COVID-19: ARE CHILDREN ABLE TO CONTINUE LEARNING DURING SCHOOL CLOSURES?

A global analysis of the potential reach of remote learning policies using data from 100 countries

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for every child

Contents

Key messages

In response to the unprecedented educational challenges created by school closures due to the COVID-19 pandemic, governments around the world responded quickly and have designed remote learning policies that have the potential to reach more than a billion students.

Yet at least 463 million students worldwide have been cut off from education:

- More than 90 per cent of ministries of education enacted some form of policy to provide digital and broadcast remote learning.

- At the global and regional levels, most students (about 70 per cent) have assets at home that would allow them to learn remotely via digital or broadcast classes.

- **But at least 31 per cent of schoolchildren worldwide cannot be reached by remote learning programs, mainly due to a lack of necessary household assets or policies geared toward their needs.**

- **And 40 per cent of countries did not provide remote learning opportunities at the pre-primary level of education.**

Reasons for the limited reach of remote learning policies vary:

Limited focus on pre-primary education:
Only 60 per cent of ministries provided remote learning policies for pre-primary education. Almost 70 per cent of students attending pre-primary education prior to the school closures do not have any access to digital or broadcast remote learning opportunities.

Regional discrepancies:
The share of students who cannot be reached by digital and broadcast remote learning policies is the highest in the countries of Sub-Saharan Africa: at least 48 per cent in West and Central Africa and 49 per cent in Eastern and Southern Africa.

Rurality and poverty:
Around the world, over 70 per cent of students who cannot be reached live in rural areas and over three-quarters come from the poorest 40 per cent of households.

Huge variations between and within countries:
Unsurprisingly, digital and broadcast remote learning have a higher potential reach in wealthier countries than in poorer ones, as well as in wealthier and/or urban segments of the population. The digital and broadcast remote learning coverage in low- and middle-income countries varies significantly, from almost zero per cent to 100 per cent.

Although remote learning policies were originally designed in response to the COVID-19 pandemic, they can be used as a way to deliver education even after schools reopen. **The following actions are needed to ensure the world's children can continue to learn:**

1. Democratize access to safe and secure remote learning for all children and young people. Remote learning programs need to be designed around modalities that are accessible to all children and adapted for households that do not have access to broadcast or digital media.

2. Modernize the infrastructure and delivery methods used by education systems and produce accessible resources based on the national curriculum. These vital improvements will make education systems stronger and more robust and can enrich learning opportunities for all children – including the estimated 258 million who are out of school – whether schools are open or not.

3. Identify the best combination of remote learning policies, develop and provide quality education content, and invest in infrastructure that will help reach marginalized children by supporting remote learning in remote and rural areas.

4. Support and train teachers and parents to effectively manage remote 'virtual' classrooms and help children learn at home, at all levels of education including pre-primary. Blended learning approaches that combine in-person and remote instruction will be critical.

5. Address the social and gender norms that in many countries prevent children – especially girls – from using computers and online learning to their maximum potential.

6. Invest in innovation that supports real-time monitoring of remote learning, including formative learning assessments.

Introduction

In early 2020, schools around the globe closed to help contain the spread of COVID-19, and at their peak these closures interrupted the learning of almost all the world's 1.5 billion from pre-primary to upper secondary school students.[1] Governments and education stakeholders responded swiftly with remote learning policies that directed educators to use delivery channels that included digital tools, TV/radio-based teaching, and take-home packages so students could continue to learn.[2]

This factsheet aims to help answer the question "How many students attending school prior to COVID-19 were able to continue to learn during school closures?"

Using data from the UNESCO-UNICEF-World Bank Survey on National Education Responses to COVID-19 School Closures (June-July 2020), as well as household microdata from sources like Multiple Indicator Cluster Surveys (MICS), Demographic and Health Surveys (DHS) and others, this factsheet estimates the *potential* reach of these remote learning policies, with a focus on broadcast-based (radio and television) and internet-based approaches.[3]

However, it must be emphasized that the *actual* number of students reached is likely significantly lower than the estimates presented in this factsheet, which reflect best-case scenarios based on the policies that were implemented and the technologies available in households. The fact that a home has a television and the country offered TV-based instruction does not guarantee that the children in that home partook of that instruction – parents may not understand how to access the coursework or may not take the steps necessary to support their child's learning.

Furthermore, it should be noted that the UNESCO-UNICEF-World Bank Survey on National Education Responses to COVID-19 School Closures took an expansive approach regarding the provision of remote learning: while many countries provided remote learning only for specific grades (e.g., the last grade of primary education), in cases where this occurred, *all* primary students in that country were considered to potentially have been reached with a learning solution. As a result, this factsheet overstates the actual numbers of students reached.

Although the remote learning policies examined were intended as a response to the pandemic, in some cases they can and should continue to be used as a way to deliver education even after schools reopen. As such, it is important to understand the characteristics and minimum number of children who were not able to benefit from these remote learning policies so that the policies can be improved.

By providing insights as to which schoolchildren did not have access to digital or broadcast remote learning opportunities during school closures, we seek to help policymakers make choices that will ensure more children can acquire an education during the COVID-19 pandemic and beyond.

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[1] UNESCO (2020), Education: From disruption to recovery. https://en.unesco.org/covid19/educationresponse

[2] For a summary of distance learning solutions provided by MoEs, please visit: https://en.unesco.org/covid19/educationresponse/nationalresponses

[3] It should be noted that the analysis does not include all the possible remote learning approaches such as paper-based or SMS-based approaches due to a lack of reliable data.

# How did countries provide education during school closures?

Almost all countries implemented digital and/or broadcast remote learning policies, but only 60 per cent did so for pre-primary education.

The UNESCO-UNICEF-World Bank Survey on National Education Responses to COVID-19 School Closures collected critical information on how ministries of education in more than 110 countries continued to provide learning opportunities during school closures.[4] For each level of education, most countries have developed policies regarding digital (internet-based) or broadcast (TV- or radio-based) remote learning. The most common approach focused on digital instruction, which was used by 42 per cent of countries for pre-primary education, 74 per cent of countries for primary education and 77 per cent of countries for upper secondary education. Many countries have also developed broadcast curricula, especially for primary and lower secondary students.

Overall, 94 per cent of ministries of education analyzed developed policies regarding the provision of at least one form of remote learning that involved digital and/or broadcast instruction, though only 60 per cent provided this type of policy for the pre-primary education level.

Addressing this shortcoming should be a priority – recent estimates find that every dollar invested in increasing enrollment in pre-primary education returns $9 in benefits to society in the form of reduced repetition and dropouts in primary and secondary school, as well as increased lifetime earnings for individuals.[5] In addition to improving remote access to pre-primary instruction, policies should also recognize that at this level, parental involvement is particularly important.

