grade 3 to Grade 8 students in the United States. They project that students could return to school in the fall of 2020 with 32–37 per cent less progress in reading than they would have achieved in a typical school year. These predictions are even higher for math, with losses estimated between 50–63 per cent.

Kaffenberger (2020) creates different post-COVID-19 learning scenarios using data from seven low- and middle-income countries (LMICs) to model long-term learning loss. Assuming a one third reduction in learning time (i.e. about one term outside of school), this study projects that learning levels for a child in grade 3 would be one year lower than expected by the time that child reaches grade 10. This reflects both time out of school and additional learning regression.

Simulations from the World Bank, based on data from 157 countries, predict that a combination of school closures and the loss of family livelihoods caused by the pandemic would result in an average loss of 0.3 – 0.9 quality-adjusted years of schooling. This will reduce learning achievements that students typically gain during their lifetime from 7.9 to 7.0 – 7.6 years (Azevedo et al., 2020).

The case of foundational reading skills

To help understand the potential effects of COVID-19 school closures on learning, this paper examines the association between foundational reading skills and non-attendance/absence from school in young children (aged 9–14 years old). The analysis draws upon data from the Foundational Learning Skills module of the UNICEF supported Multiple Indicator Cluster Surveys 6 (MICS6), which tests basic reading skills for both in and out-of-school children.

Measuring the relationship between school attendance and foundational learning is crucial to understanding the potential harm of widespread school closures due to COVID-19 for at least three reasons. First, the acquisition of skills and knowledge is a cumulative process and foundational learning skills are key to developing children's lifelong competencies and improving their future opportunities (Glick and Sahn, 2010; Maton, 2009; Thompson et al., 2001; Walker et al., 2011). Second, it has been shown that learning is key to offsetting the developmental disadvantages of younger children, especially for those from deprived contexts (Evans and Kim, 2013; McCoy and Raver, 2014; World Bank, 2018). Third, foundational skills losses are difficult to regain, and young children who fall behind are the hardest to reintegrate into education systems, especially those systems that tend to focus on high achievers and fail to target those at-risk (Banerjee and Duflo, 2011; Glewwe et al., 2009; Muralidharan and Zieleniak, 2013).

Regression analysis was conducted to examine whether and to what extent children who dropped out of school in the year of the survey were less likely to demonstrate foundational learning skills, in comparison to children who continued attending school.[3] Since both groups of students attended school in the period preceding the assessment, this exercise captures the learning difference of a single year at most.[4] The analyses were conducted independently for five LMICs (Bangladesh, the Democratic Republic of the Congo, Madagascar, Pakistan-Punjab and Zimbabwe) and two age groups (9–11 years and 12–14 years).[5]

Two main findings (*see Figure 2*) are common to the countries analyzed. First, children who are recently out of school perform far behind children who continued to attend school. Second, the foundational reading skills gap between these two groups widens with age.[6] There are, however, notable variations between countries/territories, potentially due to high degree of heterogeneity in school systems, which requires further study. For the 9–11 age group, in the Punjab province of Pakistan, children who recently left the school are 43 percentage points less likely to demonstrate foundational reading skills compared to children attending, while in Madagascar the gap is 11 percentage points. For older children, aged 12–14, the largest gap is also observed in Pakistan's Punjab province where recently out-of-school children are 54 percentage points below those who continued to attend. The smallest gap is seen in the Democratic Republic of the Congo at 5 percentage points.

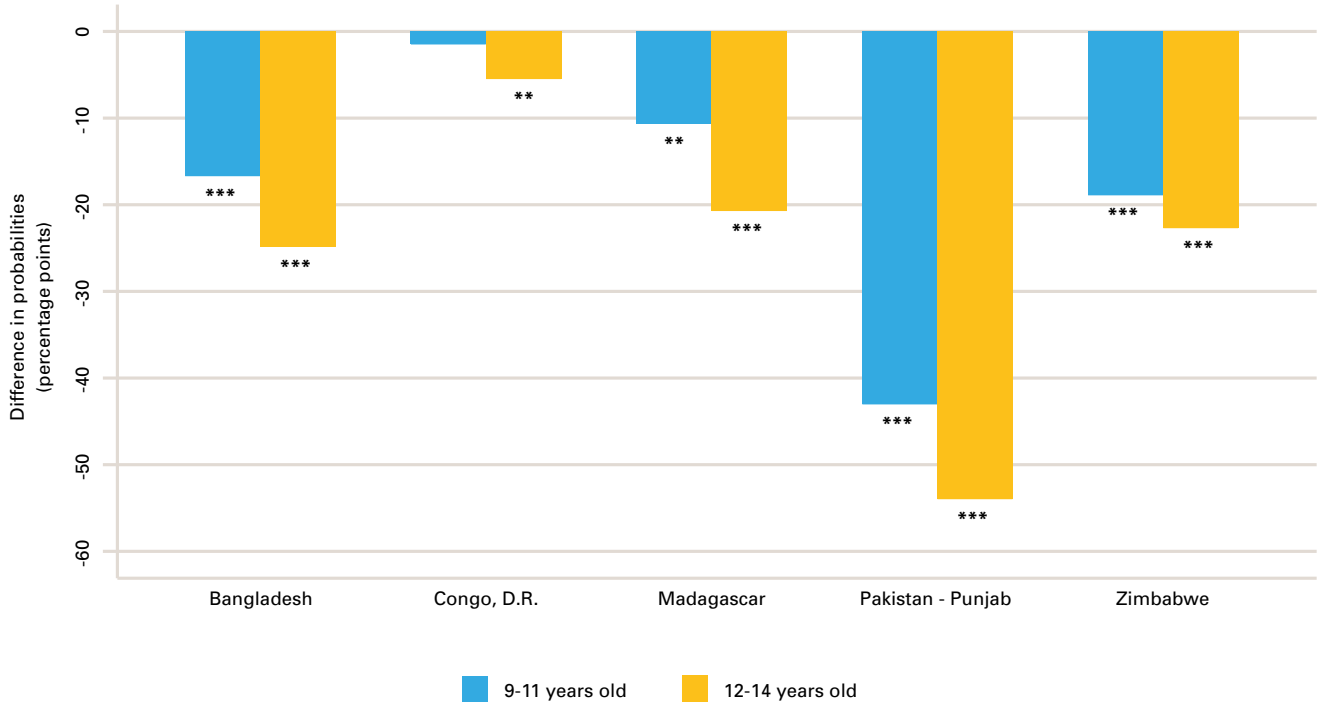
3 These regressions were estimated using a linear probability model (LPM) that controls for age, sex, location (rural/urban), household wealth quintile, mother's education, and the child's highest grade of education previously attained. See more details in the Annex.

