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COVID-19 AS AN OPPORTUNITY TO BUILD RESILIENT EDUCATION SYSTEMS

Drawing Lessons from Five Countries in Eastern Europe and the South Caucasus

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Abstract

In response to the COVID-19 pandemic, education systems had to redeploy inputs typically used in schools to remote education. This significantly reduced average student learning, with disadvantaged students experiencing a disproportionately large decline. Not closing these learning losses will have long-lasting effects on productivity and economic growth and dampen social mobility. In the five Eastern European countries analyzed in this paper, not acquiring sufficient learning is not a challenge that began with the pandemic. Perhaps the pandemic and the attention it is bringing to students' "learning loss" will create the political conditions to implement long-awaited education reforms to reduce the learning gaps and create better conditions for disadvantaged students, the core element of resilient education systems. This paper shows that using data to guide policy decisions, standardized tests as a diagnostic tool, and remediation policies should become permanent features of education systems. The pandemic pushed forward the use of technology in education. Using technology through online tutoring or Computer Assisted Learning can, when designed appropriately, improve students' academic performance, socio-emotional skills, and psychological well-being.

Acknowledgements

1. Introduction and motivation

The COVID-19 pandemic exposed the vulnerability of student learning in many countries. This is particularly true for disadvantaged children and youth, whose human capital formation depends almost entirely on the provision of public services. If public education services are interrupted, or their quality is compromised during shocks – pandemics, earthquakes, wars, or others – then the unavoidable outcome is that these shocks will have a long-term negative impact on overall well-being, with a higher cost for the poor. Essential lessons can be drawn from the COVID-19 pandemic to avoid interruptions to the learning process during shocks. This paper aims to identify lessons learned from the COVID-19 pandemic for designing the policies needed to build more resilient education systems. The analysis is based on policy responses in five Eastern European countries (Armenia, Azerbaijan, Georgia, Moldova and Ukraine), contrasted with international evidence. Most of the lessons learned are relevant for other countries in the region and for middle-income countries worldwide.

The concept of resilience used in this paper refers to the capacity of the education system to respond effectively to shocks and crises[1] in four domains: *preparation, response, adaptation*, and *building back better*. Resilient education systems ensure that the learning process is disrupted to the minimum possible extent. These systems prepare teachers for teaching under various crisis scenarios and design programs, to ensure that no students drop out of school because of a crisis. Resilient education systems use standardized assessments to determine the magnitude of the problem and act based on that information. Resilient education systems acknowledge that disadvantaged students are more likely to be disproportionally affected during extended school closures, and thus have compensatory and remediating policies and interventions in place. Furthermore, resilient systems recognize that shocks also create opportunities to introduce long-awaited reforms to address the structural constraints of the system.

Most countries decided to close schools at the outset of the COVID-19 pandemic, with no information about the virus' lethality and transmission rates. This meant that the pandemic interrupted the human capital formation process, with children missing out on education for months or even – in some places – for years. Governments implemented remote education strategies to provide learning alternatives while schools were closed. Evidence shows that remote education is, in the best-case scenario, a poor substitute for face-to-face learning. Most disadvantaged children and children whose parents have low educational attainment lack devices connected to the internet, so home learning is not feasible. International evidence shows that students' learning suffered because of school closures and that this *learning loss* – or forgone learning to be more precise – was more acute the longer the schools remained closed and among disadvantaged students.[2] Learning losses and their disproportionate impact on poor students will have substantial long-term welfare implications due to forgone productivity, with countries suffering lower growth and increased inequality.

With some marginal differences in design and implementation, remote learning strategies mainly relied on online classes with complementary pedagogical materials available from dedicated portals, in addition to some efforts to reach the most disadvantaged students with educational material by television. Teachers struggled, given their low levels of digital literacy and lack of experience of delivering online classes.

But other more critical factors explained the learning loss caused by school closures. The quality and relevance of online education were marginal compared with the negative effect of the number of days that schools remained closed. Reopening schools as soon as it became clear that they were not the infection hub that was thought at the beginning of the pandemic was far more important than improving the effectiveness of remote education. The COVID-19 pandemic showed that education systems display rigidities (or at least policymakers perceive them) in their decision to open or close schools: in most cases there was a binary decision affecting all schools with no space for school autonomy. Only two of the five countries analyzed in this report opened some schools with less than all of the

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students attending any given day. In the other three countries, the decision was either to keep all schools closed at all times, or fully open with all students attending five days a week.

A few countries with education systems showed resilience during the COVID-19 pandemic. Despite closing schools, students in Denmark and France did not experience learning loss. This is partly explained by the initial conditions in these countries and many of the evidence-based decisions that policymakers took during and after the pandemic. France prioritized the reopening of schools over other activities. French students lost 10 weeks of face-to-face instruction, one of the world's shortest periods of school closure. Denmark kept schools closed for longer (around the average among Organisation for Economic Co-operation and Development – OECD – countries). Still, their education system had reliable digital infrastructure with developed online learning platforms, high levels of digital skills among students and teachers, and universal broadband connectivity. Both countries had robust, standardized tests that identified learning gaps which triggered compensatory or remediating policies – tutoring in small groups and prioritizing foundational skills in the curriculum – right after the pandemic.

2. Conceptual framework: The technology of skills formation

The stock of an individual's human capital or skills, knowledge, and experience is the outcome of a complex, dynamic, cumulative process involving innate ability, parental investment decisions, and personality traits such as grit and motivation. Schooling is one of the most important parental investment decisions determining student learning (T) and, therefore, the stock of individuals' human capital. Parents can invest in schooling by absorbing the opportunity cost of children going to school (forgone labor remuneration), investing directly in private education, choosing a neighborhood partly based on the quality of public education available, or making other efforts to improve the quality of school inputs available to their children. Parental investments also determine the availability of household assets and other family inputs conducive to learning, such as learning material at home, a good learning environment, and access to technology. Rich parents can afford housing in a neighborhood with a high-quality public school, or can pay for private schooling with qualified teachers, learning materials, and motivated and committed school directors. Children of better-off parents also enjoy more family inputs at home, such as books, technological devices and – most importantly – educated parents who create a positive cross-household covariance between family and school inputs.[3]

The learning outcomes of student 'i' at age 'a' are determined by his or her innate and immutable ability (μ_i), and the flow of past parental investments in the form of family and school inputs, $\boldsymbol{F_i(a)}$ and $\boldsymbol{S_i(a)}$, respectively:

$$T_{i,a} = T_a\ (\boldsymbol{F_i(a)}, \boldsymbol{S_i(a)},\ \mu_i) \qquad (1)$$

Family and school inputs in equation (1) have a positive effect on learning outcomes $(\partial T_i/\partial F_i,\ \partial T_i/\partial S_i > 0)$. There is some evidence suggesting that, *within households*, families adjust their inputs in response to the availability of school inputs, making family and school inputs substitutes $(\partial^2 T_i/\partial F_i \partial S_i > 0)$.[4] For instance, affluent families can increase family inputs when the availability or efficiency of school inputs is reduced, as occurred during the COVID-19 school closures.[5] A second important characteristic of the *technology of skills formation* is that it is a cumu-lative process, with learning today determined by the stock of skills or learning acquired in the past.[6] The cumulative nature of learning implies that, if not adequately addressed, the learning loss caused by school closures today will have long-lasting impacts on students' ability to continue learning throughout their lives.

These properties of the *learning production function* have important implications for the distribution of student learning outcomes in general, and the effects of school closures. The concentration of family and school inputs in better-off households, the possibility of better-off parents compensating for adverse changes in school inputs, and the cumulative nature of the learning process explain the structural learning disparities observed in most countries even prior to the pandemic, and why school closures exacerbated learning gaps.

The simple framework described here can help us to identify the effects of school closures on learning outcomes and their distribution (see Figure 1). When schools closed, school inputs had to be reallocated to remote learning activities, significantly reducing their ability to produce learning (efficiency effect). Teachers, for example, had to deliver classes through online platforms without previous experience within a few days, significantly reducing their effectiveness in producing learning (first arrow in the upper left side of Figure 1). With schools closed, family inputs became much more important to produce learning, putting marginalized students at a disadvantage compared to their more affluent peers (upper right side of Figure 1). Students in well-off households had the enabling conditions to mitigate, at least partly, the effects of school closures: devices at home with access to the internet; parents with sufficient schooling and time to assist them during their learning process; and quiet spaces to study, concentrate and learn. Meanwhile, disadvantaged students did not have these minimum conditions to learn, so every day of school closure represented a loss of opportunity for poor children.[7] See the lower right side of Figure 1.