Figure 1
Share of countries that implemented digital and broadcast remote learning policies, by education level
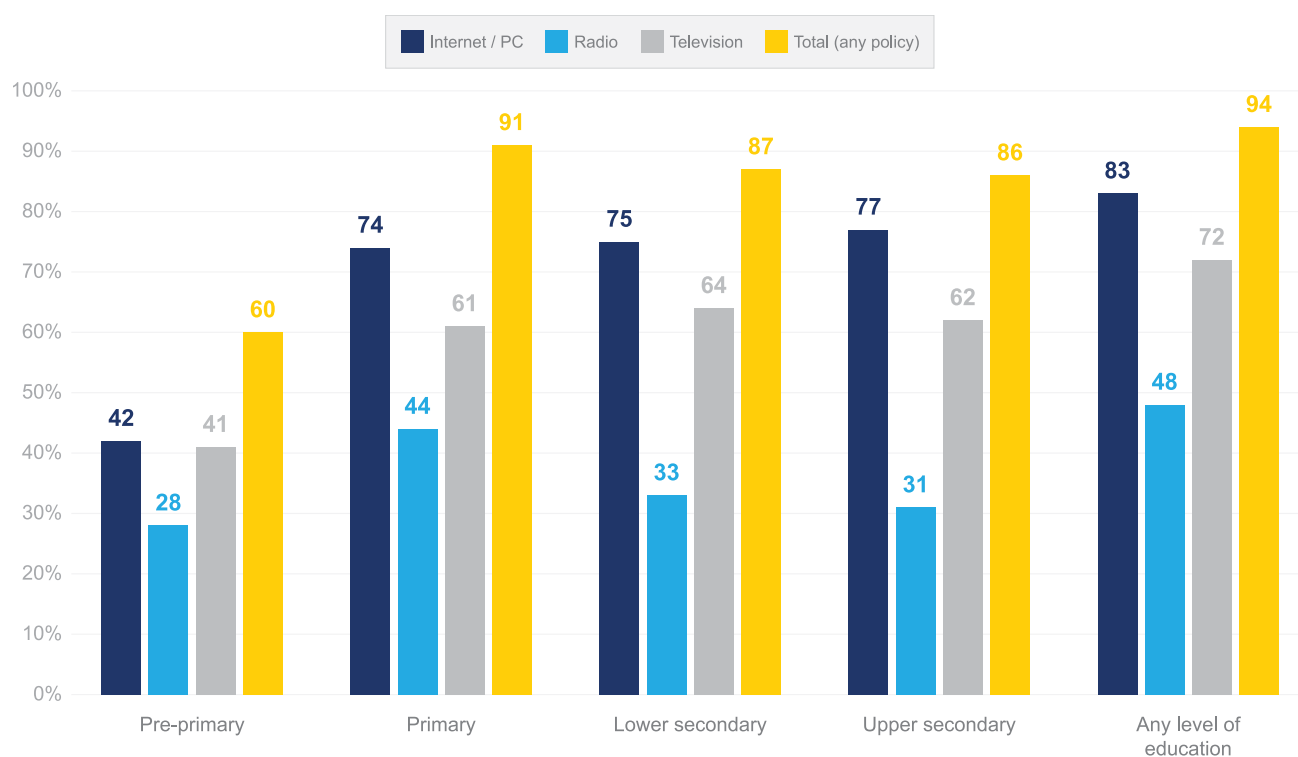
Sources: UNESCO-UNICEF-World Bank Survey on National Education Responses to COVID-19 School Closures (2020) and UNICEF country offices (2020).
Note: Figures are estimated using simple averages across countries.

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[4] UNESCO-UNICEF-World Bank Joint Survey (2020). http://tcg.uis.unesco.org/survey-education-covid-school-closures. Note that while the data on policy responses were collected through the joint survey and in some cases UNICEF country offices, and represented more than 110 countries, the reachability analysis presented in this factsheet was based on 100 countries where in addition to data on policy responses, household microdata was also available.
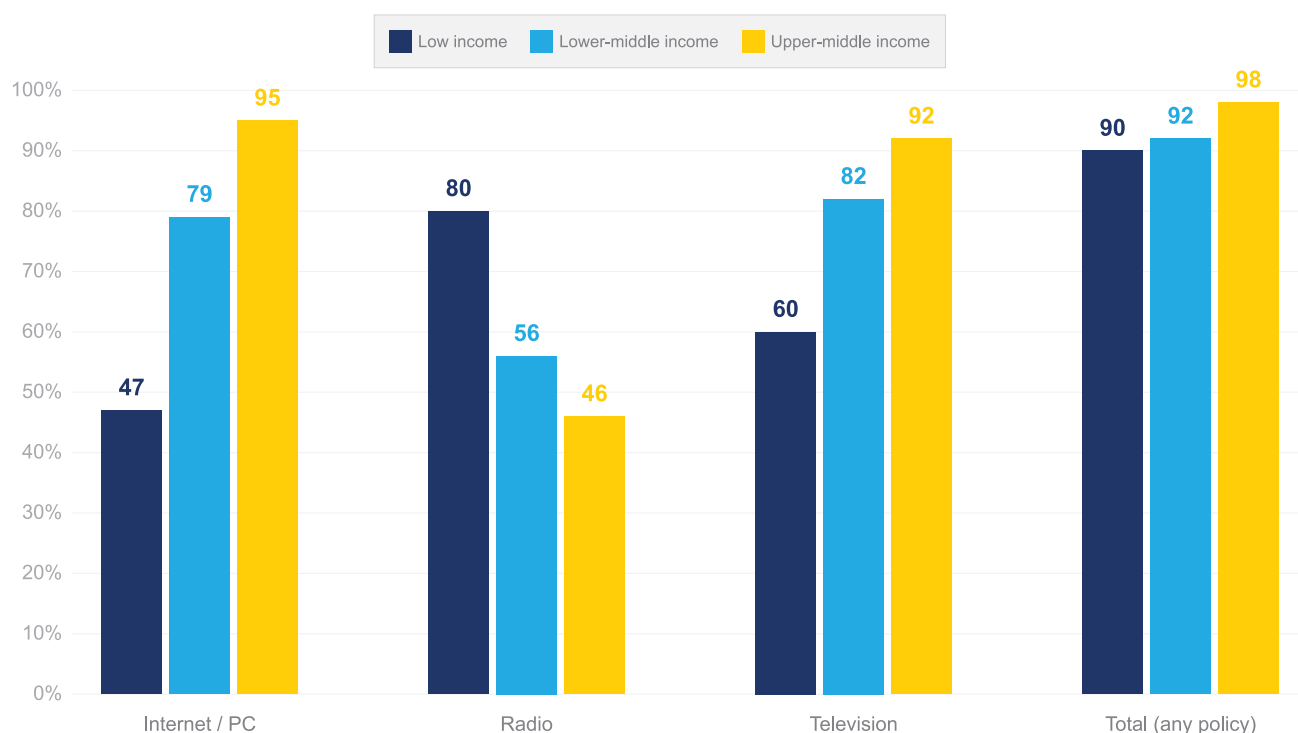
[5] UNICEF (2020), Policy Brief: COVID-19: A Reason to Double Down on Investments in Pre-Primary Education. https://www.unicef-irc.org/publications/1137-covid-19-a-reason-to-double-down-on-investments-in-pre-primary-education.html

Low-income countries predominantly implemented radio-based instruction, whereas middle-income countries relied primarily on television and digital media.