4 The data do not allow for differentiating the foundational skills of children before and after they leave school, however, the regressions control for the higher grade previously achieved. As this variable is not a perfect measure of learning, it cannot be completely ruled out that low foundational skills (and other unobserved variables) explain non-attendance (reverse causality bias). While this limitation does not affect the correlations between children's current attendance status and their likelihood of demonstrating foundational skills presented here, it does not allow for a causal interpretation.

5 Although the foundational MICS learning module was available for 15 countries/territories at the time of this working paper, only five of them (Bangladesh, the Democratic Republic of the Congo, Madagascar, Pakistan-Punjab and Zimbabwe) have the required sample size for robust analysis. (*see Table A1 in the Annex*).

6 The only exception is the case of the Democratic Republic of the Congo for the 9–11 age group, where the difference between children who left school and those who continued to attend is not statistically significant (i.e. there is no evidence of a difference between the two groups).

Figure 2. How far behind are recently out-of-school children compared to those still in-school? Difference in the probability of demonstrating foundational reading skills by country and age group



Source: Authors' calculations based on MICS6 data for 5 countries with sufficient sample sizes for both age groups and for both recently out-of-school children and in-school children, 2017–2019.

Notes: Bars represent the difference in the probability of demonstrating foundational reading skills of recently out-of-school children compared to children still attending school expressed in percentage points (Table A2 in the Annex presents the values). In the case of Bangladesh (ages 9–11), the value of -17 (blue bar) means that recently out-of-school children are 17 percentage points less likely to demonstrate functional reading skills than those who are still attending. According to the model, the probability of demonstrating foundational skills is 50 per cent for 9–11-year-old children attending school in Bangladesh, thus the likelihood for children recently out-of-school is 33 per cent (17 percentage points lower).

*** Indicates that the difference between out-of-school and In-school in foundational learning is statistically significant at 99 per cent confidence, ** at 95 per cent and * at 90 per cent. No stars (the Democratic Republic of the Congo - 9–11 age group) means that the gap between out-of-school and in-school is not statistically significant (i.e. it cannot be ruled out that both groups of children have the same likelihood of demonstrating foundational skills). Controls include age, sex, location (urban/rural), household wealth quintile, mother's education and child's highest grade attained in the previous school year. See the Annex for more details on the method of analysis.

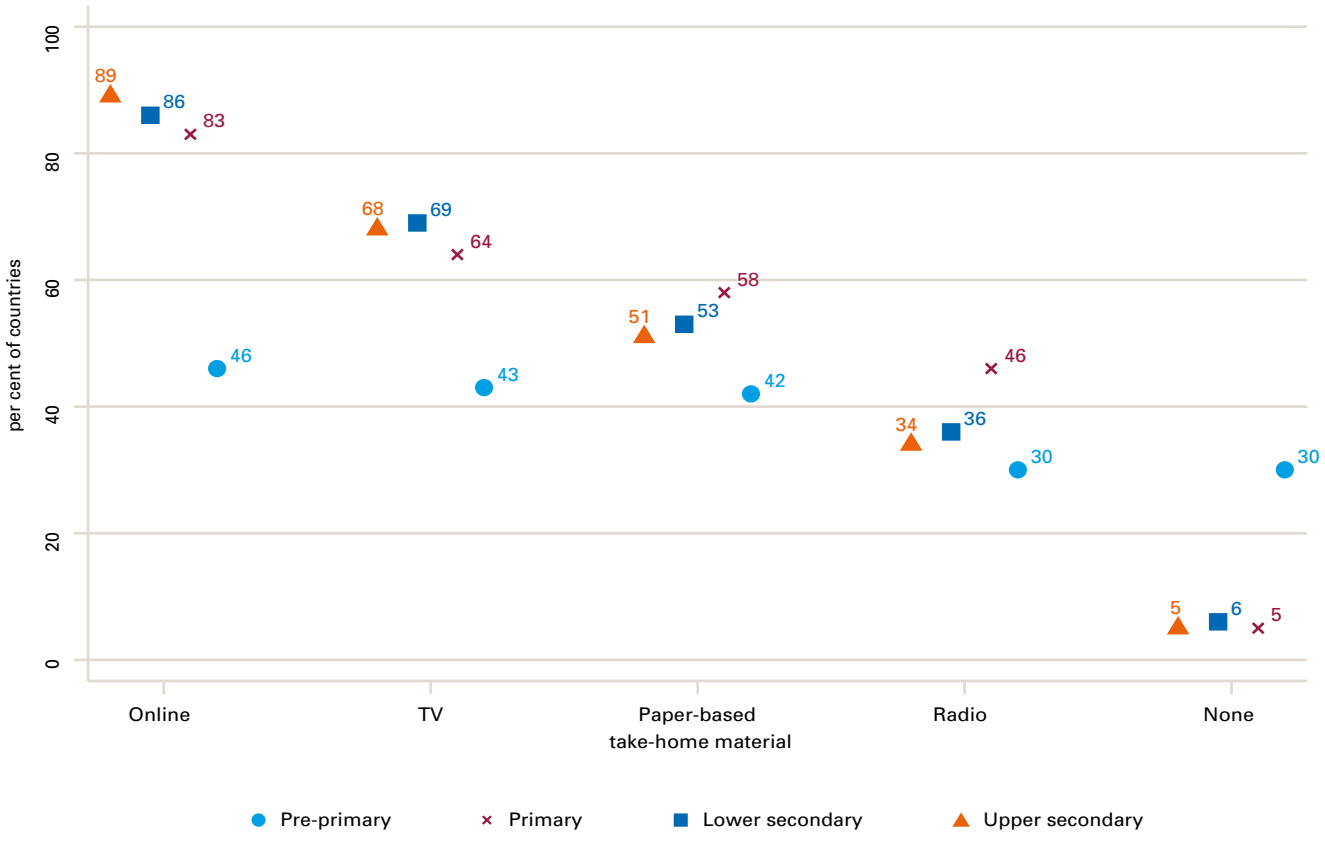
These results support the growing body of evidence demonstrating that not attending school can have immediate adverse effects on children's learning and, more precisely, on the acquisition of foundational skills. They suggest that the school closures prompted by COVID-19, which effectively put most children out of school for extended periods in 2020, may likewise be having immediate adverse effects on children's learning and their acquisition of foundational skills. Identifying the prevalence and scale of such learning loss is key to designing preventive and corrective interventions. Failure to do so, however, can amplify the damage at an exponential social, economic and financial cost.

As a first step towards mitigating the potential negative effects of the COVID-19 school closures on learning, countries worldwide have made great efforts to provide remote learning through various modalities. Section 3 describes these initiatives, emphasizing the dual challenges of accessibility and effectiveness and stressing the importance of employing monitoring and evaluation strategies. As highlighted further below, these elements are key tools for successfully protecting and ensuring the continuity of children's learning.