To summarize, from a conceptual point of view, the COVID-driven school closures reduced the effec-

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Figure 1: School closures and school learning outcomes
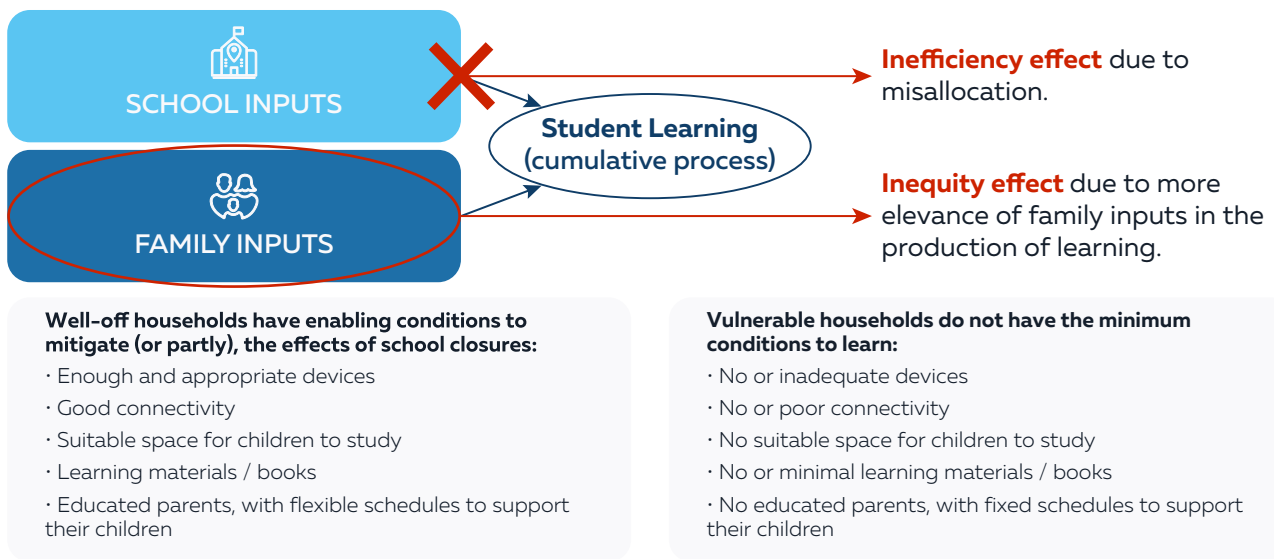
Source: Authors' illustration.

tiveness of school inputs, harming overall learning outcomes. They also made the relatively unequal distribution of family inputs more important in the production of learning, therefore increasing learning disparities between poor and non-poor households. The result is a much more pronounced learning loss among disadvantaged students (See Figure 1).

The *technology of skills formation* is also helpful for identifying the potential contribution of public policy to shaping learning disparities in the context of school closures. By offering remote learning during school closures, governments worldwide were mitigating the efficiency effect but also exacerbating the inequality impact – as the most disadvantaged students did not benefit at all from remote education. During the pandemic, many governments focused their efforts on improving the effectiveness of online learning through, for example, better online educational materials or training to enhance online teaching; this, at best, had a marginal positive impact among relatively better-off students. Given these limitations of remote learning, particularly among disadvantaged students, the most efficient and equitable education strategy was to reopen schools as soon as it was safe. The second-best option would have been to complement remote learning with interventions to improve the availability of family inputs, such as providing disadvantaged households with technology devices with access to the internet. Shutting down schools meant closing one of the few opportunities for many households in low- and middle-income countries to escape poverty. Therefore, as shown by the simple framework described here, education authorities should implement remediation strate-

gies targeting disadvantaged students. Otherwise, given the cumulative nature of learning, the learning loss brought about by school closures would have long-lasting costs, particularly among the poor.

3. The education response to COVID-19

3.1 The pre-pandemic context

Five countries in Eastern Europe and the South Caucasus are analyzed in this study: Armenia, Azerbaijan, Georgia, Moldova, and Ukraine. These countries vary in their levels of development, per capita GDP, poverty rates, and pre-pandemic education indicators. As shown in Table 1, the countries are middle-income countries with per capita GDP levels in purchasing power parity (PPP) of around $13,000, significantly below the average in Europe and Central Asia (ECA). Three of the five countries have relatively low poverty levels, measured as per capita household incomes below $5.50 international dollars. In contrast, Armenia and Georgia have poverty rates of 45 percent and 47 percent respectively.

The five countries have high levels of expected years of schooling, but still considerable proportions of the student populations with low learning levels. In Armenia, and Ukraine, for instance, at least 23 percent and 28 percent of children, respectively, are unable to read proficiently by age 10. The World Bank's Human Capital Index (HCI) captures how productive typical children born in each country will be when they grow up: all the countries included in the analysis are well below the ECA average of 0.69. In other words, average newborns in Armenia are expected to exploit just 58 percent of their productive potential, due to lack of access to quality health and education services. In Azerbaijan, Georgia, and Moldova, productivity and long-term growth are below 60 percent of full potential, due to a lack of universal access to human capital. Most of this loss is accounted for by the relatively large share of the student population with low learning levels.

The following information sources were used in this analysis to describe the various policies and initiatives implemented in the five countries to mitigate the impact of the pandemic on student learning outcomes: (i) human development reports prepared by World Bank staff in the five countries; (ii) global survey data from ministries of education around the world collected by UNESCO, UNICEF and the World Bank in May 2020 (Round 1)[8], July 2020 (Round 2), and February 2021 (Round 3); (iii) phone survey data from parents in Georgia, collected by the World Bank in August 2021; (iv) focus group discussions (FGDs) with parents, teachers, and principals in Georgia (July 2021), and Moldova and Armenia (December 2021); (v) the UNESCO global tracker of COVID-19-caused school closures and re-opening (UNESCO tracker,[9] data retrieved on January 21, 2022); (vi) and other data such as learning poverty,[10] GDP per capita, Gini indices, and poverty levels, among others from the World Bank.

Table 1: Main socioeconomic indicators

Country	GDP per capita, PPP1	Poverty rate at $5.50 a day (2011 PPP) (% population)	Gini Index3	Expected years of schooling4	Learning poverty5	Human Capital Index (HCI)6
ECA Average	**35 345.09**	**11.5%**		**13.1**	**13%**	**0.69**
Azerbaijan	14 442.04	7.0%	---	12.4	23%	0.58
Armenia	13 653.76	44.7%	29.9	11.3	26%	0.58
Georgia	14 989.26	46.6%	35.9	12.9	14%	0.57
Moldova	13 026.52	13.3%	26.0	11.8	11%	0.58
Ukraine	12 804.96	2.5%	26.6	12.9	28%	0.63

[1] GDP per capita based on purchasing power parity (constant 2017 international $), 2019.
[2] The most recent values for these countries are as follows: for Armenia (2020), Azerbaijan (2005), Georgia (2020), Moldova (2019), Ukraine (2020), ECA (2019).
[3] Gini Index, 2019.
[4] World Bank Human Capital Index, Component 2, 2020.
[5] World Bank Learning Poverty Indicator, 2021. Note that although the whole dataset is from 2021 the most recent country level data is from 2019.
[6] World Bank Human Capital Index, 2020.

[8] UNESCO, UNICEF and World Bank, 2020
[9] UNICEF, 2022
[10] World Bank, 2022.

3.2 Measures taken to mitigate the impact of the pandemic on learning

All five countries closed school institutions in March 2020 due to the COVID-19 pandemic. National education stakeholders responded by adopting similar remote learning policies based on a combination of online platforms and broadcast media delivery, to provide some continuity to the learning process while school institutions were closed.

Figure 2 presents the timeline of government-mandated closures of educational institutions between the emergence of the pandemic in March 2020 and October 2021. Between March 1, 2020 and October 31, 2021,[11] Armenia fully closed school institutions due to COVID-19 (affecting at least 80 percent of the student population) for 63 days, Moldova for 112, Georgia for 113, Ukraine for 125, and Azerbaijan for 205. Azerbaijan closed school institutions for longer than any other country in ECA (the average for the region is 89 days). And when the number of days of "academic breaks" and "extended academic breaks" are also included, Azerbaijan, Georgia, and Armenia are among the 10 ECA countries that closed school institutions for the longest period during the pandemic.

As described in the conceptual framework, the impact of school closures on learning outcomes can be characterized by the effects they had on school inputs, which had to be allocated in an imperfect way (inefficiency), and the increased role played by family inputs in the production of learning (inequity). Therefore, the rest of this section describes the efforts made by the governments to deploy school inputs and to try to improve the availability of family inputs among disadvantaged households.

3.2.1 Reallocation of school resources

To provide some continuity in the learning process while schools were closed, national education stakeholders in the five countries adopted relatively similar remote learning policies, based on a combination of online platforms and television education on multiple channels. Online learning platforms were created by ministries of education or education authorities, and included a variety of educational resources for teachers and students (such as learning materials and homework resources). Countries also used a combination of synchronous instruction (real-time interactions between students and teachers while lessons and instructional content are being shared) and asynchronous instruction (students learning at their own pace either interacting or not with the teacher). A summary of these responses is included in Table 2.

Figure 2: Timeline of school closures since March 2020

Source: Authors' calculations using UNESCO Tracker on school closures caused by COVID-19. The American Academy of Pediatrics (AAP) released, on June 24, 2020, the first school guidance for safe in-person learning.[12] The European Centre for Disease Prevention and Control released its recommendation on August 6, 2020.[13]

[11] When data were retrieved from the UNESCO Global Tracker in January 2022, the cumulative data on the COVID-19 caused school closures and re-opening were available until October 31, 2021.
[12] AAP, 2020
[13] ECDC, 2020

Table 2: Distance education delivery systems deployed at different levels of education

Country	Level	1. Television	2. Online Learning platform						3. Mobile phones
			Available	Modality	All subjects covered?	Commercial not for free (Teams, etc.)	Commercial for free (Black-board, google class, etc.)	Open source (Moodle, Can-vas, etc.)	
Armenia	Pre-primary	No	No						
	Primary	Yes	Yes	Synchronous	No	Yes, partially subsidized	Yes	Yes	Yes
	Secondary	Yes	Yes	Synchronous	Yes	Yes, partially subsidized	Yes	Yes	Yes
Azerbaijan	Pre-primary	Yes					Yes		
	Primary	Yes	Yes	Hybrid	Yes	Yes, free access for all	Yes		
	Secondary	Yes	Yes	Hybrid	Yes	Yes, free access for all		Yes	
Georgia	Pre-primary	Yes	No			Yes, free access for all			
	Primary	Yes	Yes				Yes		Yes
	Secondary	Yes	Yes		No		Yes		
Moldova	Pre-primary	No	No						
	Primary	No	Yes	Hybrid	Yes				
	Secondary	Yes	Yes	Asynchronous	Yes				

Source: UNESCO–UNICEF–WORLD BANK Surveys May and July 2020. Ukraine did not participate in any round of this survey. Note. None of these countries used radio or paper-based take-home materials to deploy distance education. However, in Georgia, parents with no access to preschool education for their children received take-home packages.