A country's choice of remote learning technology appears to be influenced by their income group. For example, radio-based instruction is implemented at much higher rates by low-income countries (80 per cent) than lower-middle-income (56 per cent) and upper-middle-income (46 per cent) countries. In contrast, internet- and TV-based instruction is much less common among low-income countries (47 and 60 per cent, respectively), while these methods are implemented by a much larger share of lower-middle-income countries (79 and 82 per cent, respectively) and upper-middle-income countries (95 and 92 per cent, respectively).

Figure 2

Share of countries that implemented digital and broadcast remote learning policies at the pre-primary to upper secondary levels of education, by country income group

Legend: Low income | Lower-middle income | Upper-middle income

	Internet / PC	Radio	Television	Total (any policy)
Low income	47	80	60	90
Lower-middle income	79	56	82	92
Upper-middle income	95	46	92	98

How many students could potentially be reached by remote learning?

The massive scale of school closures has laid bare the uneven distribution of technology needed to facilitate digital and broadcast remote learning at home, as well as the lack of systems to support teachers and caregivers in the safe, effective and secure use of technology for learning.[6] Despite governments' efforts to implement policies that provide digital and broadcast remote learning opportunities, not all schoolchildren have the necessary assets at home to continue their education. The share and the number of schoolchildren potentially reached – and the minimum share and number who were definitely not reached – were estimated using data on the implementation of digital and broadcast remote learning policies and household survey data on the availability of technologies needed to study at home, as detailed in Annex 1. As noted in the introduction, it should be assumed that this factsheet overestimates the number of children reached, and so by the same token, estimates of the number of children who cannot be reached are minimums.
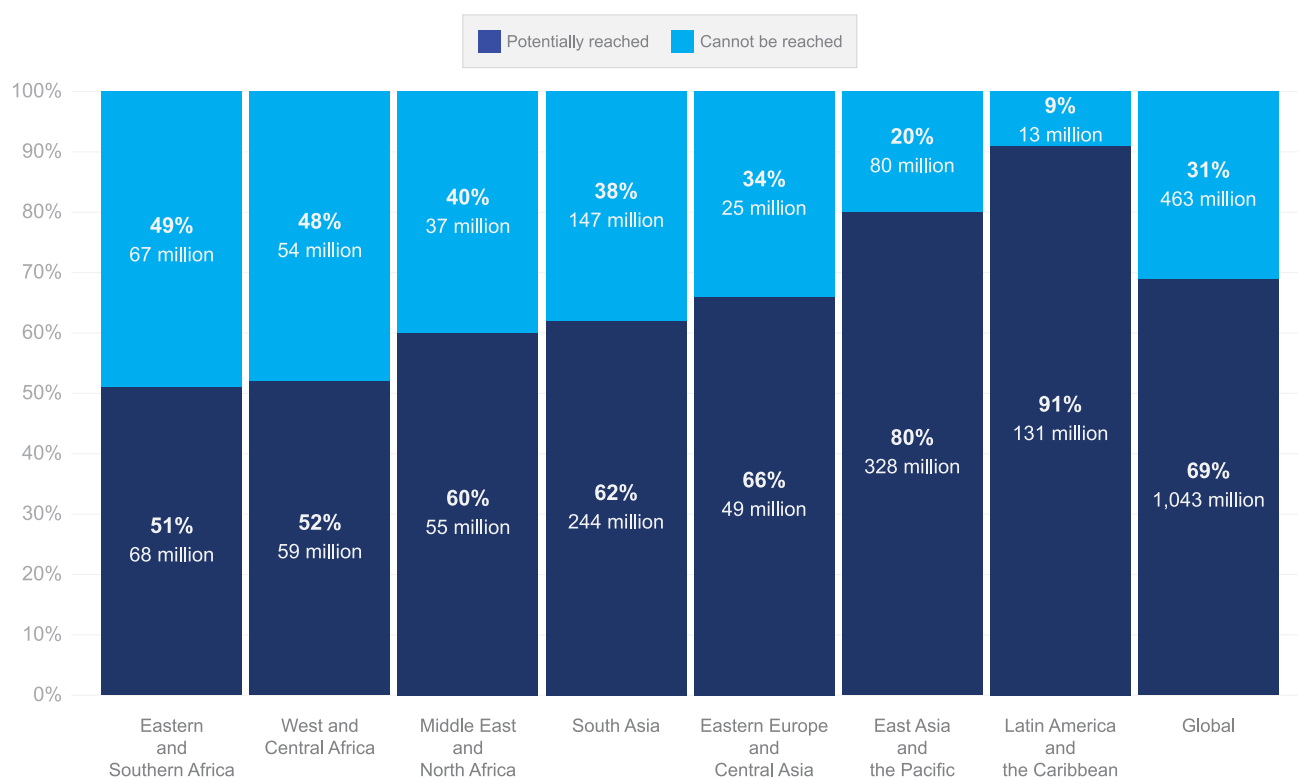

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[6] In many countries, the expansion of digital access and online learning has not been accompanied by adequate protections for the safety and security of children, who may be exposed to inappropriate material, abusive language or behaviour, or have their privacy compromised. In addition to making education platforms safe and secure, teachers, parents and students must be taught how to safely navigate these systems and the broader digital world.