3. DELIVERING AND MONITORING REMOTE LEARNING DURING COVID-19

The great inequities in access to technology, connectivity and electricity both within and between countries mean that multiple delivery channels for remote learning are needed to reach all children (Bell et al., 2020; Hereward et al., 2020; Dreesen et al., 2020). Estimates on the global reach of broadcast and online remote learning from over 100 countries find that, at minimum, 30 per cent of the world's children were not reached by remote learning during the COVID-19 school closures due to a lack of country-level remote learning policies and/or a lack of household access to technology (UNICEF, 2020a). *Figure 3* presents the different channels used to deliver remote learning for the four education levels across 118 countries, according to data collected from Ministries of Education (MoE) as part of the first round of the UNESCO-UNICEF-World Bank Survey on National Education Responses to COVID-19 School Closures.

Figure 3: Percentage of countries providing remote learning, by modality and education level, among 118 countries, 2020



Source: UNESCO-UNICEF-World Bank Survey on National Education Responses to COVID-19 School Closures.

Notes: The percentage in the figure is a simple average among 118 countries (as the cases of 'no record' are treated as missing values in the calculation). The label 'None' shows the percentage of countries that do not provide any remote learning delivery channel for that education level.

Online learning platforms were the most commonly used delivery channel, though many countries also used other remote learning channels at the same time to reach those without connectivity. At primary level, for example, approximately 81 per cent of countries reported using online platforms, and 68 per cent used a combination of digital and non-digital approaches. Slightly more countries reported using both digital and non-digital channels for lower secondary (71 per cent) and upper secondary level (74 per cent) learners.

Only 36 per cent of the countries reported using combinations of digital and non-digital modalities to reach pre-primary aged children and 30 per cent did not provide any remote learning options to pre-primary learners. The relatively low proportion of countries that included remote learning systems for pre-primary is concerning in light of the evidence pointing to the importance of early childhood education on a child's learning, health and overall well-being throughout life (Gromada et al., 2020; Muroga et al., 2020). One plausible explanation for this may be the challenge of creating and delivering content for children in their early years, due to the levels of education and engagement with parents/caregivers that this requires. Clear guidelines for parental/caregiver support have been developed for some pre-primary level radio and television programmes in an attempt to address this issue (Dreesen et al., 2020). Specific programmes have also been developed to produce tailored content for parents and caregivers of young children (*see Box 2*).

While countries continue to provide remote learning where schools remain closed, challenges remain in their scope and effectiveness in achieving learning outcomes. Recent research shows that children in the poorest countries and those from deprived backgrounds are most at risk of not being included in remote learning policies and are more likely to lack access to digital or broadcast education content. UNICEF global estimates of the maximum reach of remote learning for children document a positive association between countries' income level and the percentage of students they potentially reached by remote learning measures during COVID-19 school closures. The authors also found that students who are not reached by any online, television or radio remote learning modalities are mainly from rural areas (76 per cent) and belong to poor families (72 per cent) (UNICEF, 2020a).

Box 2. Family engagement with educational contents to encourage child learning at early ages in Brazil

Despite the specific challenges involved in providing remote learning to children in pre-primary education, promising practices have emerged in some countries that deserve special attention. In Maranhão, a state in northeastern Brazil, the Secretariat of Education, with the support of the NGO Laboratório de Educação, has developed video, photo and audio pedagogical content to transform daily routines and household tasks such as cooking, cleaning and organizing clothes into opportunities for learning basic language and mathematics skills. The content is distributed daily via SMS, e-mails and WhatsApp messages and had reached more than 10,000 people in the first two weeks of application at the end of April (it is estimated that the State of Maranhão serves about 290,000 students between 0–6 years of age). This initiative promotes the continuity of children's learning. It stands out for being easily scalable, respecting the learning needs of young children, and providing training for parents and caregivers in a state where 55 per cent of adults have not completed primary school and 16 per cent are unable to read or write.

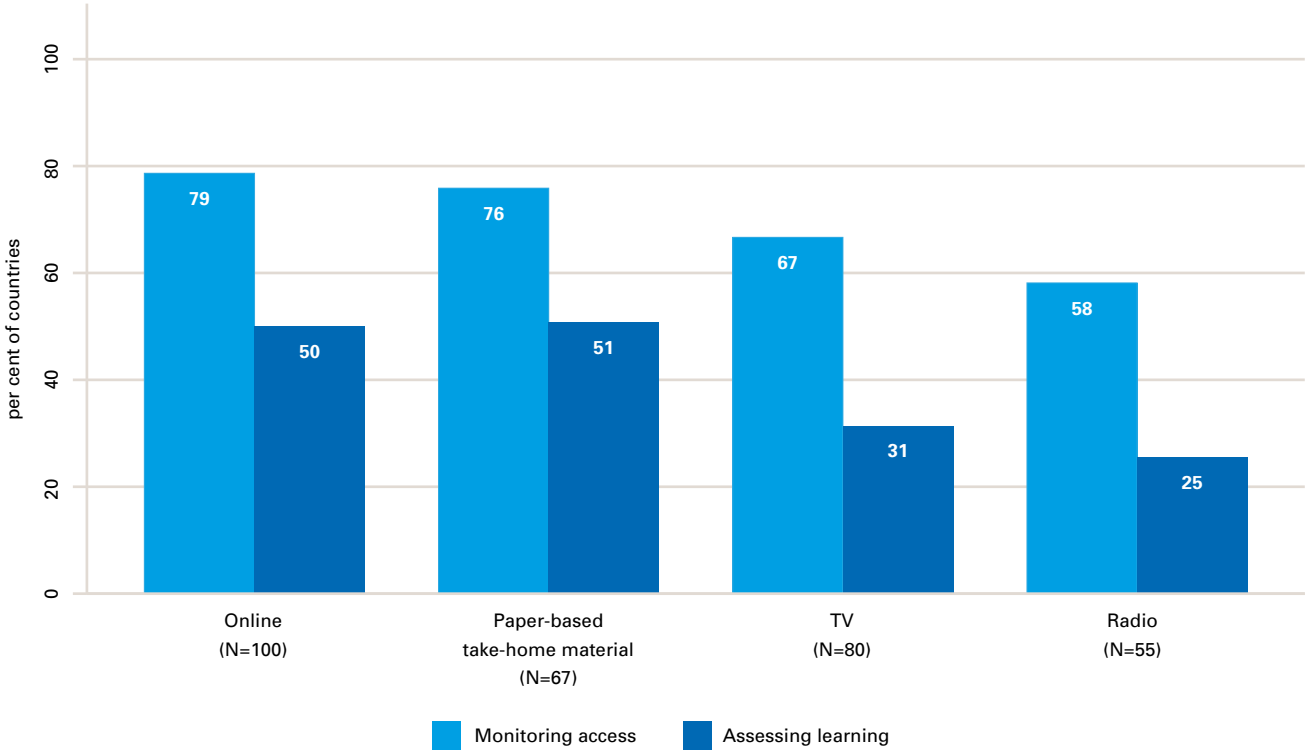
At the national level, the National Council of Education issued a recommendation to make families the direct audience for early childhood educational content. Following this guideline, the Secretariat of Maranhão began broadcasting a 3-5-minute video every day on State television, radio and other media with educational content aimed at families. In addition, the Secretariat also distributed a collection of free digital children's books and read-aloud videos produced by specialists to promote language development among children from families with low educational levels and few books in the home.