Armenia launched television lessons broadcast on the national public channel, new television channel Hybrid Edu, and the Armeduchannel YouTube and cable channels. The broadcasts included more than 400 television lessons of up to one hour each in a limited number of subjects. These lessons targeted schoolchildren from primary through upper-secondary levels, and children with disabilities (such as hearing impairments). Through a public-private partnership between the Ministry of Education and telecommunications companies, broadcast coverage of these lessons was made available to users regardless of their tariff plan or without extra cost. Video lessons were also uploaded to "E-school Armenia" digital platform and the official YouTube "Armenian educational channel". E-school Armenia was launched in late spring 2020. The platform includes digital resources, tele-lessons, online libraries, digital tools, and references to organizations with other digital resources. The platform was supported by the Ministry of Education and run by the National Center for Educational Technologies (NCET): the national body responsible for providing information and communications technology (ICT) resources to schools in Armenia. When schools started reopening in September 2020 and shifting to new modes of remote and hybrid learning, the leading digital platforms used for distance learning were Google Classroom and Microsoft Teams.

Georgia offered free access to Microsoft Office for all schools and introduced daily television education for all grades. The government also started broadcasting classes for ethnic minorities in their languages. The country also enhanced the EL.ge digital platform with digital educational resources and launched the I-school project, which provided primary, basic, and high school teachers and students with homework sets (so-called "complex assignments") and supporting materials. Georgia rolled out the E-assessment journal, part of the Assessment for Development Project (ADP) piloted before the pandemic. The ADP is intended to implement a census-based e-assessment (fully online), measure student achievements against the national curriculum, and track their progress. Approximately 150,000 students in fourth, sixth, and tenth grades are expected to be assessed in literacy and numeracy every year. The assessment results are available immediately at the end of each exam, and automated e-reports on the results are generated and distributed to teachers and parents to incentivize data-driven decisions.[14] Like in Azerbaijan, to address the fatigue students develop with online learning the Ministry of Education recommended that classes be reduced from 45 to 30 minutes. However, teachers reported that the Ministry did not provide explicit recommendations on how to adjust the content or which areas to prioritize to comply with the adjusted schedule. Teachers indicated that the reduced schedule only gave them time to explain the content and explain pupils' homework briefly.

In Azerbaijan, the Ministry of Education, in cooperation with two television channels, introduced the

'TV Lessons' ('TV Ders') educational program. The government recruited a group of qualified teachers to record television lessons, which were broadcast nationwide to a pre-announced schedule in a 5–6-hour period every day (From March 11 to June 12, 2020). Television classes covered most subjects for all grades following the school curriculum. All television lessons were then posted on the Ministry of Education's electronic portal,[15] on its official Facebook page, and on its official YouTube channel. In addition, the country launched 'Virtual School'[16] in collaboration with Microsoft, offering the Microsoft Teams platform accessible to all public schools. Virtual schooling was multifunctional, offering several features: distribution of content (such as video lessons, digital education content, and e-books), online classes, weekly assignments and assessments, and collaboration (student and teacher groups, and correspondence between students and teachers). In addition, the Ministry offered two hours of live and interactive homework assignments each week, enabling teachers to explain some topics, provide feedback, and answer students' questions submitted via chat. Moreover, during the move to synchronous online education, the government decided to adapt the curriculum, adjust daily lesson schedules, decrease the number of teaching hours for each topic, and minimize the length of the online classes for all grades from the traditional 45 minutes to 30 minutes, with 10–15-minute breaks between each class.

Moldova launched television lessons and online platforms with live and recorded lessons to deliver free distance education.[17] The policy of using multiple learning and communication platforms (such as Zoom, Google, Viber and WhatsApp) offered several options to teachers to provide distance education, but at the same time led to challenges and confusion among teachers. In a FGD with teachers, some reported that they would have preferred to use a single platform promoted by the Ministry of Education to teach and assess students, like the experience of MS Teams introduced by the Ministry of Education in Armenia.

In Ukraine, schools were given autonomy and the responsibility to organize and deliver remote learning activities. The Ministry of Education and Science (MoES) provided limited guidance during this process (school principals were offered some sanitary recommendations and limited assistance). The decentralization process of the education system created accountability gaps between the government and local authorities, which contributed to delays and problems implementing remote education. A consequence of this policy was that teachers used multiple online platforms and communication mechanisms (such as Zoom, Viber, Google Classroom, and Skype) for distance learning. Nonetheless, in March 2020, the government established a television show broadcast on all national channels, providing TV lessons for students in grades five to eleven. A "timetable" for every school age was widely communicated through the MoES website and several platforms. In December 2020, the government developed the All-Ukrainian School Online website, in collaboration with NGO Osvitoria. This platform compiles television lessons, gathers learning materials in 18 basic subjects (including lectures, tests, and materials for independent work) for grades five to eleven, and offers methodological support for teachers. Nonetheless, the system took time to launch. Moreover, in December 2020 the MoES, with support from UNICEF, launched an online platform called "NUMO", featuring educational and development videos (such as games and exercises) for children aged three to six. The government also supported public-private partnerships to integrate innovations in education. These partnerships included companies such as Microsoft, Google and Zoom and provided over 100,000 MS Office and Windows licenses to educational establishments at all levels, as well as access to Google Workspace for colleges and universities in Ukraine.

While schools were closed, the most important challenge faced by the education systems was to ensure that teachers had the skills and ability they needed to deliver online learning. Countries offered free connectivity and some forms of professional development training to support teachers' transition to remote learning. Training included areas such as instruction on distance education to increase pedagogical skills for remote learning, the adaptation of teaching content to remote teaching, and the use of open education resources, the use of ICT tools, and other topics (See Table 3). However, training was not universal and often just supported a small group of teachers. A survey of ministries of education found that at least one in three countries did not provide any training for teachers to use remote learning platforms.[18]

As such, in Armenia, the distance education platform provides teachers and school management with links to educational platforms, and instructions on using ICT tools.[19] Teachers were also offered special mobile and fixed internet tariff plans and free access to the main applications and platforms used for distance learning. Besides, the Ministry of Education of Armenia and the NCET began a cycle of accelerated courses for teachers on e-learning platforms. In 2020, eight courses were developed

[15] Edumedia-Azərbaycan, 2019
[16] Ministry of Science and Education, 2020
[17] Studii.md online platform, 2020
[18] UNESCO, UNICEF and World Bank, 2020
[19] Between 2017 and 2020 and under the World Bank's Education Improvement Project (P130182), approximately 3,000 teachers and administrative staff were trained in ICT use.

Table 3: Measures to support teachers to transition to remote learning

Country	1. Instruction on distance education (TV, radio, learning platforms, etc.)	2. Professional, psychosocial and emotional support (e.g. chat groups, online forums to share ideas and educational content)	3. Teaching content adapted to remote teaching (e.g. use of open educational resources (OERs), sample lesson plans etc.)	4. ICT tools and free connectivity (PC, mobile device, voucher for mobile broadband, etc.)	5. Guidelines for reducing the amount of over-time required to prepare a virtual classroom	6. Professional development activities (e.g. workshops and webinars) on pedagogy and effective use of technologies with various pedagogies	7. Training: Percent trained	8. Materials to support distance learning: Percent that received materials
Armenia	Yes	Yes	Yes	No	No	Yes	50% –75%	75% – but less than 100%
Azerbaijan	Yes	Yes	No	No	Yes	Yes	25% – 50%	25% – 50%
Georgia	Yes	Yes	Yes	Yes	Yes	Yes	25% – 50%	Unknown/not monitored
Moldova	Yes	Yes	Yes	Yes	---	---	---	---

Source: UNESCO, UNICEF and World Bank Surveys July 2020 and February 2021. Ukraine did not participate in any round of this survey.

on "Skills to organize distance learning" for 2,880 teachers.[20] At the beginning of 2021, the government reported that between 50 and 75 percent of teachers had been trained.

In Moldova, with the support of development partners, the Ministry of Education launched a campaign named "a computer for every teacher", which equipped teachers and students from disadvantaged groups with 12,500 laptops. It also offered teachers 80 GB of free internet traffic data. The target population was identified using data from the Education Management Information System (EMIS), which identified approximately 9,484 students from grades five to twelve in 35 districts who required computers to connect to online lessons.

In Georgia, the National Center for Teacher Professional Development[21] offered webinars for teachers to provide some pedagogical and methodological recommendations.

The Ministry of Education of Azerbaijan also introduced online training and webinars on distance learning, e-teaching, e-resources, and tools. In partnership with a local in-service education center, the ministry provided online training for 14,000 educators to improve their ICT skills.[22] Moreover, in partnership with the Ministry of Transport, Communication, and Higher Technologies, the local mobile networks operator granted some teachers mobile internet access free of charge.

In Ukraine, teacher training on distance learning was often coordinated at school level. Since the government only provided limited guidance on how to deliver remote learning, several non-government organizations intervened to provide in-service training to teachers, prepare teaching materials, and develop online classes. For instance, several initiatives were developed in partnership with UNICEF

(for secondary and preschools) or the European Union (EU) through the EU4Skills program (for vocational education and training) to support the transition to online classes. However, these projects were often conducted on a small scale and in targeted schools.

Regarding access to electronic devices, the Ministry of Digital Transformation launched the "Laptop for Every Teacher" project in 2021 to equip secondary teachers. It was intended to procure 60,000 computers and distribute them to schools in 24 regions of Ukraine and the city of Kyiv. As of December 2021, over 27,000 computers had been delivered to teachers.