> *At least 463 million – or 31 per cent – of schoolchildren worldwide cannot be reached by digital and broadcast remote learning programs enacted to counter school closures.*

Globally, at least 31 per cent of students from pre-primary to upper secondary schools cannot be reached due to either a lack of policies supporting digital and broadcast remote learning or a lack of the household assets needed to receive digital or broadcast instruction. With at least 49 per cent, Eastern and Southern Africa had the highest minimum share of students who cannot be reached. Latin America and the Caribbean have the lowest share of students who cannot be reached – 9 per cent – but again,

this does not mean we can conclude that 91 per cent of children were reached. For example, UNICEF offices in several countries such as Argentina, Bolivia, Panama, Paraguay and Ecuador have conducted telephone or online perception surveys of families with children and adolescents. The results reveal large gaps in access to electronic devices like computers or mobile phones, and to internet connections or other modalities of distance education, particularly in poor and rural areas.[7]

Figure 3
Share and number of students potentially reached and not reached[†] by digital and broadcast remote learning policies, by region (pre-primary to upper secondary)

Legend: Potentially reached ■ Cannot be reached ■

Region	Cannot be reached	Potentially reached
Eastern and Southern Africa	49% 67 million	51% 68 million
West and Central Africa	48% 54 million	52% 59 million
Middle East and North Africa	40% 37 million	60% 55 million
South Asia	38% 147 million	62% 244 million
Eastern Europe and Central Asia	34% 25 million	66% 49 million
East Asia and the Pacific	20% 80 million	80% 328 million
Latin America and the Caribbean	9% 13 million	91% 131 million
Global	31% 463 million	69% 1,043 million

Source: Authors' calculations.
Notes: i) Figures are calculated using weighted averages based on the number of students across countries.
ii) The high potential reach in Latin America and the Caribbean does not indicate that children in this region had more access to communication assets in the household – access is shown in Figure 5. Rather, it reflects that the policies in this region targeted technologies that are available in most households.
[†] "Reached" indicates potential maximums; "Cannot be reached" indicates minimums, which are likely much higher.

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[7] UNICEF LACRO COVID-19 Education Response, Update # 14, August 6, 2020. https://www.unicef.org/lac/latin-america-and-caribbean-covid-19-education-response

At least two out of three pre-primary school students cannot be reached, and almost half of the students that cannot be reached are primary school students.

The potential reach of digital and broadcast remote learning policies increases strongly from pre-primary to primary education and then more gradually for higher school levels. At least 69 per cent of students who attended pre-primary education cannot be reached by digital and broadcast remote learning policies, while at least 18 per cent of upper secondary level students cannot be reached by such policies. This is due to two factors – first, households with older students are better equipped with technology than households with younger students; and second, policies in most countries aim to reach older students.

Globally, 49 per cent of the school population consists of primary school children.[8] As such, of the at least 463 million students around the world who cannot be reached, a little over 215 million were attending primary education prior to the COVID-related school closures. The regions with the highest concentrations of students who cannot be reached are South Asia (147 million), East Asia and the Pacific (80 million), Eastern and Southern Africa (67 million) and West and Central Africa (54 million) – again, these figures represent minimums, and the actual students who were not reached are likely much higher.

Figure 4
Share and number of students potentially reached and not reached[†] by digital and broadcast remote learning policies, by education level
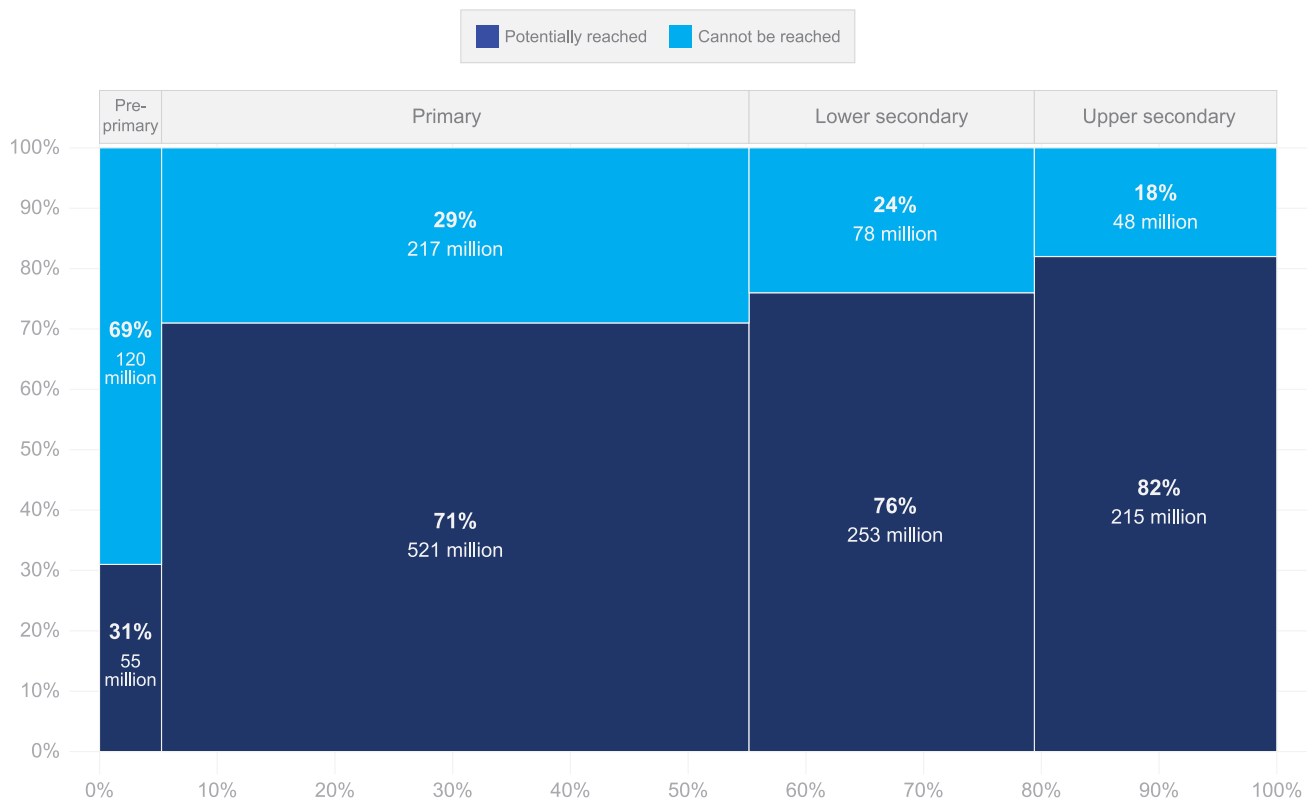
Source: Authors' calculations.
Notes: i) Figures are calculated using weighted averages based on countries' student populations.
ii) The high potential reach in Latin America and the Caribbean does not indicate that children in this region had more access to communication assets in the household – access is shown in Figure 5. Rather, it reflects that the policies in this region targeted technologies that are available in most households.
[†] "Reached" indicates potential maximums; "Cannot be reached" indicates minimums, which are likely much higher.