Paulet Piedra and Reimers (2020); https://www.educacao.ma.gov.br; and https://labedu.org.br

It is therefore important that countries invest in monitoring the reach and learning effects of the various remote learning channels to enable the design of resilient policies that prioritize reaching populations most at risk (Schaffhauser, 2020; Azevedo, 2020). As highlighted in the UNESCO-UNICEF-World Bank MoE survey, however, monitoring and learning assessment of remote learning channels can pose additional hurdles.

Figure 4 shows the percentage of countries that are actively monitoring user access and assessing learning across the various remote delivery channels. Among the countries offering online learning, 79 per cent are monitoring user access, and 50 per cent are measuring learning. Since online learning often entails two-way interaction between the user and the technology, monitoring can be built into the delivery platform. Likewise, the paper-based take home materials modality, which involves the physical delivery of materials, interaction with learners/parents through exercise books and paper-based assessments, can facilitate monitoring. For TV and radio modalities, however, the one-way delivery process makes monitoring more challenging. This may explain why a smaller percentage (67 percent) are monitoring user access and only 31 per cent are assessing learning. Likewise, for countries using radio as a delivery channel, only 58 per cent are monitoring access, and 25 per cent are monitoring learning outcomes.

Figure 4. Percentage of countries monitoring user access and assessing learning among 118 countries, by remote learning modality, 2020

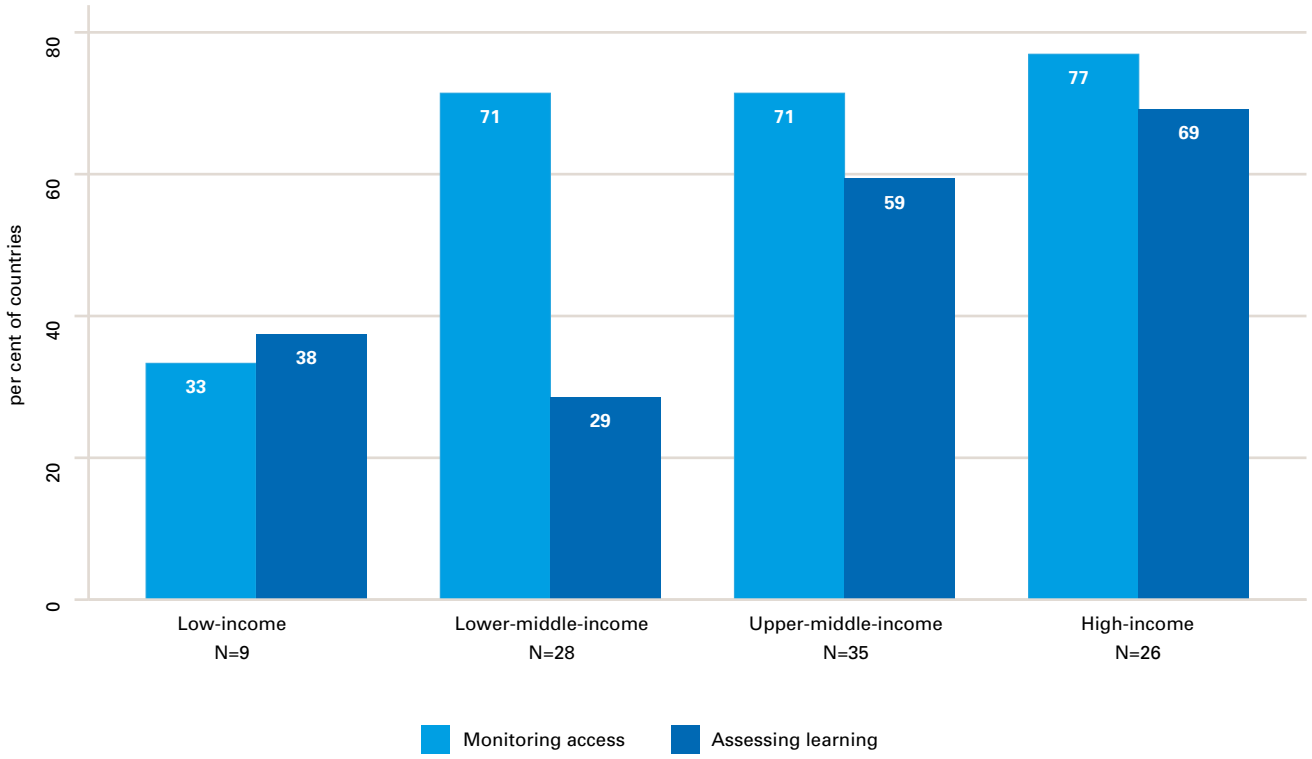


Source: UNESCO-UNICEF-World Bank Survey on National Education Responses to COVID-19 School Closures.

Notes: The percentages in the figure are simple averages among the number of countries employing the respective remote learning modality, which is specified on the x-axis.

Further analysis found that low-income countries are less likely to provide online learning as a delivery channel and less likely to monitor online learning when it is rolled out. Only 53 per cent of the low-income countries surveyed provide an online learning platform, compared to 95 per cent for high-income countries. *Figure 5* shows that, in low-income countries, only 33 per cent monitor access, while a slightly higher 38 per cent assess learning outcomes for online learning. For lower-middle-income countries, a relatively high percentage of countries monitor user access (71 per cent), while only 29 per cent assess student learning. Meanwhile, for upper-middle-income and high-income countries, the shares of countries monitoring access (71 per cent in upper-middle and 77 per cent in high-income) and learning (59 per cent in upper-middle and 69 per cent in high-income) is much higher. This is potentially due to higher levels of system capacity in monitoring and assessment in those countries.