3.2.2 Measures to support family inputs

Many countries negotiated access to the internet at subsidized or zero cost with local private communication companies to facilitate student access to online distance learning infrastructure. "Zero-rating educational content" is considered one of the quickest ways to improve cost-free access to online materials.[23] For example, in Armenia, special mobile and fixed internet tariff plans were offered for schoolchildren and teachers, and free access was provided to the main distance learning applications and platforms. Additionally, in Armenia, all 181 general secondary and high school textbooks were posted in electronic format free of cost. Georgia also introduced subsidized internet access to children in January 2021. Still, these benefits were introduced relatively late and were not widely disseminated; therefore, families did not fully benefit from them. In FGDs with Georgian teachers, some added that the internet package was not enough to conduct classes, search, download, or upload materials. Likewise, Moldova offered 80 GB of free internet traffic per individual in need. Countries also made access to distance learning platforms avail-

[20] There are approximately 31,018 teachers in Armenia, according to the Statistical Committee of Armenia, 2020.
[21] Ministry of Education and Science of Georgia, 2014.
[22] There are 140,648 teachers in public and private secondary schools in Azerbaijan (State Statistical Committee of Azerbaijan, 2020).
[23] Truncano, 2016

able through mobile phones. In Ukraine, national mobile operators provide non-tariffed access to the All-Ukrainian School Online platform's website and its mobile application.

Fewer countries subsidized or provided devices for free. For example, Armenia received donations of laptops[24] that were distributed among students; in Georgia, since 2011, laptops have been distributed for free to grade one students attending public schools. Identical laptops have also been distributed to first-grade teachers. The laptops, referred to as "bukis", are a local version of the Intel classmate laptop produced by a Georgian computer firm,[25] and are pre-loaded with digital textbooks and other educational content (such as education games developed by the Ministry of Education). In Moldova, the Ministry of Education distributed 12,500 laptops for teachers and students in 2021 to fully satisfy the demand of secondary and lyceum students from all districts.[26] Finally in Ukraine, while the MoES encouraged schools to provide electronic devices to students from disadvantaged socioeconomic backgrounds, it also stressed that parents were responsible for ensuring access to online education.

Some countries also introduced measures to include populations at risk of being excluded. These included flexible and self-paced platforms (asynchronous learning), sign interpretation for students with special needs, and psychosocial and mental health support for learners (for example online counseling) to minimize the impact of school closures on the well-being of students. All five countries offer psychosocial and mental health support to learners by phone or online. For example, Azerbaijan created a hotline to provide socio-psychological advice to students and teachers. Experienced school psychologists provided psychological counseling on various psycho-emotional issues such as aggres-

sive behavior among young students, panic, fear of admission exams, and so on. According to the survey of ministries of education, Azerbaijan also offered support to counter interrupted school meal services. In Ukraine, the MoES and the Office of the Educational Ombudsman established several hotlines to support teachers and students in secondary and higher education, and vulnerable students were prioritized and received free prepacked school meals at home during distance learning.

On the other hand, Moldova introduced additional support to lower-income households and child protection services (see Table 4). While Armenia, Azerbaijan, and Moldova encouraged regular calls from teachers or principals to students, in Georgia, communications mainly took place via videoconference technology or the e-school platform. None of these countries reported implementing specific measures to support girls' education.

3.3 Main challenges related to the rolling out of remote education

The information collected through FGDs in the different countries provided unique and deep understanding of how the pandemic affected the lives of teachers, parents, and students in various ways. Teachers and principals reported how the pandemic changed their teaching strategies and interactions with students, shared many challenges encountered during this period, and revealed that many elements needed for implementing a successful remote strategy were not in place. Qualitative data collected from parents exposed the limitations of the measures taken by ministries of education to support student learning – particularly among the disadvantaged – and revealed the struggles of families during school closures.

Table 4: Measures taken to support families

Country	A. To facilitate the access to online learning			B. To ensure inclusions of population at risk of being excluded				C. To minimize impact of school closure on the wellbeing of students			
	1. Negotiate access to internet at subsidized or zero cost	2. Make access to distance learning platforms available through mobile phones	3. Subsidized / free devices for access	1. Special efforts to improve access to learners with disabilities, refugees, migrants, and minorities	2. Flexible and self-paced platforms *(e.g., Asynchronous learning)*	3. Additional support to lower-income households, including economic support *(e.g., take-home rations, cash based transfers)*	4. Tailored learning materials to learners with disability, refugees, migrants, and minorities	1. Psychosocial and mental health support to learners *(e.g., online counselling)*	2. Regular calls from teachers or principals	3. Additional child protection services	4. Support to counter interrupted school meal services *(e.g., distribution of meals, food banks, vouchers)*
Armenia	Yes*	Yes	Yes*	Yes	Yes		Yes	Yes	Yes		
Azerbaijan	Yes	Yes		Yes	Yes			Yes	Yes		Yes
Georgia	Yes	Yes	Yes	Yes	Yes		Yes	Yes			
Moldova	Yes	Yes	Yes			Yes		Yes	Yes	Yes	

*Source: OECD, UNESCO, UNICEF and World Bank Surveys May 2020, July 2020, and February 2021. *School-by-school basis. Ukraine did not participate in any round of this survey.*

[24] These donations came from commercial banks, IT companies and members of parliament.
[25] Ministry of Education and Science of Georgia, 2011
[26] ipn Press Agency, 2021

Among teachers, the most common challenges were related to: (i) poor connectivity and availability of equipment; (ii) difficulties adapting curricula to remote education and insufficient digital skills among teachers to deliver remote learning; (iii) increased workloads with little or no guidance from ministries of education; and (iv) challenges grading students. For example, related to the first challenge, in Moldova, schools had to operate without equipment for long periods, and communicated with students and parents using text messages, social media, or phones. Teachers would write text messages with the lessons and the homework without any additional interaction with their students:

❝ *"If other schools were somewhat prepared, we were three steps below them in terms of computer equipment. We were confused, blocked, and at a disadvantage. It was torment. We were only working through text messages; messaging took us till 9 or 10 at night. We also had discussions – mostly with parents – on landlines, and used various other methods. It was no way to work".* **(Urban teacher, Moldova)**

❝ *"We have very old equipment at our school, which we are trying to replace, but this is not enough. We need a better internet connection for teachers to conduct online classes. Everything they have learned and achieved during this period needs to be supported to keep and develop more in the future, but we are still struggling with this."* **(Male principal, Georgia)**

A second challenge for teachers was to adapt curricula for remote education with little or no guidance from ministries of education. Teaching on online platforms was particularly challenging for older teachers, most of whom lack the necessary digital skills and, on the receiving end, among students with disabilities. In Georgia, some teachers went to school to support students with disabilities, who otherwise would have been wholly excluded from learning. Teachers also found it challenging to keep students engaged in online learning. In Georgia, principals reported that pupils' attitudes worsened: they did not attend classes, learn what they were supposed to, or behave as well in class as they did during face-to-face studying. Principals also reported that teachers struggled to control all their students. In their opinion, students had more freedom at home, and they felt less responsible for their studies:

❝ *"It was complicated for me when the students didn't want to join the chat room, I had to ask them nicely; they were hard to connect with. A*

lot of time was wasted on organizational issues before classes started." **(Rural teacher, Moldova)**

❝ *"School is the only environment for children to communicate with each other … Every communication has a positive effect. No matter how hard we try, we cannot ensure the quality of offline learning during remote learning, no matter what equipment we use."* **(Male principal, Armenia)**

❝ *"In the beginning I was worried, to be honest, I was learning how to use online tools, and then I was teaching my students. It was hard emotionally, but slowly I got used to it. I had great motivation, which helped me keep calm."* **(Female, teacher, Georgia)**

Third, teachers in all the countries reported an increase in their workloads, and little to no guidance from their ministries of education on how to face the challenges of remote learning. The additional workload was usually related to the added task of monitoring students and keeping them engaged during online education. These difficulties were compounded by inconsistent or insufficient guidance by the ministries of education. For example, in Moldova teachers had to report to the authorities on the status of students during distance education:

❝ *"The problems were generally associated with the presence or connection of students from socially vulnerable families and monitoring them. You had to be able to say where they were at that moment, what they were doing: that is, the teacher had somehow become a social worker and a parent. We had to report to the ministry what their temperature was and how they were doing."* **(Rural teacher, Moldova)**

❝ *"I taught many lessons outside school with pupils, when we knew that we didn't have enough time and they needed more explanations of the lessons."* **(Female teacher, Georgia)**

Finally, another significant challenge for teachers was assessing students' knowledge in remote education. Teachers in Georgia felt they were limited in what they could do online, including how to approach activities that would typically be graded. In Moldova, teachers concurred that assessing students was more time-consuming and challenging to enforce and validate: there were no interactive assessment tools for testing. Students submitted their completed tests as pictures or scanned images using communication tools. Teachers printed the responses, marked them, scanned images (or took pictures of the marked tests) and send them back

to each student. Additionally, not all students complied with the tests, reporting technical problems, and it was difficult for teachers to determine if the students were being helped by their parents.

> *"Assessment suffers the most for three reasons; the first is our limited professional competence, the second is that we lack the equipment, skills and resources to do it, and the third has to do with our generation."* **(Teacher, Moldova)**

> *"I saw it was hard for some students to understand various things I was explaining, and later they sent back well-written homework, which I assume was done by their parents. And after we were back in face-to-face learning, I saw my grades were baseless, because on the screen everything seemed okay, but in reality we didn't have good outcomes from [distance learning]".* **(Female teacher, Georgia)**

On the receiving end of the learning process, parents and students faced similar challenges: (i) poor or no connectivity at all at home and limited access to adequate devices; (ii) little student interest and fatigue with online learning; (iii) deficient or inconsistent guidance on the remote education model from the ministry of education; and (iv) difficulties learning new topics, especially for low-performing students.