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[8] Three factors contribute to this: 1) primary school comprises more grades than lower secondary or upper secondary school; 2) many children drop out after primary school; and 3) younger cohorts are more populous than older ones, particularly in developing countries.
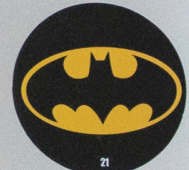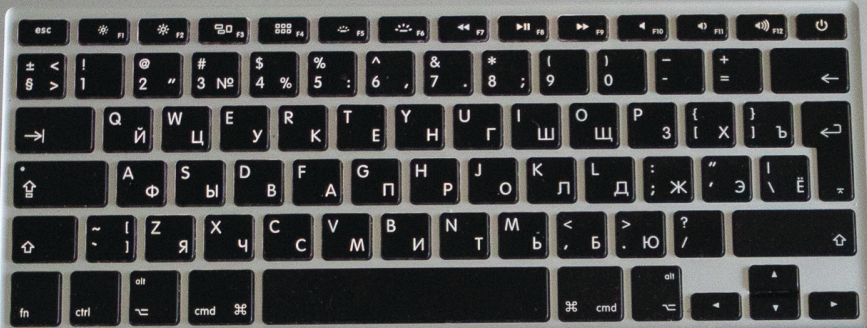
In Kyiv, Ukraine, Zlata, 7, does schoolwork from home, with all schools in the country closed as part of measures to combat the spread of COVID-19.

# What is the potential reach of different remote learning approaches?

Although television presents constraints in terms of sharing course materials, policies that implemented TV-based remote learning had the potential to reach the most students.

The proportion of students potentially reached by different digital and broadcast remote learning policies varied by region. Globally, TV-based remote learning policies had the potential to reach the highest proportion of students (62 per cent), which accounts for almost 930 million students worldwide; this suggests television has a significant role to play in delivering education during school closures, despite the fact that this medium doesn't offer a convenient way to transmit course materials.

The potential reach of internet-based learning is lower than that of television. Outside of the most-developed countries, at best internet-based remote learning had the potential to reach only about 50 per cent of students in Latin America and the Caribbean, Eastern Europe and Central Asia.

In East Asia and the Pacific, the Middle East and North Africa, and Eastern Europe and Central Asia, more students were potentially reached by internet-based learning than radio programs, but in Eastern and Southern Africa and West and Central Africa, more students were potentially reached through radio-based education than the internet. For Latin America and the Caribbean, the share of students potentially reached by radio and the internet is almost the same.

Figure 5
Share of students (pre-primary to upper secondary) potentially reached by different types of remote learning policies by region
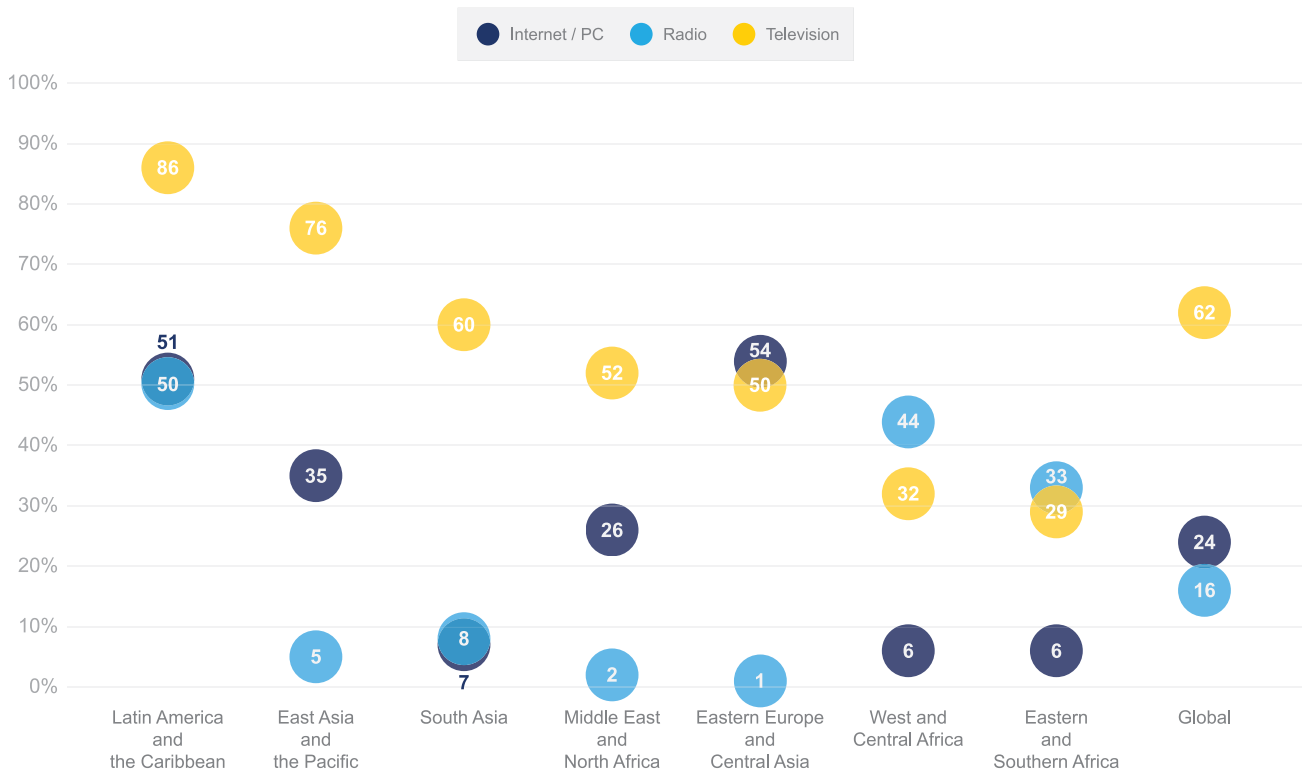
Source: Authors' calculations.
Note: Figures are calculated using weighted averages based on the number of students across countries.