Figure 5. Percentage of countries monitoring user access and assessing online learning (among 97 countries deploying online learning), by income group

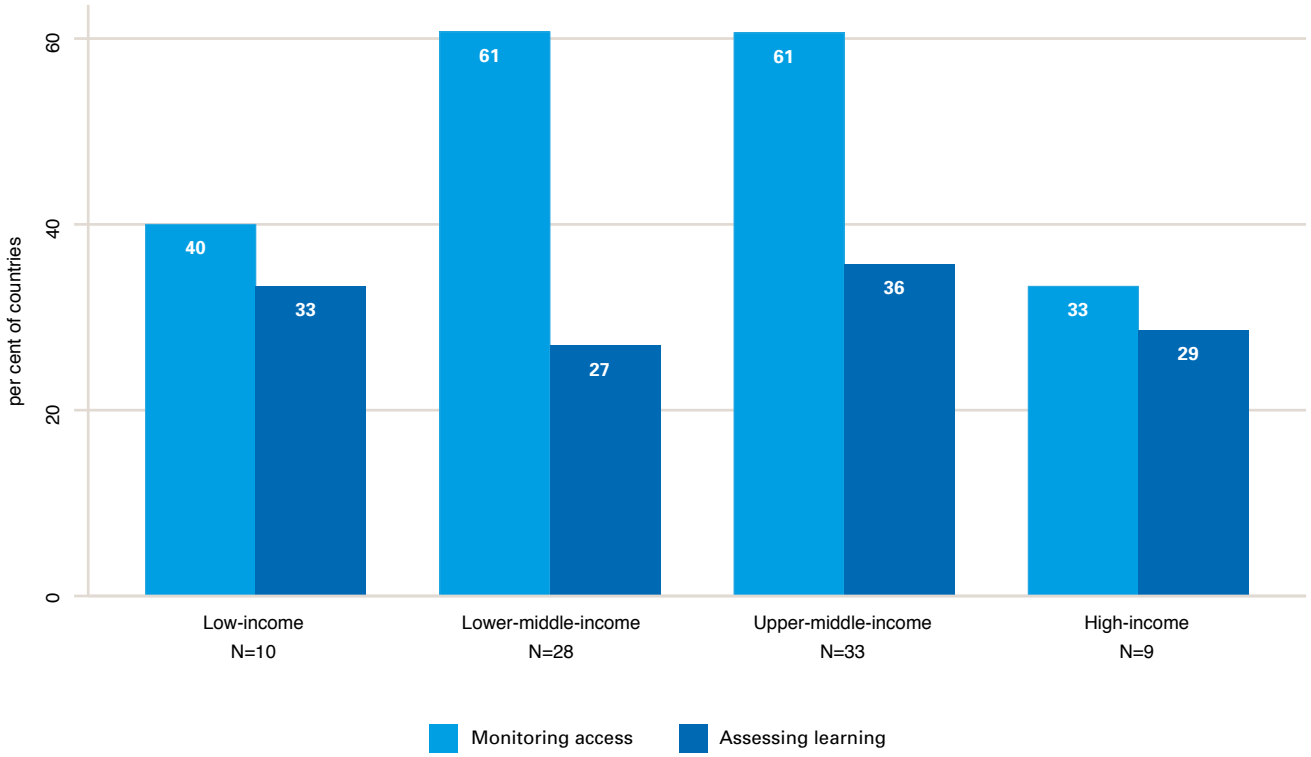


Source: UNESCO-UNICEF-World Bank Survey on National Education Responses to COVID-19 School Closures.

Notes: The percentages in the figure are simple averages among the number of countries employing the respective remote learning modality, which is specified on the x-axis. Income classification is drawn from the categorization of the World Bank (three countries were dropped from the analysis because of missing information related to income classification).

A different trend is observed by country income group when it comes to the monitoring of broadcast media as a remote learning delivery channel. *Figure 6* shows that lower- and upper middle-income countries that have a remote TV learning policy report higher rates when it comes to monitoring access (61 per cent) compared to both low-income (40 per cent) and high-income countries (33 per cent). This could be due to the relative importance placed on the various delivery channels in countries with different levels of connectivity and TV ownership.

Figure 6. Percentage of countries monitoring user access and assessing learning for remote TV learning among 77 countries that used TV as a remote learning channel, by income group



Source: UNESCO-UNICEF-World Bank Survey on National Education Responses to COVID-19 School Closures.

Notes: The percentages in the figure are simple averages among the number of countries employing the respective remote learning modality, which is specified on the x-axis. Income classification is drawn from the categorization of the World Bank (three countries were dropped from the analysis because of missing information related to income classification).

These findings suggest that while the importance of monitoring access and assessing learning during school closures is considered important, these processes still need further development and integration into systems. The following section presents details of the different strategies some countries have been following to address challenges in remote learning delivery and monitoring.

4. PROMISING PRACTICES FOR THE DELIVERY, MONITORING AND ASSESSMENT OF REMOTE LEARNING

Based primarily on the UNESCO-UNICEF-World Bank survey and the UNICEF COVID-19 Education response tracker,[7] this section identifies and documents promising practices to address three major challenges to remote learning. These challenges are ensuring access and effectiveness for all; maintaining motivation and commitment among teachers, families and children; and assessing whether children are learning.

Monitor remote learning access and use to improve outreach, delivery and responses when schools reopen

While the potential to reach children through multiple delivery channels is great, there are significant challenges to achieving inclusiveness and making sure children have access and use remote learning methods. For example, a recent survey from Bangladesh revealed that while 86 per cent of 9th graders with access to television were aware of the government's TV-based learning programme (Sangsad TV), only half of them had ever watched it (Kumar et al., 2020).

Some countries have been using monitoring to understand gaps and strengthen access for marginalized populations. Egypt, Ethiopia, Tanzania and Mongolia have used phone surveys and SMS to monitor TV and radio based remote learning usage. Oman conducted a gap analysis to identify access-related challenges experienced by marginalized learners, and, in Haiti, local Education in Emergencies groups are helping to gather data on the use of online learning platforms. Additionally, in Iraq, UNICEF supports the monitoring of education satellite channels offered in multiple languages and is using that analysis to provide feedback to the Ministry of Education-Kurdistan Regional Government for expanding access. Lebanon conducted a Learning Readiness Rapid Assessment (LeaRa) to predominantly monitor the remote learning needs of refugee students. Meanwhile, Jordan utilized its e-learning user analysis among youth (aged 16–24), which explored their levels of connectivity as well as attitudes and interests towards online learning, to inform programme interventions.

Countries are also using monitoring to improve the effectiveness of remote learning. In Indonesia, the United Nations High Commissioner for Refugees (UNHCR) learning centres are using WhatsApp groups to track refugee learners' and volunteer teachers' experiences and to provide targeted support when needed. In Mongolia, UNICEF-produced TV lessons for pre-primary and primary learning in Tuvan and Kazakh languages are being assessed for effectiveness. In Palestine, data collected in April 2020 showed that only 15 per cent of the 127,453 children enrolled in online learning were actively accessing e-learning platforms. In response, the Ministry of Education and UNESCO established a working group on home learning to address this challenge. Understanding the reasons for low engagement in remote learning – including those related to student characteristics (demographic, socioeconomic, motivations, etc.), the support system, the quality of the programmes or the context – is essential for improving the impact and reach of remote learning.

7 The UNICEF COVID-19 Education response tracker is a tool used by UNICEF staff to provide information on COVID-19 education responses in more than 120 countries.