Poor connectivity or limited access to digital devices were recurrent problems among low-income families. In Azerbaijan, middle- and low-income families struggled to make full and effective use of online classes due to the shortage of digital devices at home, a lack of uninterrupted high–speed internet, and the overlapping class schedules of children. In Georgia, internet connection problems were problematic, especially outside Tbilisi, the capital. In rural Georgia, children mainly accessed distance learning through mobile phones. In a household in Armenia with only one mobile phone and several children, parents reported difficulties accessing remote education.

> *"It is a major problem in villages; about a third of all parents and children lacked the equipment, or could not afford it, or had several school-age children in the family and could not allocate so much time for education, had little time for meetings, and could hardly ever be involved in school life. Contacts with parents are rare: not because no meetings are held, but because the parents have worries of their own and their involvement is low."* **(Rural teacher, FGD Moldova)**

> *"When there is one phone in the home that the child uses to join the class, and the phone rings, it is already a problem, because the class disconnects. Also, there are three children in my sister's family who had to join different classes at the same time, and there is a problem both with the internet and the conditions at home to join the lesson".* **(Male parent, Armenia)**

> *"For instance, there are four children in a family, but there is only one computer or mobile phone at home. It's clear that the rest are cut off the lessons. In other words, it wasn't possible to ensure quality."* **(Male principal, Armenia)**

Keeping students engaged in their learning was another challenge during remote education. Some parents reported that their children developed emotional and behavioral problems during this period. Parents in Armenia said in FGDs that their children were less motivated to prepare for the lessons during this period. Moreover, in a 2021 telephone survey in Georgia,[27] parents reported that 61 percent of their children were anxious and 63 percent bored during distance education. Teachers in Moldova also reported behavioral changes in their students during this period. Some teachers said in FGDs that the pandemic had adversely affected students' attitudes towards learning: primary pupils became less disciplined and organized, and secondary students were less diligent.

> *"The children agreed in the chat who would reply about each part of the lesson during the class, and they learned the lesson in turn, they got nimble: one of them wrote the homework and sent it by chat, and everyone, for example, copied the solution of that math exercise."* **(Female parent, Armenia)**

> *"I noticed that my daughter's efficiency dropped during the online period. She had studied excellently before remote education. There were 40 people in their class and the teacher could hardly manage. The children were also tired of constantly sitting in front of the screen; their eyes were tired."* **(Female parent, Armenia)**

> *"My two boys were badly affected emotionally; they became more aggressive in that period. ... It was difficult to explain to them why they should not go to school and socialize with their friends."* **(Female parent, Armenia)**

Learning new content was challenging during remote education, especially for low-performing students. In Armenia, parents reported that low-per-

forming children suffered from distance education, and that learning new content areas or subjects was particularly difficult for them. Behavioral problems, lack of focus, and even aggressive conduct among students were reported in the FGDs. Parents in Armenia said children were becoming more aggressive, losing interest, and were tired of remote learning. In Moldova, one of the main challenges parents faced was leaving their children alone at home without supervision while they went to work. These parents were concerned about their children's personal safety, and they were unable to ensure that their children participated in distance education.

❝ *"The parents of primary school pupils had very negative attitudes because they had to go to work, and their children were often left alone at home".* **(Urban teacher, Moldova)**.

The diversity of online platforms (or learning management systems) and digital communication used by different schools caused confusion among parents. In Ukraine, since schools had the autonomy and responsibility to deliver remote education, many online platforms and communication mechanisms (such as Zoom, Viber, Google Classroom and Skype) were used by teachers for distance learning. Families stressed their preference for a single nationwide platform.

Despite all the challenges faced by parents during online learning, there were some positive outcomes. For example, school directors in Georgia and Armenia reported that the pandemic helped to increase parental involvement in the learning process. In Ukraine, school directors acknowledged strengthening of the "triangle" (teachers-school-parents) which is one of the foundations of the New Ukrainian School Reform. In Moldova, additionally, some teachers stated that students returned to school with positive perceptions of school, appreciating the face-to-face learning experience and the environment it offers for socialization:

❝ *"In the early stages of the pandemic, students perceived online studies as something interesting, something unusual, something attractive. But some fatigue was already noticeable because they were in front of their screens, whether large or small, from morning to evening. After returning to school, they came to value better the opportunity to socialize with other students, social meetings and the need to communicate. They saw the school with different eyes, they perceived the importance of school and the need to be at school."* **(Urban teacher, Moldova)**

❝ *"It was interesting for us as parents to see how the teacher conducted the lesson. Usually, you take your child to school, and you do not know what is going on there, but here everything was very well reflected, how caringly the teachers conducted the classes process, how patient they were, because it was also a challenge for the teacher: different families, different children".* **(Urban male parent, Armenia)**

3.4 Lessons learned

The efforts of ministries of education to provide services while schools were closed are commendable, and it was undoubtedly much better than nothing. However, the emerging evidence shows that it was impossible to introduce remote learning practically overnight without compromising learning. If the inefficiencies and inequities that characterized remote education during the COVID-19 school closures had been acknowledged in the first few months after the pandemic began, reopening schools would have been the priority of education strategies. As discussed in more detail in the section below, none of the countries analyzed in this report fully acknowledged the devastating effects of the pandemic on student learning, especially among the most disadvantaged children. A few of them have designed and are currently implementing learning remediation strategies. This section is divided into two subsections, one discussing the lessons learned on improving remote education and the second showing why the number of days that schools remained closed was excessive.

3.4.1 Lessons to improve remote education

No country or education system was prepared to face a pandemic without disruption to learning. Schools and teachers needed extensive guidance and skills to deliver remote education. Although in some countries, like Georgia, legislation for online learning had been discussed for years, none of the countries were prepared nor had the enabling conditions to transition to remote education successfully. For instance, given the high levels of school autonomy in Ukraine, the system relied almost exclusively on principals and teachers for remote education, and this policy likely contributed to increasing inequalities (as teachers or schools in urban areas and higher-income students were probably more likely to respond quicker and better). As a result of the policy implemented in Ukraine, many online platforms and communication mechanisms were used among teachers for distance learning, which on the one hand helped parents to pick the most conven-

ient mechanisms for their children, but on the other hand contributed to the confusion among parents because of the lack of a unified approach to distance learning.

Although the design of some solutions was appropriate, some countries failed to deliver or implement them appropriately. For example, Georgia subsidizes access to the internet among school-aged children, which is an effective way to increase access to education resources. However, these benefits were introduced relatively late (in January 2021), and the government failed to disseminate them widely to families. In an August 2021 World Bank survey of families with school-age children, only 7 percent reported receiving internet access for a reduced fee, and 88 percent reported not benefiting from the reduced internet fee because they were unaware of the subsidy or the price reduction.

The enormous challenges of switching from face-to-face to remote education came at a cost and involved a wealth of knowledge and contributions. School closures accelerated the use of technology, and showcased the potential of education technology to support and complement the role of teachers for a more resilient education system. At the system level, school closures encourage governments to deploy learning management systems (LMS) which allow teachers to deliver distance education (synchronous or asynchronous), provide a platform to communicate and interact between students and teachers, support the submission of homework and quizzes, and facilitate access to courses and learning digital contents. These LMS could continue to be used and improved in future "hybrid" or "blended" learning educational models combining traditional face-to-face education with remote education. For instance, in December 2020 the Ukrainian MoES developed e-journals to monitor student participation in online education and to record attendance, homework and grades. Moving forward, the MoES is planning to couple e-journals to existing data collection tools while enhancing their analytical functionalities in order to obtain more accurate information on the education system at the national, regional and local levels.

The school closures also accelerated the testing and exploration of different software in education and digital libraries. They made evident the need for fast-tracking investment in internet connectivity and devices for teachers and students. Production of digital materials and video lessons also accelerated during this period, and they were mainly offered free of charge to boost access. Some principals from Armenia reported that online platforms

enabled teachers to make the lessons more motivating and interactive and created the possibility of introducing new teaching methods. Armenian principals also suggested that before the pandemic, most teachers did not know how to use ICT. The need to deliver education remotely improved their digital skills. In Georgia, teachers and principals participating in the FGDs indicated that teachers were united during the pandemic:

> *"During the pandemic we saw professional unity. Some of our teachers used to go to others' homes to teach them how to conduct classes online, and in addition even pupils were involved in this [teaching] process".* **(Female Teacher, Georgia)**

> *"Elderly teachers didn't know how to write text messages on their phones…We managed to organize online classes within five days. Glory and honor to our teachers."* **(Female principal, Armenia)**

3.4.2 Lessons on the extent of school closures

One of the most important lessons from the COVID-19 pandemic is the need to make decisions based on existing evidence. As shown in Figure 2, as early as June 2020 in the United States and August 2020 in Europe, evidence suggested that most girls and boys under the age of 12 who contracted COVID-19 did not develop any symptoms, and only a tiny proportion had severe symptoms. Soon after, it also became clear that schools were not the virus hotspots that were initially thought.[28] Evidence from Germany,[29] Spain,[30] and the United States shows that the rate at which children transmitted the virus among themselves and adults was significantly lower than transmission rates among adults. Additionally, in early 2021 evidence showed that primary school teachers did not have higher infection and mortality rates than the general population, suggesting that teachers were not at greater risk.[31]

Around the same time – between the start of the pandemic and late 2020 – both theoretical and empirical studies showed that school closures came at a considerable cost in terms of learning loss, particularly for disadvantaged students. It was also clear that children were not only losing learning in core areas such as numeracy and literacy but were also suffering from depression, anxiety, and other mental health problems.[32]

Despite all the evidence available by early 2021, school closures remained part of the strategy to contain the spread of the virus in many countries,

[28] D. Lewis, 2020
[29] Isphording et al., 2020
[30] Catala et al., 2020
[31] Lynda et al., 2021
[32] Lewis et al., 2021

including those analyzed in this paper. Schools also remained closed, despite restrictions being lifted for other activities which, from the point of view of social welfare, could be considered of less importance (such as restaurants and shopping centers). Some European countries, such as Belgium, Norway, and Denmark (included in Figure 2 as a benchmark), did take account of the emerging evidence and prioritized school reopening over other economic activities. For instance, Belgian schools were closed between March and May 2020, reopened in June, closed again during July and August for the summer break, reopened again in September 2020, and have never closed since. Also, in Belgium, all non-essential activities closed during the fall of 2020 as the second wave of the virus emerged, but schools were kept open.