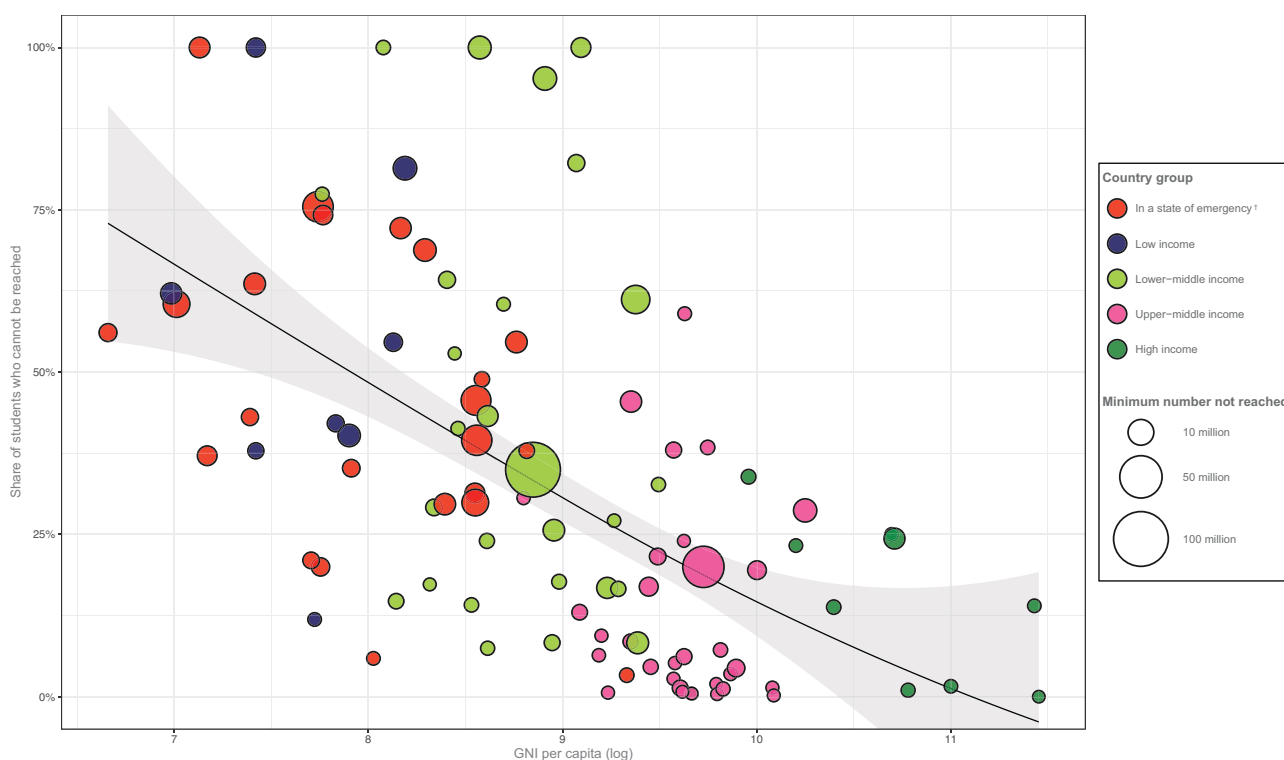## Students who cannot be reached and a country's GNI per capita

Unsurprisingly, digital and broadcast remote learning have the potential to reach more students in wealthier countries than in poorer ones.

In order to understand the patterns that determined whether or not students were potentially reached by digital and broadcast remote learning policies in the countries analyzed, it is important to explore the relationship between each country's economic status, measured by Gross National Income (GNI) per capita, and the share of students who cannot be reached. It is also important to highlight how countries in fragile contexts, namely those included in

the UNICEF 2020 Humanitarian Action for Children (HAC) appeal, fare in terms of remote learning.

An explicit trend exists in the association between a country's GNI per capita and the percentage of students potentially reached – in countries with lower levels of GNI per capita, a large share of students cannot be reached by digital and broadcast remote learning policies.

Figure 6
The relationship between GNI per capita and the minimum share of students who cannot be reached by digital and broadcast remote learning policies

Source: Authors' calculations.
Note: Figures are calculated using weighted averages based on the number of students across countries. The sizes of the dots reflect the minimum number of students who cannot be reached.
† Countries included in the UNICEF 2020 Humanitarian Action for Children (HAC) appeal.

Three quarters of countries included in the 2020 HAC appeal implemented at least one remote learning policy, potentially reaching 51 per cent of all students experiencing humanitarian crises. However, since only 35 per cent of these countries implemented one or more policies to ensure the continuity of pre-primary education, at best just

22 per cent of pre-primary school students were potentially reached. At higher levels the numbers improve – remote learning policies potentially reached 63 per cent of upper secondary school students experiencing humanitarian crises.
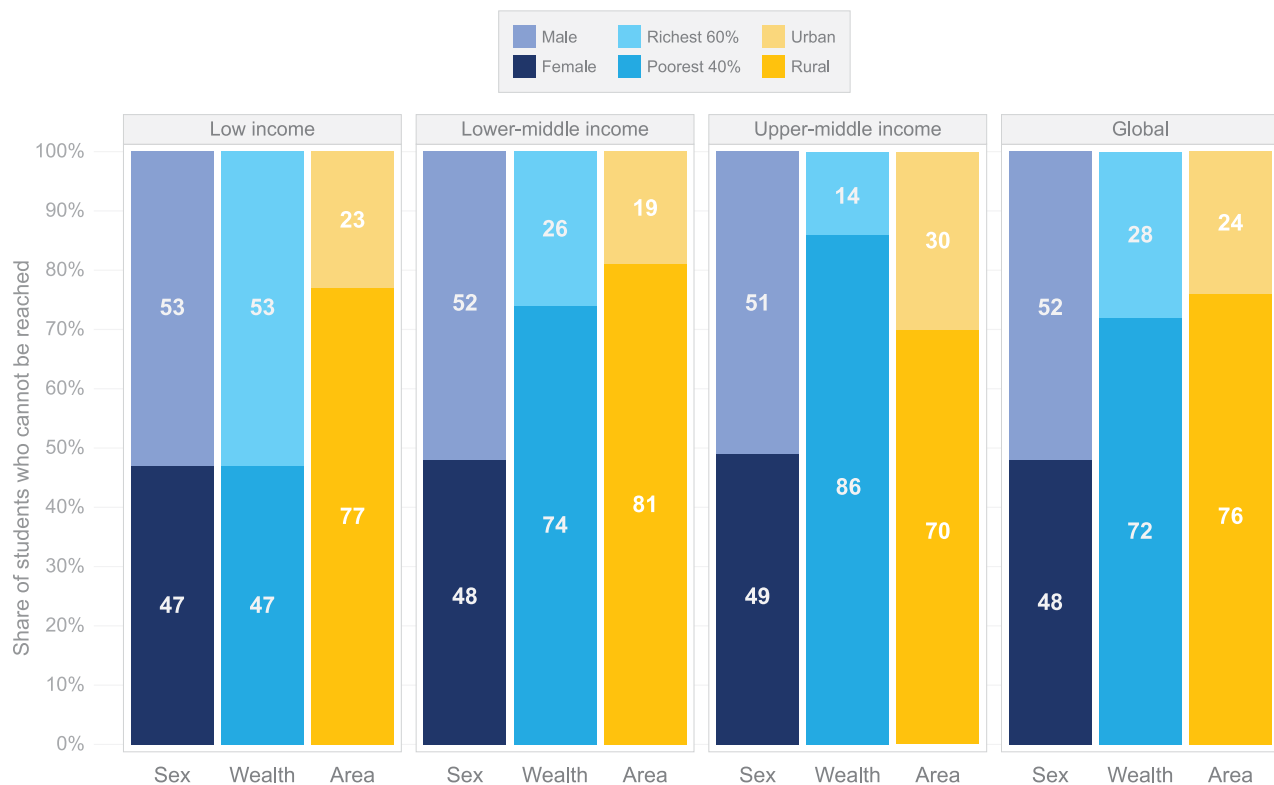
Which students cannot be reached?