Other countries have made progress on concrete measures to include monitoring as part of school re-opening processes, so that learning losses and increases in school dropouts can be understood and addressed. Venezuela has reported plans to monitor attendance and re-enrolment after schools reopen. The aim is to develop alternative educational opportunities such as catch-up programmes or accelerated education for children who may have fallen behind. In Cote d'Ivoire, UNICEF has assisted the Ministry of Education in implementing a real-time monitoring system, which focuses on tracking potential challenges that girls experience as they return to school. These examples highlight the useful ways in which countries can utilize results from monitoring access and learning to strengthen policy and build back more resilient and equitable education systems.

Maintain regular communication between teachers, learners, and caregivers to improve remote learning delivery

Keeping learners motivated and engaged during school closures is a challenge faced by education actors in many countries. A survey from June, 2020 of 392 primary and secondary school leaders from ten African countries found that one quarter (26 per cent) of school leaders reported not keeping in touch with their learners every week (UNESCO, 2020a). Furthermore, around four in every ten teachers reported that communicating with families during school closure was very challenging.

Some countries are using a variety of tools to reach out to learners, parents and the community for feedback and to strengthen their engagement (*see Box 3*). In Ethiopia, messaging apps are being utilized to engage parents and students in learning. Meanwhile in Argentina, Jamaica, Botswana, Nigeria, the Gambia, Uganda, Zimbabwe and Zambia, U-Report, a social messaging channel, is used to gather quick feedback from children about their experiences with remote learning programmes. Several countries are also working with parents, teachers and community partners to help support monitoring of learners at home. In Namibia, school boards are involved in supporting schools and their teachers in monitoring remote learning and teaching.

UNICEF is supporting the Ministry of Education in Tanzania to develop guides for parents on how to monitor and supervise their children's learning as a short-term solution for ensuring the continuity of learning, especially for those without access to digital tools. These initiatives supporting parental/caregiver engagement are important as their involvement has been shown to be vital in children's learning (Avvisati et al., 2014; Goux et al., 2017; Bouguen et al., 2015; and Brossard et al., 2020). This importance is magnified when households double as classrooms and caregivers act as teachers during school closures.

Box 3: Engaging with communities to give continuity to the learning of Syrian Refugees in Lebanon

In Lebanon, UNICEF supports local NGOs in the provision of non-formal education (NFE) programmes spanning from early childhood to adolescence, in particular to support Syrian refugees' pathways into formal school. When learning centres closed due to COVID-19, education partners leapt into action, providing remote learning and staying connected to learners and families.

A rapid survey of 48 learning centres for Syrian refugees was undertaken in early May to understand if and how programmes had adjusted to remote learning. Forty-six centres were confirmed to be providing remote learning (47 per cent of them on a daily basis and 43 per cent of them 2-3 times a week). Teachers reportedly used various tools and educational content to provide lessons remotely; in particular, 76 per cent used curated lessons from YouTube, and 53 per cent of learning centres reported use of the Akelius digital language course.

Internet connectivity and hardware issues (e.g. phones not suitable for online learning) were the most common challenges reported. Some partners overcame these challenges by providing wireless hot spots for learners. Teachers reported parental engagement as a critical factor for remote learning. Over half (56 per cent) of the learning centres reported daily communication with parents/caregivers using WhatsApp or Zoom. As a very encouraging outcome, teachers reported observing refugee parents enjoying learning together with their children.

Assess learning for the design of effective and inclusive solutions

Countries have realized the great damage that the current crisis can do to learning and they have put great efforts into providing remote learning through various delivery channels. Even so, it is critical to conduct learning assessments to evaluate their effectiveness, improve their implementation and to pave the way for hybrid approaches (that combine in-person and remote learning) as schools reopen.

Some country initiatives have started using novel methods such as telephone testing to address this gap in knowledge on whether and how remote education is improving learning. Though not all learning can be assessed by telephone, recent research by Angrist et al., (2020a) provides evidence that phone-based assessments can accurately capture basic reading and numeracy skills when carried out with the right principles. These principles include using simple and clear instructions, drawing upon proven test items focused on the target skill, and following strict ethical protocols to protect children.[8] An evaluation of the effectiveness of two COVID-19 interventions targeting primary school students in Botswana provides two concrete examples of this type of assessment. The first, a weekly SMS containing numeracy problems addressed to parents and caregivers, resulted in an average learning gain of 0.16 standard deviations after four weeks. The second, an additional weekly 20-minute support phone call with both parents and children, led to an average increase of 0.29 standard deviations (Angrist et al., 2020b).

The closure of schools caused by the crisis forced many countries to cancel, postpone or adjust high-stakes exams and national learning assessments planned for 2020. According to a UNESCO analysis of 144 countries (UNESCO, 2020b), half of these countries announced the postponement of all assessments for the first six months of 2020 (e.g. Spain, Latvia, Turkey, Nigeria, Ghana, Liberia, Togo, Algeria,

8 The authors also document a high similarity between the results of the Annual Status of Education Report (ASER) in numeracy implemented face-to-face and via telephone.

Cambodia, Costa Rica, and Colombia). Meanwhile, 16 per cent introduced major changes such as reducing the number of subjects tested or moving assessments to online formats (e.g. Belgium, Myanmar, Mexico, Venezuela and Egypt). At the same time, 15 per cent kept the same schedule and characteristics for assessments (e.g. Jordan, Morocco, Palestine and Syria), while 8 per cent cancelled them entirely (e.g. France, Ireland, Indonesia and Uganda), and 3 per cent reduced the number of tests (e.g. Ecuador, Vietnam, Italy).

There is an urgent need to increase the scale of learning assessments in the current remote learning environment. Learning assessments are a key component in tailoring instruction to the specific learning needs of students (Bhula, 2019). When schools reopen, the use of these tools are essential for identifying children's learning levels, and to design remediation, compensation, catch up and accelerated programmes accordingly. Assessments are necessary to determine the effectiveness of the different remote learning methods and the optimal conditions for their implementation. These aspects are critical to support evidence-based and cost-effective decision making, especially given possible further school closures or the need to continue hybrid education methods.

Assessment of remote learning should be regular and frequent so that it captures the different and highly changing phases of the response to the pandemic and allows for timely adjustments in implementation. They should be adapted to different contexts, education systems, ages and remote learning methods to enhance their use among policy makers, teachers and parents (Montoya and Arcia, 2020). It is also important that assessments be accompanied by analyses of associated factors to identify as far as possible the determinants of learning outcomes.

Children who are not reached by remote learning methods are at greatest risk of not being assessed, resulting in highly unfavourable biases if action is not taken to universalize learning assessment. According to the World Bank (2018), while virtually all children in high-income countries participate in a large-scale national learning assessment, only one-third of those in low-income countries do. The lack of technical capacity to measure learning and utilize results requires urgent interventions that promote the development of large-scale assessment skills in education systems and formative assessment skills among teachers in their face-to-face or remote interactions with students.