In contrast, schools in Azerbaijan remained closed even when most other countries started opening them, even partially, in the fall of 2020. Between March 2020 and October 2021, Azerbaijan closed school institutions for 438 days (due to COVID-19 and extended academic breaks) compared with Denmark, which closed school institutions for only 177 days in the same period. Countries that already had a learning crisis, as measured by the World Bank's learning poverty indicator, were also more likely to close schools for more extended periods (Figure 3).

Figure 3: COVID-19 school closure days and learning poverty (all regions)
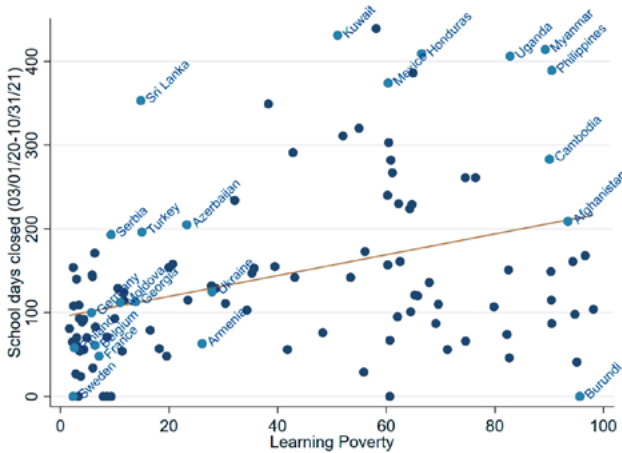
Source: Authors' calculations using data from UNESCO Tracker and Learning Poverty (LP). The most recent learning poverty country data comes from 2019.

A second important lesson is that education systems seem rigid regarding schedules, grades, and types of schools that could remain open or closed during the pandemic. Education ministries could have introduced differentiated policies regarding school closure by academic level or in rural areas,

where the student density in schools was significantly lower. A strategy along these lines would have been a good reflection of the evidence showing that younger students and students in less agglomerated schools were at considerably lower risk. Apart from a few countries where schools reopened with students going on different days for only a few days per week to maintain social distancing and keep class sizes small, many countries decided to keep all schools closed or open them all full time.

The failure to base policy decisions on evidence, or at least account for the evidence alongside other considerations, resulted in significant learning losses, particularly among disadvantaged students. Evidence from rich countries measuring student learning before and after the pandemic shows significant learning losses despite short school closures and high internet penetration. For instance, in the Netherlands, overall, students in grades four to seven encountered an average 0.08 standard deviation (SD) learning loss in math, spelling, and reading, equivalent to half a year of formal schooling.[33] Losses were up to 60 percent larger among students from disadvantaged households. In Belgium, grade 6 students in the "COVID cohort" that suffered from school closures had 0.19 SD lower scores in mathematics and 0.29 SD in Dutch than prior cohorts of students on standardized tests.[34] These are massive losses, equivalent to more than a full year of formal schooling.[35] In Germany, authors found learning losses of 0.07 SD in reading comprehension, 0.09 in operations, and 0.03 in numeracy for grade 5 students, close to half a year of formal schooling.[36] The learning losses in math were more severe in low-achieving students. A recent systematic review (Patrinos et al, 2022),[37] found that the average learning loss across a sample of 41 countries with robust learning loss data is 0.23 SD, or almost one full year of formal schooling, with losses varying from zero in Sweden to 0.8 SD in Nepal. Figure 4 presents the microlevel data from this systematic review.

A third lesson is the lack of preparedness of education systems to address learning loss once schools reopen, in some cases returning to "business as usual" but ignoring the mounting evidence showing significant learning loss. The evidence examined for this report suggests that many countries are not implementing aggressive learning recovery plans with effective strategies and enough financial resources to remediate the learning lost during the pandemic. Many countries do not know the extent of learning losses in their country and lost the opportunity to measure it. For instance, in response to the pandemic, Ukraine canceled the mandatory state

[33] Engzell et al., 2021
[34] Maldonado & De Witte, 2022
[35] Evans & Yuan, 2019
[36] Schult et al., 2022
[37] Patrinos et al., 2022. The systematic review only includes studies using scores from school-based tests or assessments administered by researchers or international assessment programs, including EGRAs, and any study that can be scaled to the Harmonized Learning Outcomes. In addition, studies must have measured learning loss with pre-COVID control data and during or post-COVID treatment data. Studies using projections and simulations were excluded. The study includes underline microlevel data released in January 2023.

Figure 4: Average learning losses across various countries

Learning Loss (SD) in Countries with Robust Learning Loss Data
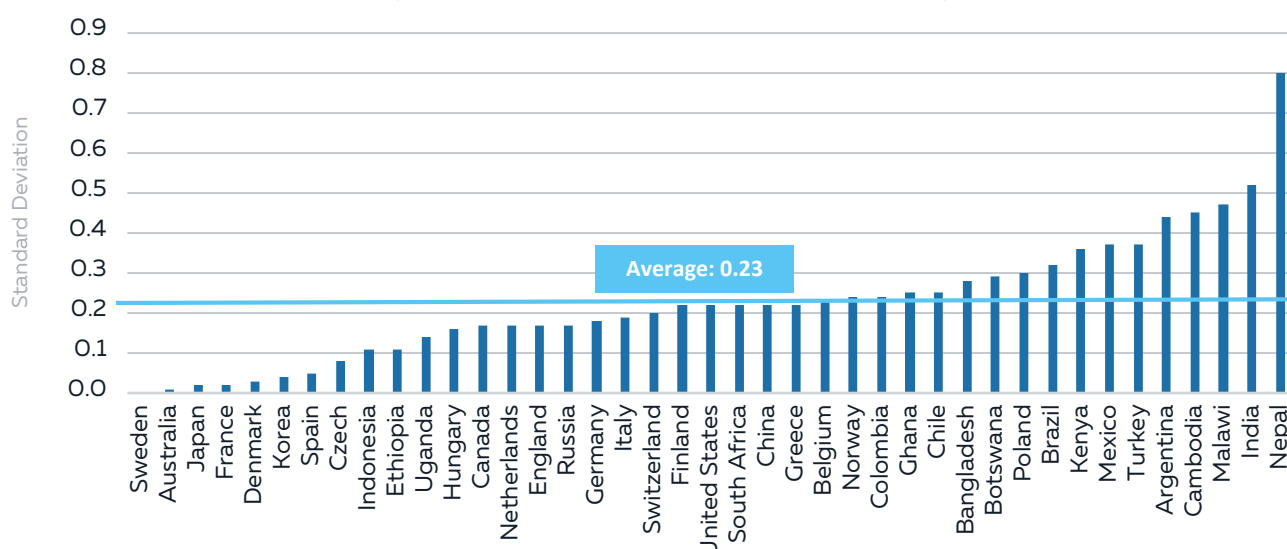
Source: Authors' calculations using effect sizes from multiple studies with robust learning loss data obtained from Patrinos' microlevel data (2023). 0.23 SD is equivalent to almost a whole year's worth of learning.

final certification in grades four, nine, and eleven – the only tool that could have been used to estimate the impact of school closures on students learning – in 2020 and 2021. Failure to provide remediation to help children catch up, or to make necessary adjustments to instruction to accommodate the learning needs of poor and vulnerable children, means that these children will continue to fall further behind (accumulate learning losses) even after returning to school. These government inactions will enable the costs of the pandemic to manifest themselves in the forms of higher poverty and inequality for several generations to come.

Table 5 summarizes the results of a survey conducted with ministries of education in selected countries regarding the actions taken to address the learning losses. Although countries have taken

Table 5: Steps taken to assess learning losses because of COVID-related school closures

Country	Steps taken to assess students?	Measures to address learning gaps
Armenia	Yes, students were assessed at the classroom level (formative assessment by teachers)	Remedial measures for all students
		Remedial measures with focus on students who were unable to access distance learning
		Remedial measures with focus on immigrant, refugee, ethnic minorities, or indigenous students
Azerbaijan	Yes, students were assessed in a standardized way at the national level	Assessment of gaps in student learning that may have accumulated during school closures
		Remedial measures with focus on students who were unable to access distance learning
		Remedial measures with focus on students in upper secondary with a national examination at the end of 2019 or 2020 calendar
Georgia	Yes, students were assessed in a standardized way at the national level	Assessment of gaps in student learning that may have accumulated during school closures
		Remedial measures for all students
		Remedial measures with focus on students who were unable to access
Moldova	---	---

Source: UNESCO, UNICEF and World Bank Survey, February 2021 (Round 3).

some steps to measure students learning to iden-
tify those lagging, the results of these assessments
were not necessarily promptly communicated or
published. In Georgia, 32 percent of parents said
that no diagnostic test had been implemented to
measure the learning and socio-emotional chal-
lenges of students, and 49 percent indicated that
they were unaware of these efforts. In the same
country, 20 percent of parents reported that the
school did not organize activities for students who
needed to learn more, and 49 percent answered
that they were unaware of such activities. Armenia
was a clear exception, with parents of secondary
school pupils in urban communities reporting that
after-school classes and additional learning mate-
rials were being offered to children falling behind.