> *Globally, three out of four students who cannot be reached by remote learning opportunities come from rural areas and/or poor households.*

Students who cannot be reached by any of the three means of remote learning analyzed in this study come from various backgrounds, but some themes can be observed. Students in rural areas consistently represent the vast majority of those who cannot be reached, irrespective of the country's level of economic development. Overall, three out of four students who cannot be reached live in rural areas, but in low-income countries the percentage is even higher.

It is also important to note that in this study, only children who were in fact attending school prior to the pandemic were counted. This is significant, because attendance rates for children in poorer and rural areas are low to begin with. As such, if out-of-school children were also counted, children in poorer and rural areas would represent even more than 75 per cent of those who cannot be reached.

Students from the poorest 40 per cent of families account for a disproportionately high percentage of those who cannot be reached. In low-income countries, they represent 47 per cent of those who cannot be reached, while in middle-income countries they constitute from 74 to 86 per cent of those who cannot be reached. Boys and girls were almost evenly represented among students who cannot be reached.

Figure 7
Composition of students who cannot be reached, by sex, household wealth and area of residence, by country economic classification

Legend: Male, Female, Richest 60%, Poorest 40%, Urban, Rural

Low income
Sex: Male 53, Female 47
Wealth: Richest 60% 53, Poorest 40% 47
Area: Urban 23, Rural 77

Lower-middle income
Sex: Male 52, Female 48
Wealth: Richest 60% 26, Poorest 40% 74
Area: Urban 19, Rural 81

Upper-middle income
Sex: Male 51, Female 49
Wealth: Richest 60% 14, Poorest 40% 86
Area: Urban 30, Rural 70

Global
Sex: Male 52, Female 48
Wealth: Richest 60% 28, Poorest 40% 72
Area: Urban 24, Rural 76

Share of students who cannot be reached (y-axis: 0%–100%)

Source: Authors' calculations.
Note: Figures were calculated using weighted averages based on the number of students across countries.
How to read this chart: The chart shows the percentage of students who cannot be reached, broken out based on their sex, household wealth and place of residence. For example, in low-income countries, 47 per cent of students who cannot be reached were girls.

Call for action

In 2020, remote learning policies enacted in response to school closures due to the COVID-19 pandemic sought to reach more than 1 billion students globally. Hundreds of millions of students in high- and upper-middle-income countries benefited, but hundreds of millions more students in lower-resource settings were excluded from opportunities to continue learning.

Partial and ongoing school closures mean that remote learning will continue to be an essential education platform for the foreseeable future. Blended learning approaches that combine in-person and remote instruction will be key to ensure students attending school can continue to learn, and they also provide an unprecedented chance to reach out-of-school children and youth.

Policies must focus on modernizing both the infrastructure and delivery methods used by education systems and producing accessible, safe and secure remote learning resources based on the national curriculum. These vital improvements will make education systems stronger and more robust and can enrich learning opportunities for all children – including the estimated 258 million who are out of school[9] – whether schools are open or not. Initiatives like Connect to Learn,[10] in collaboration with Generation Unlimited and GIGA, can fast-track safe access to technology and connectivity, increasing options for remote learning delivery and facilitating quicker responses to school closures.

Digital and broadcast remote learning policies must address the needs of all households and accommodate situations where children do not have the necessary technological assets at home. To achieve this, identifying the best combinations of digital and broadcast remote learning should be a priority, and investments should be made to develop the infrastructure necessary to reach children who are marginalized, live in remote and rural areas, or are displaced by emergencies. This approach will also help prepare education systems for future crises.[11]

Remote learning programs need to reach students, but students must access, use and learn the material. As such, policies should recognize that teachers, school professionals and parents also have to adapt to these new forms of learning and need to be trained to effectively manage virtual classrooms. Skills gaps among teachers and parents are one of the most critical barriers to effective, safe and secure remote learning,[12] yet more than one in three countries did not provide any training for teachers to use remote learning platforms.[13]

Policies that provide remote learning opportunities at the pre-primary level are vital. Enrollment in pre-primary education yields significant benefits to society, and has a tremendous impact on childrens' future learning as well as their lifelong earnings.[14]

There is a need to address the social and gender norms that prevent children — especially girls — from using computers and online learning to their maximum potential. Even in households where online learning is an option, in many countries, parental restrictions are among the most common barriers to digital access for children, and concerns about girls' online safety and the fear that girls will become exposed to content that goes against their community's values mean girls are discouraged from using the internet.[15]

Further investments and innovation are needed to ensure the quality of remote learning and provide real-time monitoring of education outcomes, including formative learning assessments. Countries have engaged in a variety of measures to understand the usage and effectiveness of different delivery channels, but these activities remain a challenge for many.[16]

Democratizing safe access to remote learning for all children and young people is key to providing quality education during the pandemic and beyond. Improved remote learning infrastructure and polices, particularly those that use a blended approach, will play a valuable role in helping countries navigate intermittent closures well as prevent outbreaks of the disease.[17] When countries begin to emerge from the COVID-19 crisis, governments should prioritize school reopenings as soon as is safely possible, using consultative preparations and holistic remedial plans that coordinate with all the key actors.

[9] UNESCO (2019), New Methodology Shows that 258 Million Children, Adolescents and Youth Are Out of School. http://uis.unesco.org/sites/default/files/documents/new-methodology-shows-258-million-children-adolescents-and-youth-are-out-school.pdf

[10] Connect to Learn is the new name for "Learning Unlimited" and "Digital Learning for Every Child."

[11] UNICEF (2020), Promising practices for equitable remote learning Emerging lessons from COVID-19 education responses in 127 countries. https://www.unicef-irc.org/publications/pdf/IRB%202020-10%20CL.pdf

[12] Global Education Monitoring Report (2020), Distance Learning Denied. https://gemreportunesco.wordpress.com/2020/05/15/distance-learning-denied/

[13] UNESCO-UNICEF-World Bank Joint Survey (2020). http://tcg.uis.unesco.org/survey-education-covid-school-closures/

[14] UNICEF (2020), Policy Brief: COVID-19: A Reason to Double Down on Investments in Pre-Primary Education. https://www.unicef-irc.org/publications/1137-covid-19-a-reason-to-double-down-on-investments-in-pre-primary-education.html

[15] For example, in the Democratic Republic of the Congo, only 24 per cent of adolescent girls with computers at home use them at least once a week (see COVID-19 and education: The digital gender divide among adolescents in sub-Saharan Africa. https://blogs.unicef.org/evidence-for-action/covid-19-and-education-the-digital-gender-divide-among-adolescents-in-sub-saharan-africa/)

[16] UNESCO-UNICEF-World Bank Joint Survey (2020). http://tcg.uis.unesco.org/survey-education-covid-school-closures/

[17] United Nations (2020), Policy Brief: Education During COVID-19 and Beyond. https://www.un.org/en/coronavirus/future-education-here

Mounee Mahdeya, 10, uses her computer tablet to complete schoolwork for her Level IV class at Monipur High School and College in the Mirpur area of Dhaka, capital of Bangladesh.