5. LOOKING FORWARD: MOVING FROM REMOTE LEARNING STRATEGIES TO RESILIENT AND EFFECTIVE EDUCATION SYSTEMS

As the COVID-19 crisis persists and countries prepare for a new normal that may include the continued or localized closure of schools, governments, donors and the education community are developing hybrid models, which combine in-school instruction with remote learning channels and can be leveraged in times of shock. The findings of this research call on education stakeholders to collaborate on strengthening the effectiveness for learning and resilience of education systems in the following ways:

1. **Focus on foundational learning and the development of strong monitoring and evaluation systems.** Today, more than ever, children's acquired and potential learning must be protected and prioritized. Losses in foundational learning are the most difficult to recover and can result in significant damage to children's accumulated learning and future opportunities. There is a need to promote, develop, and refine methods of monitoring and evaluating learning in and outside of school, as well as to ensure their application in disadvantaged contexts.

2. **Collect real-time measurements specific to the context of COVID-19**. While the analyses presented and referenced in this report might be useful for planning response measures and preventing further damage at an early stage, better information is required to enable real-time measurement of specific COVID-19 effects and differentiate the possible factors affecting learning and other educational outcomes. The active participation of the international community and donors is key to ensuring the generation of reliable and timely information at the country level. Reliance on inappropriate and unspecific data is risky and affects the ability of decision makers to design context-appropriate interventions.

3. **Promote multiple delivery channels for better inclusivity.** Remote or hybrid learning systems that have multiple delivery channels to reach learners with low levels of connectivity, access to technology and digital skills are much needed. The availability of quality content adapted to children of different ages and levels must also be guaranteed. Focus should be on what is accessible to learners as well as effective to ensure that quality learning is achieved, regardless of technological constraints.

4. **Strengthen communication between teachers and parents/caregivers**. Education systems, acting in joint efforts with other relevant sectors, should invest in greater and more systematic support to teachers and caregivers. It is becoming increasingly clear that learning occurs both at school, in the classroom, in the community and at home. Consistent communication is of vital importance to improve learning acquisition and progress, especially at early ages.

ANNEX: ANALYSIS METHOD

To help develop a better understanding of the potential effects of COVID-19 school closures on learning, Section 2 of this paper presents estimates of the association/correlation between foundational reading skills and non-attendance/absence from school for young children (between 9–14 years old).[9]

The data comes from the Multiple Indicator Cluster Surveys – round 6 (MICS6) collected between 2017–2019. Two MICS6 modules were used: (1) the one testing the acquisition of foundational reading skills of in and out-of-school children, and (2) the one inquiring about their schooling status in the year of measurement (period 1) and the previous year (period 0).

Two age groups, (1) 9–11 years and (2) 12–14 years, and five low- and middle-income countries (Bangladesh, the Democratic Republic of the Congo, Madagascar, Pakistan-Punjab and Zimbabwe) are examined independently. The separation into these two age groups is due to the importance of analyzing children separately according to the level of reading proficiency they should have for their age. Children ages 9–11 are in general supposed to master the phase of 'learning to read', while children ages 12–14 are supposed to be "fluent readers." The decision to limit the analysis to only five countries/territories (of the 15 with MICS6 data available at the date of drafting this paper), was due to the small number of recently out-of-school children represented in the remaining ten. To ensure the robustness of the results, a threshold of 30 observations of children recently out-of-school per age-group was set (see Table A1).

The method of analysis relies on comparing the foundational reading skills between two groups of children, using an econometric regression. The first group of children pools those who did not attend school in the measurement period (period 1) despite having attended in the immediately preceding school year (period 0) and are classified as "recently out-of-school"; the second group is composed of the children that attended school in both periods and are classified as "in-school."

9 Although the MICS6 foundational skills data is available for children ages 7-14, age 9 is the minimum age at which children have finished the phase where they learn the essential mechanics of reading (World Bank, 2019).

Table A1. Sample size (15 countries with foundational learning MICS 6 data available) by country and age group

	9 –11 years old			12–14 years old		
	Full sample	Recently out-of-school children		Full sample	Recently out-of-school children	
	N. Obs	%	N. Obs	Total	%	Total
Bangladesh	7095	1.6	114	7001	2.6	184
Congo, D.R.	1655	6.9	114	1524	9.3	141
Gambia	922	1.1	10	879	1.6	14
Ghana	1608	1.1	18	1698	1.8	30
Kiribati	315	1	3	352	4	14
Kyrgyzstan	305	0.7	2	226	1.3	3
Lesotho	928	0.9	8	971	2.7	26
Madagascar	1609	4.4	71	1550	9.5	147
Mongolia	1779	1.1	20	1362	1.8	24
Pakistan (Punjab)	3941	1.6	63	3879	4.1	160
Sierra Leone	1680	1.4	24	1373	1.8	25
Suriname	548	1.8	10	443	1.4	6
Togo	1052	0.4	4	909	1.3	12
Tunisia	517	1.5	8	559	2.3	13
Zimbabwe	1427	2.9	41	1135	10.6	120

Source: Authors' calculations based on MICS6 data for 15 countries by age groups, 2017–2019.

The **primary model**, from which the findings previously presented come, is represented by Equation 1:

$$\text{Prob(read=1)}_{i,j,k} = \alpha_{j,k} + \beta\ \text{o\_school}_{i,j,k} + \delta\ x_{i,j,k} + \varepsilon_{i,j,k} \qquad \text{(Equation 1)}$$

Where:

- **read** is a binary variable equal to 1 if the child *i* in the age-group *j* from the country *k* responds correctly to all the tasks assigned in the MICS6 foundational reading test, and to zero otherwise. Thus, this variable gives a measure of the probability of demonstrating foundational reading skills.
- **o_school** is a variable equal to 1 if the child *i*, in the age-group *j*, from the country *k* is not attending school the year of the survey (period 1), but attended school the year before (period 0), and zero if the child is attending school in both period 1 and period 0.[10] β is the coefficient associated with this variable that results from the econometric estimation of Equation 1. It measures how far behind recently out-of-school children are from in-school children in their ability to demonstrate foundational reading skills (MICS6 test).

10 Two questions from MICS6 were used to construct this variable: "At any time during the current school year did (name) attend school or any early childhood education programme?"; and: "At any time during the previous school year did (name) attend school or any early childhood education programme?"

- **x** is a vector of control variables[11] that includes:
  - **age** (three dummy variables[12] per age group);[13]
  - **sex** (one variable equal to 0 for boys and 1 for girls);
  - **location** (one variable equal to 0 for urban and 1 for rural households);
  - **wealth percentiles** (a dummy variable representing each of five groups);[14]
  - **mother's education** (a dummy variable representing each of three groups);[15]
  - **grade attended during the previous school year** (a dummy variable representing each of eight grades).[16]

- ε is the error term, which captures the lack of accuracy of the model compared to reality (e.g. measurement errors, functional form problems, unobserved variables, etc.);

- and $\alpha_{j,k}$ is the constant term.