4. Policy options to construct more resilient education systems

Acknowledging that school closures caused significant learning loss with a more considerable impact among disadvantaged students is the starting point for designing and implementing a "learning recovery plan." Three of the five countries studied reported that they had developed learning recovery plans. Nevertheless, these were poorly communicated to parents, teachers, and principals or lacked implementation protocols and the additional budget needed to be impactful. Returning to *business-as-usual* once schools reopened, as seen in some countries, makes the implicit assumption that there was no forgone learning and, therefore, no need to put a remediation strategy in place or increase education budgets to address the crisis. Some teachers and principals surveyed for this study claimed that the curriculum was covered during school closures, and did not see the need to implement remediation strategies.

The immediate challenge faced by education systems is to ensure that all students return to school. Many students became disengaged during the long school closures due to financial difficulties, a lack of access to technology, sickness, or other challenging circumstances. Many secondary students might now be working, married, or out of the system. As schools reopen, many students may not come back. Therefore, education systems will exclude a large proportion of the student population, exacerbating the inequalities that already exist in these countries. Countries need to put extra efforts into supporting re-engagement – especially of vulnerable groups such as disadvantaged children, girls, refugees, and students with special educational needs – and provide the necessary conditions and incentives for children to remain in schools.

Information campaigns have successfully improved enrollment, attendance, and learning outcomes, and can be implemented at scale with limited financial investments. The use of technology also enables these information campaigns to reach parents through different media: television, radio, text messages, social media platforms (such as Facebook, Instagram, and Twitter), email, and telephone. For instance, in Armenia, parents reported that teachers used Viber and social platforms to communicate with parents frequently. Frequent communication with parents significantly affects attendance, academic scores, and grade promotion rates,[38] and information can be provided to parents by text message. Interventions informing parents and students about the high returns to schooling have also significantly increased attained years of schooling, raised attendance rates, and had significant positive effects on learning.[39]

The policy options discussed in this section focus on building back better, encouraging education systems to prioritize learning, and collecting student achievement data to identify students falling behind. We put forward the elements of a simple, evidence-based learning recovery plan (LRP) that could be implemented immediately to mitigate learning losses. But to implement an LRP, schools require technical and strong leadership from education authorities. Modifying the curriculum to prioritize foundational skills is, in most cases, the responsibility of national ministries of education. Designing and implementing large-scale student assessments is another task rarely implemented at subnational level and is never done at school level. Implementing remediation strategies, such as tutoring, computer-assisted learning (CAL), or grouping students based on proficiency levels, can be overwhelming for schools. This section also identifies the importance of accompanying any LRP with financial support that expands countries' education budgets to cope with the consequences of any crisis. Additionally, the second part of this section distills the lessons from the COVID-19 school closure in countries like Denmark and France that can contribute to constructing more resilient education systems.

4.1 Prioritizing, measuring, and improving foundational skills

The learning loss caused by the pandemic could be addressed through an LRP comprising at least three elements: (i) prioritizing foundational skills in the curriculum; (ii) using standardized tests to identify students below the minimum learning standard; and (iii) implementing compensatory or remediation policies:

1   **Prioritizing foundational skills.** Careful consolidation of the curriculum ensures that all students acquire foundational skills – numeracy, literacy, and socio-emotional skills – that will enable them to keep learning in the future. See the World Bank's Accelerating Learning Recovery Rapid Framework.[40]

2   **Identify lagging students.** Large-scale, census-based student assessments can measure foundational skills effectively and be a powerful diagnostic tool to identify students below minimum proficiency levels.

3   **Close gaps through compensatory or remediation policies.** Many education interventions have proven to be effective at closing learning gaps. The third and final step of the LRP is to implement effective remediation interventions targeting lagging students.

Greater variation within classrooms is expected after the pandemic. Children with access to learning support at home during remote learning may maintain grade-level expectations. Nonetheless, many students, especially the most disadvantaged, will likely fall behind, particularly if they require adequate remediation to help them catch up. In that case, they could continue to fall further behind even after returning to school. For instance, after the 2005 earthquake in Pakistan, children missed 14 weeks because of school closures. Four years later, children affected by the earthquake were two years behind similar children who had not been affected in learning. The authors concluded that this deficit was too large to be explained by the time out of school; instead, they argued that children learned less every year after returning to school. One potential channel for their finding is that learning loss can accumulate after children return if no remediation or adjustments to instruction are implemented to match the children's level.[41]

Therefore, data on learning are critical for identifying the competence level of each student, teaching to the level of the student, designing remedial education programs tailored to students' needs, and, at the system level, monitoring where more investment is needed to ensure education is inclusive. However, measuring learning is not politically appealing because it has the potential to make the learning crisis visible to all, especially to parents who could demand better services. But all children must be supported after long periods of school closures, especially those who suffer the most from the remote learning policies of these countries, like vulnerable populations.

Countries should make inventories of existing assessments relevant to their context or use ready-made assessment frameworks applied in the region or similar countries. Well-designed classroom-specific assessments for diagnostic or formative purposes can also help teachers to determine current student learning levels so that they can adjust their instruction appropriately.

Compensatory or remediation programs – such as tutoring, grouping, or CAL – have proven effective when instruction is adjusted to students' learning level (to teach at the right level) rather than their age or grade. For instance, in India, working with volunteers to provide instruction at the level of the student had significant learning gains after 40 days of intervention.[42] Also, hiring tutors to provide instruction to students lagging in basic literacy and numeracy skills greatly impacted learning. The same study shows that teaching at the right level using tutors is comparable to a CAL intervention.[43] In Italy, a program that provided free individual tutoring online to disadvantaged middle school students during the COVID-19 lockdown increased students' academic performance by 0.26 SD on average (equivalent to more than a full year of formal schooling), and enhanced their socio-emotional skills aspirations, and psychological well-being.[44]

Another pedagogical strategy that has proven effective for teaching at the right level in school systems with low learning levels is organizing students into different groups based on ability.[45] Most of the time, these pedagogical strategies do not require a significantly greater teacher effort but instead rely on restructuring classes or providing remedial lessons for the lowest performers.[46] CAL programs enable adaptive and personalized learning, allowing students to go at their own pace after an initial screening and facilitating teaching at the right level. In India, a personalized technology-aided afterschool instruction program implemented with middle school students improved math and Hindi test scores for all students, but particularly for low-performing students.[47] In a more resilient and inclusive education system, targeting teaching instruction by learning level should be an institutionalized and structural policy that teachers regularly implement to ensure that all students learn, and that no student is left behind.

Combining remediation with extended instruction time – achieved by expanding the school year, the school day, or offering summer programs – can also result in a more resilient education system. Still, the curriculum must be adjusted to prioritize foundational skills (literacy, numeracy, and socio-emotional

[40] World Bank, 2022
[41] Andrabi et al., 2020
[42] Banerjee et al., 2016
[43] Banerjee et al., 2007
[44] Carlana & La Ferrara, 2021
[45] Duflo et al., 2011
[46] World Bank, 2018
[47] Muralidharan et al., 2019

skills) and target poor students. As described above, remediation programs were difficult to incorporate when curriculums were not adjusted accordingly or when sufficient financial resources were not available. In several countries, the academic year was shortened instead of expanded. And even when the school year was extended for two additional weeks, as was the case in Azerbaijan, enrollment was voluntary, which could have exacerbated differences among students instead of reducing them.[48]

Overall, the countries included in this report made minor adjustments to the school calendars to make up for school days lost and reported needing to have plans to revise the regulation on the duration of instruction time and content of curriculum after the school year 2020/2021.[49] In some countries, ministries of education wanted to extend the school calendar – by shortening summer vacations – or introduce additional lessons to make up for the lost classes. But these efforts were not accompanied by the necessary financial incentives or adaptation of curricula to prioritize certain subject areas. Therefore, it is not surprising that teachers pushed back against these strategies, especially as they were already suffering from significant burnout because of the challenges engendered by remote learning.

The learning recovery plan students need to recover from long school closures must be accompanied by additional financial resources. Nonetheless, low and lower-middle-income countries have been reducing their education budgets while upper-middle and high-income countries are doing the contrary, increasing their budgets and education programs to support students.[50] If education is not prioritized in all government budgets, the gap between lower and higher-income countries in learning outcomes and human capital development will be amplified.

4.2 Opportunities to construct a more resilient education system

The COVID-19 crisis has led to a significant learning loss but also created a unique opportunity to implement long-awaited reforms capable of addressing structural constraints to educational systems. The learning challenges did not start with the pandemic: they were there, and COVID-19 exacerbated them. Before the pandemic, roughly half the students in low- and middle-income countries were not achieving basic foundational skills, and this had become known as the "learning crisis."[51] According to the OECD's 2018 Programme for International Student Assessment (PISA) test, 36 percent of 15-year-old students in Ukraine did not achieve minimum

learning proficiency levels, along with close to half of 15-year-old students in Moldova and more than 60 percent in Azerbaijan and Georgia. Half of the students in the five countries may know how to read but cannot comprehend simple texts; they may know how to solve basic math operations but cannot use them to address everyday problems. This is a massive crisis that was unfolding every day before the pandemic. Hopefully, the pandemic made the situation visible and created the conditions to design and implement the interventions needed to address it.

If a "learning recovery plan" can mitigate the loss of learning brought about by the pandemic, it could also address the "learning crisis." Prioritizing foundational skills in the curriculum, identifying lagging students, and implementing compensatory or remediation policies should be part of an inclusive education system. Literacy, numeracy, and socio-emotional skills should be the core of the curriculum.