Annex 1: Methodology

The findings presented in this factsheet are based on an analysis of the potential reach of remote learning policies, which used two data sources. The first is the UNESCO-UNICEF-World Bank Joint Survey on National Education Responses to COVID-19 School Closures (May-July 2020), which compiles information collected from ministries of education regarding the policy measures adopted to ensure the continuity of learning during school closures, including the provision of remote learning through radio, television and the internet for each education level.

Although the survey also asked about the delivery of paper-based materials and their coverage, these data were not used because of the very low response rate to this question. To increase the number of countries analyzed, UNICEF country offices also collected some additional data.

The second data source was household surveys, primarily Multiple Indicator Cluster Surveys (MICS) and Demographic and Health Surveys (DHS), in addition to national data sources. Surveys conducted from 2010 onward were used in the analysis. Household data were used to calculate three indicators: (1) the percentage of students living in households with access to radio; (2) the percentage of students living in households with access to television; and (3) the percentage of students living in households with access to the internet or a computer (depending on the availability of the data).[18] The aggregation combined countries, weighted by their student population at each level of education.

The final analysis included 100 countries that participated in the joint survey and also have household microdata available. Indicators were calculated for children attending school at each education level, including pre-primary, primary, lower and upper secondary.[19] In addition, the total percentage of students with radio, television, or internet access or a computer at home was calculated for each country.

A child was considered to have potentially been reached if s/he was able to continue learning through any of the three modalities listed. The reachability indicator for a country was calculated as the share of students (at a specific education level and in total) reached by any of the policies designed for them. Importantly, the students who cannot be reached include both those whose households lack the necessary assets for remote learning, as well as those who were not targeted by the government's policies.

To estimate the possible reach of each digital and broadcast learning policy, household microdata were analyzed in combination with data on each country's policy response. As such, a student was considered to be "potentially reached" by a policy designed for their education level if they had the necessary technology at home to access that modality (broadcast or digital) of remote learning.

For example, the maximum potential reach of a policy designed to continue the education of lower secondary school students through internet classes is the share of lower secondary students in that country who have a computer or an internet connection at home.

Another important methodological pillar of the analysis was to identify vulnerable populations and formulate targeted policy messages to help them. To this end, the composition of students who cannot be reached was estimated by sex, household wealth, and place of residence to shed light on the share of girls, students from poor households, and students living in rural areas who cannot be reached. As a final step, the data were aggregated by UNICEF regions and World Bank country income group classification.

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[18] For countries where the household microdata from MICS6 were available, the availability of an internet connection at home was used. For countries that participated in DHS and other survey programs, the choice between internet access or possession of a computer was dictated by the availability of the data on each of the indicators.

[19] For five countries (Azerbaijan, Djibouti, Ecuador, United Kingdom and Uzbekistan), survey microdata did not include information on school attendance in the household roster. In these cases, children were divided into four groups – pre-primary, primary, lower and upper secondary – based on the age for each education level in the country.

Annex 2: Data sources

1. Botswana AIDS Impact Survey 2013. Ministry of Health (Botswana), National AIDS Coordinating Agency (Botswana), Statistics Botswana.

2. Brazil Continuous National Household Sample Survey (Continuous PNAD) 2018, IBGE.

3. Bulgarian Longitudinal Inclusive Society Survey (BLISS) 2013. Open Society Institute-Sofia, World Bank.

4. China Health and Nutrition Survey 1989-2015, Carolina Population Center, University of North Carolina at Chapel Hill, Chinese Center for Disease Control and Prevention (CCDC).

5. Demographic and Health Survey, 2010-2019.

6. Ecuador National Health and Nutrition Survey 2012. Ministry of Public Health (Ecuador), National Institute of Statistics and Censuses (Ecuador).

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Annex 3: Number of students potentially reached by remote learning policies (in thousands), by country economic classification and region

Remote learning approach	Education level	Low income	Lower-middle income	Upper-middle income	East Asia and the Pacific	Eastern Europe and Central Asia	East and South Africa	Latin America and the Caribbean	Middle East and Northern Africa	South Asia	West and Central Africa	Global
Internet / PC	Pre-primary	23	1,396	9,640	2,326	1,163	728	9,259	505	1,378	289	20,299
	Primary	2,205	33,554	96,582	69,115	13,910	4,233	26,958	15,085	11,144	4,044	157,648
	Lower secondary	1,710	16,668	60,872	36,938	14,806	1,571	20,629	4,670	5,791	1,232	94,840
	Upper secondary	869	18,204	53,943	35,769	9,853	1,367	16,301	3,475	9,968	1,685	90,545
	Total	4,807	69,822	221,037	144,148	39,731	7,899	73,147	23,735	28,280	7,250	363,331
Radio	Pre-primary	1,971	6,435	2,533	1,058	258	3,654	8,879	-	945	2,082	18,986
	Primary	43,886	50,129	10,683	10,984	360	32,513	29,548	982	15,455	35,157	132,115
	Lower secondary	7,131	18,750	6,689	6,541	169	4,390	20,300	650	6,156	8,299	52,362
	Upper secondary	2,073	13,195	6,079	1,890	249	3,428	13,982	592	6,943	4,636	36,114
	Total	55,061	88,509	25,985	20,473	1,036	43,985	72,709	2,225	29,499	50,174	239,576
Television	Pre-primary	421	11,267	20,826	3,734	2,453	2,727	17,461	1,453	8,985	2,766	46,412
	Primary	14,457	196,103	190,251	166,102	5,893	26,703	51,596	18,078	112,031	19,721	445,089
	Lower secondary	8,338	90,810	110,386	79,806	18,085	6,110	33,725	13,681	53,312	7,783	237,049
	Upper secondary	3,612	82,174	84,503	60,074	10,416	4,094	21,550	14,417	58,719	5,814	200,679
	Total	26,828	380,353	405,966	309,716	36,847	39,634	124,332	47,628	233,048	36,084	929,228
Total	Pre-primary	2,050	13,730	21,397	5,922	2,547	5,144	18,240	1,453	9,299	3,427	54,784
	Primary	49,042	217,340	199,154	173,507	16,005	49,372	54,355	24,835	118,548	39,130	520,837
	Lower secondary	12,234	95,761	111,615	83,901	18,523	8,412	35,025	14,177	55,389	10,436	252,886
	Upper secondary	4,448	87,020	86,863	64,296	11,636	5,540	23,752	14,435	60,961	6,276	214,796
	Total	67,775	413,851	419,029	327,627	48,710	68,468	131,373	54,899	244,198	59,270	1,043,303

Source: Authors' calculations.
Note: Figures were calculated using weighted averages based on the number of students across countries.

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