Equation 1 was estimated using a **linear probability model (LPM),** which is appropriate for the estimation of relative probabilities such as those sought to be evaluated in this working paper. The **internal validity** of this model rests on the assumption of constant variance of the error term across groups (i.e. currently out-of-school and in-school children). A potential violation of this assumption is the existence of unobservable variables associated with the probability of demonstrating foundational reading skills other than the current schooling status, for example, skills acquired in previous years.

Although, the data do not allow for differentiating the foundational skills of children in the preceding school year, the regressions control for the higher grade previously achieved. As this variable is not a perfect measure of previously acquired reading competence, it cannot be completely ruled out that low foundational skills, for instance, explain in part dropping-out (i.e. reverse causality bias). While this limitation does not affect the interpretation of the correlations between children's current attendance status and their likelihood of demonstrating foundational skills presented here, it does not allow for a causal interpretation.

Table A2 presents the results of the estimation of Equation 1 (β and P. Value) by country and age group.

11 Control variables seek to capture the differences in the acquisition of foundational reading skills inherent to certain characteristics of the sample (in this case: age, sex, location, wealth, mother's education, wealth and the grade attended in the preceding school year), regardless of current school status.

12 Term for variables that take values of 0 or 1.

13 For the 9-11 age group: (1) a variable equal to 1 for the 9 years old, and 0 otherwise; … (3) a variable equal to 1 for the 11 years old, and 0 otherwise. For the 12-14 age group: (1) a variable equal to 1 for the 12 years old, and 0 otherwise; …; (3) a variable equal to 1 for the 14 years old, and 0 otherwise.

14 (1) a variable equal to 1 if the child belongs to a household from the bottom of the wealth distribution, and 0 otherwise; …; (5) a variable equal to 1 if the child belongs to a household from the top of the wealth distribution, and 0 otherwise.

15 (1) a variable equal to 1 if the child's mother has no formal education, and 0 otherwise; …; (3) a variable equal to 1 if the child's mother has higher secondary or more, and 0 otherwise.

16 (1) a variable equal to 1 if the child's highest grade of education previously attained is grade 1, and 0 otherwise; …; (8) a variable equal to 1 if the child's highest grade of education previously attained is grade 0, and 0 otherwise. These variables seek to proxy approximately the level of learning of children in the previous school year.

Table A2. Difference in the probability of demonstrating foundational reading skills - recently out-of-school versus in-school children (LPM), by country and age group

	9 –11 years old		12–14 years old	
	β	P. Value	β	P. Value
Bangladesh	-16.69***	[0.00]	-24.86***	[0.00]
Congo, D.R.	-1,49	[0.43]	-5.48**	[0.02]
Madagascar	-10.65**	[0.03]	-20.71***	[0.00]
Pakistan (Punjab)	-43.03***	[0.00]	-53.97***	[0.00]
Zimbabwe	-18.90***	[0.01]	-22.69***	[0.00]

Source: Authors' calculations based on MICS6 data for five countries with sufficient sample sizes for both age groups and recently out-of-school children and in-school children, 2017–2019.

Notes: β is the coefficient associated with the variable o_school (Equation 1). It measures how far behind recently out-of-school children are from in-school children in their ability to demonstrate foundational reading skills. The P. Value (probability value) tests the null hypothesis that β is equal to zero (i.e. that o_school has no correlation with read). *** Indicates that β is statistically significant at 99 per cent confidence, ** at 95 per cent and * at 90 per cent. No stars (the Democratic Republic of the Congo – 9–11 age group) means that the data do not allow us to conclude that the correlation between o_school and read is not equal to zero.

To confirm the results of the previous exercise (Equation 1 - LPM) and to provide complementary interpretations of the relationship between foundational reading skills and dropping-out recently from school, a second set of equations (Equation 2) was also estimated using a **logistic regression model (LOGIT)**.

$$\frac{(\text{Prob (read=1)}}{\text{1-Prob (read=1)}_{i,j,k}} = \alpha_{j,k} + \gamma\ \text{i\_school}_{i,j,k} + \delta\ x_{i,j,k} + \varepsilon_{i,j,k} \qquad \text{(Equation 2)}$$

Where:

- **i_school** is a variable equal to 1 if the child *i*, in the age-group *j*, from the country *k* is attending school in both period 1 (the year of the measurement) and period 0 (the preceding year), and zero if the child attended in period 0 but is not attending school in period 1. This definition is the opposite of o_school (Equation 1). γ is the coefficient associated to i_school. However, it cannot be interpreted directly and requires the calculation of the odds ratio of success (in demonstrating foundational reading skills γ **– or**, i.e. odds of demonstrating foundational reading skills for i_school / odds of demonstrating foundational reading skills for o_school;
- and the other variables and parameters **read,** α**,** δ**, x** and ε are defined as above (Equation 1).

Table A3 presents the results of the estimation of Equation 2 by country and age group. Similar to the primary model, the results indicate that children who continue to attend school in period 1 perform better in foundational reading skills than those who do not. For example, in Pakistan (Punjab), 9–11 years old children who continue in school have 35 times more chance to demonstrate foundational reading skills than those who drop out.

Table A3. Association between school attendance and the probability of demonstrating foundational reading skills (Logit Model) by country and age group

	9 –11 years old			12–14 years old		
	γ	P. Value	γ - or	γ	P. Value	γ - or
Bangladesh	0.35***	[0.00]	2,23	0.50***	[0.00]	3,17
Congo, D.R.	0.24	[0.39]	-	0.50**	[0.03]	3,16
Madagascar	0.87***	[0.01]	7,35	0.50***	[0.00]	3,18
Pakistan (Punjab)	1.55***	[0.00]	35,33	1.32***	[0.00]	21
Zimbabwe	0.48***	[0.01]	3	0.53***	[0.00]	3,35

Source: Authors' calculations based on MICS6 data for five countries with sufficient sample sizes for both age groups and recently out-of-school and in-school children, 2017–2019.

Notes: γ is the coefficient associated with the variable i_school in Equation 2. It measures the association between attendance status of children and their ability to demonstrate foundational reading skills. The P. Value (probability value) tests the null hypothesis that γ is equal to zero (i.e. that i_school has no correlation with read). *** Indicates that γ is statistically significant at 99 per cent confidence, ** at 95 per cent and * at 90 per cent. No stars (the Democratic Republic of the Congo – 9–11 age group) means that the data do not allow us to conclude that the correlation between i_school and read is not zero. γ - or is the odds ratio of success in demonstrating foundational reading skills (i.e. odds of demonstrating foundational reading skills for i_school / odds of demonstrating foundational reading skills for o_school).

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