The evaluation system should monitor attainment levels in literacy, numeracy, and socio-emotional skills. Well-designed large-scale student assessments capture foundational skills, are linked with the national curricula, and allow for comparisons over time.[52] A well-design testing scheme formed by standardized tests is one of the essential features of a resilient education system. Countries with regular census-based student assessments could: (i) identify lagging students at a higher risk of losing learning or disengaging during school closure; (ii) quantify the overall learning loss engendered by school closures; and (iii) identify students or groups of students who lost more learning during school closures. Large-scale student assessments can also be effective at improving student learning. Providing schools with a report card summarizing the results of standardized tests and identifying the areas of the curriculum in which students struggled the most is enough to ignite changes in the classroom and improve student learning.[53]

With more than half of the students failing to achieve minimum learning standards in some of the countries analyzed in this paper, compensatory or remediation policies should have been in place even before the pandemic. Providing tutoring in small groups, using CAL, or grouping students based on their competency level are examples of the general principle of "teaching at the right level." Education systems, schools, and classrooms within schools operate under the highly restrictive assumption that there is minimum proficiency among all students within the classroom. Grade four teachers assume that all their students know how to read

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[48] These strategies are aligned with the World Bank's framework for learning recovery and acceleration, referred by its acronym as R.A.P.I.D.
[49] UNESCO, UNICEF and World Bank, 2021
[50] World Bank and UNESCO, 2022
[51] World Bank, 2018
[52] de Hoyos et al., 2021
[53] de Hoyos et al., 2017; de Hoyos, Ganimian et al., 2021

and write, count to 20, and make simple additions and subtractions. However, this is not the case for many students, especially those from poor or marginalized households.[54] For students who lag significantly in competencies concerning the average student in the classroom, the time spent at school is highly inefficient. To bring them up to the right level, lagging students need remedial interventions and more instructional time tailored to their competencies. As mentioned above, this can be achieved through tutoring, CAL, or grouping students according to their level of proficiency.

Other, more complex, interventions can greatly reduce the learning gap between poor and non-poor students. For instance, high-quality early childhood education is perhaps the most cost-effective policy to close development gaps between poor and non-poor children, creating the conditions for them to learn during their academic or formative years. Full-time school models can also improve learning outcomes among poor students.[55]

COVID-19 not only brought the importance of guaranteeing learning for all to the center of the education debate, but also forced stakeholders in the education system to think about the conditions required to use technology effectively in education. Teachers had to improve their digital skills, and education ministries had to develop educational content and pedagogical plans to be delivered online. All these efforts contribute to higher quality provision of education services for rural, isolated, or marginalized groups, including refugees – provided they are granted access to devices connected to the internet.

One technology stands out as transformational, particularly for poor and lagging students. As mentioned above, computer-assisted learning with instruction and content that can be adjusted to the level of competency or proficiency of the student has been proven effective at reducing learning gaps.[56] The logic behind CAL that "teaches at the right level" is very simple. If lagging students have a level of proficiency far below the average student (the level at which teachers usually teach), the solution is to reduce the level of instruction. As mentioned above, this can be done by tutoring a small group of lagging students or grouping students according to their level of competence (as opposed to their grades). However, none of these solutions individualize the learning experience. CAL can do this. If education systems complement conventional, face-to-face instruction with CAL that targets lagging students, learning gaps can be significantly reduced.

Creating resilient education systems that protect student learning from external shock is not only desirable or ideal. Despite experiencing school closures, students in Denmark and France did not suffer significant learning losses. Denmark closed schools for a total of 22 school weeks, equivalent to more than half a school year – slightly more than the OECD average.[57] Nonetheless, Denmark has mitigated the learning losses observed in other countries. The resilient education system of Denmark had good preconditions for handling the educational disruption – reliable digital infrastructure[58] and broadband connectivity, high levels of digital skills among teachers and students,[59] and online learning support platforms available for schools.[60] It also mobilized financial resources towards education to support the delivery of compensatory interventions: additional teaching, remediation for students lagging, improving student well-being, and reducing inequalities among children from different socioeconomic backgrounds.[61]

Denmark's education system regularly measures students' foundational skills using standardized assessments implemented online, self-scoring, and adaptive programs.[62] In response to the evidence, the country introduced differential return dates to schools based on the age group of the student. The youngest grades (grades zero to four) were allowed back in school after eight weeks of distance learning, and they were taught in small groups by a few teachers.[63] On the other hand, older grades (grades six to eight) experience the full 22 school weeks of distance education. The country also changed its response over time, and in the second lockdown, schools opened partially under the "emergency teaching" scheme for a shorter number of hours. The curriculum focused on core, foundational skills.[64]

France made its open school policy a priority, closing schools for only 10 weeks, one of the shortest periods in Europe. France had a strong national assessment system that measured student learning during the pandemic from students in multiple grades and cohorts and covered students in public and private schools. This generated robust data on academic progress before and during the pandemic.[65] The country also collected student demographic data (such as socioeconomic background, ethnicity, and immigrant status) that enabled them to conduct performance gap analysis, along with extensive censuses or representative samples survey and longitudinal data on topics ranging from mental health, attitudes, and home and life situations during the confinement. France established support for lagging students to consolidate the aspects of their programs that were not covered during confine-

54 Muralidharan et al., 2019
55 Padilla-Romo, 2022
56 Muralidharan et al., 2019
57 OECD, 2021
58 Denmark outperforms OECD average in student access to computers for school-work, with 98% overall and 96% for lower socioeconomic quartile (PISA 2018, OECD Denmark Country Note, 2020).
59 Denmark excelled in pre-pandemic ICT use: 90% of secondary teachers frequently allowed student ICT use for projects or class work compared to 53% in other OECD countries, and 88% felt confident in supporting learning through digital technology, surpassing the OECD average (67%) (OECD Denmark Country Note, 2020).

60 Denmark also excelled in pre-pandemic online learning support: 91% of students attended schools with effective platforms, surpassing the OECD average of 54% (OECD Denmark Country Note, 2020).
61 European Commission, 2020; OECD Denmark Country Note, 2020
62 The data is collected by The National Agency for IT and Learning (Styrelsen for IT og Læring) under the Ministry of Children and Education.
63 The Danish Evaluation Institute, https://www.eva.dk/uk
64 Reimer et al., 2021. Another important feature of Denmark is that it accompanied its education response with social protection measures that protected Danish workers from the economic costs of the lockdown. The generous social safety nets included families' income protection via the temporary wage compensation program, which

ment. The country halved class sizes for students in priority schools from 24 down to 12 students, which helped to rebound learning to pre-pandemic levels.

COVID-19 exposed the vulnerabilities of education systems and made it clear that more unequal ones were less resilient. Education systems with a large proportion of the student population below the minimum learning level had more students at risk of falling further behind during school closures. Building inclusive education systems is central to the resilience agenda. Inclusion can be promoted by effectively using data to detect lagging students and design remediation strategies. However, more resources must be allocated to schools serving disadvantaged students to implement these policies. The fiscal transfer rules should be more progressive, acknowledging that far more resources should be allocated to underprivileged students to produce a given level of learning. Carefully designing fiscal transfers can improve the system's efficiency (that is, how much enrollment and learning are delivered for every dollar spent) and reduce learning disparities across regions and between poor and non-poor students.[66]

is believed to softer the economic impact of the pandemic (reducing layoffs). These measures likely translate into less stress on the home front compared to other countries (Greer, S., King, E., Massard da Fonseca, E., & Peralta-Santos, A. (2021)).
[65] Thorn & Vincent-Lancrin, 2021
[66] Al-Samarrai & Lewis, 2021

Final Remarks

COVID-19 was a massive shock for education systems around the world. In a matter of days, education systems had to redeploy inputs typically used in schools to remote education. This shift reduced the efficiency of school inputs to produce learning. It also made relatively unequal household conditions more critical for determining student learning. The result was a significant reduction in average student learning, with disadvantaged students experiencing a disproportionately large decline.

As learning is a cumulative process, while learning today is partly the outcome of the stock of past learning, not addressing the learning loss brought about by COVID-19 would have long-lasting effects on future learning outcomes, restricting productivity and growth and dampening social mobility. To address learning loss, countries in the South Caucasus, Eastern Europe, and elsewhere could design and implement learning recovery plans that prioritize foundational skills, develop the tests needed to measure them, and close learning gaps through remediation policies.

But the pandemic also brought opportunities. Lack of learning among a significant proportion of the student population, most of whom are from disadvantaged households, is not a challenge that began with COVID-19. The five Eastern European countries analyzed in this paper faced learning challenges well before the pandemic. The pandemic exposed the vulnerability of unequal education systems. Perhaps the pandemic and the attention it is bringing to students' "learning loss" will create the political conditions to implement long-awaited education reforms to reduce the learning gaps and create better conditions for disadvantaged students, the core element of resilient education systems.

Use of data to guide decisions, standardized tests as a diagnostic tool, and remediation policies should become permanent features of education systems. During school closures, remote education experienced a giant leap forward, with teachers, parents, and students becoming more familiar than ever with digital platforms and digital communication tools. This opens many opportunities to build more resilient education systems. For instance, online tutoring or remedial education could be provided remotely to lagging students needing individualized support. Using technology through online tutoring or CAL can, when designed appropriately, improve students' academic performance, socio-emotional skills, and psychological well-being.[67] But these solutions come together with heavy internet connectivity and device investments. It is also evident that digital literacy (the ability to use digital technology) is insufficient for teaching and ensuring students' learning. Teachers also need so-called "digital pedagogical skills", or the ability to use digital tools and resources to facilitate learning, check for understanding, provide feedback, and so on. Currently, several skills and competency frameworks incorporate digital pedagogical skills.[68]

Exploiting the opportunities engendered by COVID-19 will require evidence-based education policies and financial resources. More resources should go where they are most needed: the schools serving disadvantaged students. If finance ministries have long-term horizons when allocating resources, they should prioritize constructing equitable resilient education systems. Well-designed policies with sufficient budgets are not a guarantee of success. In a large sector formed of many actors with interests that are not necessarily well-aligned, implementation can be as challenging as – if not more challenging than – design and budget allocation. Politicians and education policymakers have an enormous responsibility to create coalitions with relevant actors and find a consensus among stakeholders to improve learning opportunities among disadvantaged students and develop the basis for constructing resilient education systems.

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[67] Carlana & La Ferrera, 2021
[68] World Bank, 2021

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