3 Learning from the frontlines of educational innovation during a pandemic

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The education imperative created by COVID-19 is to prepare students to build back better, not just to prepare them for the past. This requires innovation and change, not just restoring the pre-existing status quo. Were there any lessons learnt during the pandemic of value to understand how to innovate better, in order to build back better? This chapter examines some of the educational innovations generated in the early phase of the pandemic. Focusing on a subset of innovations documented in this report, the chapter focuses on two questions: 1) What was the focus of those innovations in the early phase of the pandemic?; 2) What conditions enabled the emergence of these innovations? It concludes with ten lessons from these case studies that could help during the recovery.

Introduction

The COVID-19 pandemic shocked education systems worldwide, negatively impacting educational opportunity. Emerging evidence documenting the educational consequences of such shock suggests that it will be profound and augment educational inequality within and between nations (Reimers, 2021[1]). The direct impact of school closures, and the indirect impact of the economic recession and increase in poverty resulting from the pandemic, as well as the health impact of the pandemic on students, teachers and their families, all constrained opportunities to learn. The protracted nature of this crisis aggravates the consequences in terms of lost opportunities to learn, deskilling of students, disengagement for students and for faculty, and for some dropout. These educational impacts will, in turn, complicate other social and economic challenges such as economic and social inequality, social inclusion, social cohesion, trust in government, competitiveness and climate change.

While the negative consequences of the pandemic have received some scholarly attention, considerably less thought has been devoted to identifying potential silver linings created by the pandemic. It is perhaps understandable that, as a result of the obvious education losses for students as well as teachers, created by the pandemic this period came to be constructed, for many in the education community, as traumatic, one that we should try to recover from, and perhaps forget.

There are at least two risks that stem from an exclusive focus on the negative impacts of the pandemic. The first is that focusing solely on the educational trauma and loss experienced during the pandemic might distort, even romanticise, our memories of educational conditions prior to the pandemic. Amidst the sense of loss so many experienced when students and teachers did not meet in person or did so under conditions that greatly challenged their interactions, it might be easy to forget that before the COVID-19 crisis education systems were failing many children, who were not learning much, and certainly not much of value to help them participate civically or economically. Much of the conversation about “recovering learning loss” reflects such romanticised view of the past, before the pandemic. The few studies which assess learning loss compare what the current cohort of students know and can do in various grades, relative to what their peers in the same grades knew and could do in the immediate years before the pandemic. What such analysis conceals is how low such levels of learning were, particularly for poor and marginalised students, before the pandemic. Whether the “learning loss” was big or small is secondary to the fact that no one was learning very much even before the loss.

The second risk of focusing exclusively on the “loss” is that it leads inevitably to try to “recover” that which was lost, which focuses our energies on the standards of the past, ignoring the fact that, if it is to be relevant, education must prepare students for the future, a future which has been significantly altered by the pandemic itself. The pandemic created new challenges, certainly for the immediate future but possibly beyond, in effect rewriting the future, and this should cause us to focus on how to help students develop the skills to address those future challenges, rather than focus on helping them gain the skills which might have been relevant even in the almost two years since the pandemic hit.

Illustrative of these rapid changes to scenarios about the future is a recent report of the National Intelligence Council of the United States, which underscores social fragmentation as the most salient challenge for American democracy, arguing that “the COVID-19 factor” accelerated pre-existing trends of social fragmentation, for example diminishing trust in government and interpersonal trust, particularly across diverse identity groups (National Intelligence Council, 2021[2]). Given these risks, educational institutions should be increasing their efforts to develop civic skills and dispositions, reinforcing trust in government and interpersonal trust, and supporting students in gaining the skills to collaborate productively across identity and other divides. Merely working to recover “learning loss”, particularly in domains which may have been deemed adequate or sufficient to prepare students to meet the needs of the past, is no longer enough. A number of accelerating trends, predating the pandemic, motivated already the urgency for new education goals. For instance, the OECD Future of Education and Skills Project had already advanced an interest in broadening the curricular goals to prepare students to participate civically and

economically. This interest resulted in the expansion of the domains of student knowledge and skills assessed in PISA, beyond language, mathematics and scientific literacy, to include global competency and socio-emotional skills. Similarly, UNESCO Commission on the Futures of Education published a report in 2021 articulating an ambitious vision of reimagined education to help humanity meet the challenges of the future.

Therefore, the education imperative created by COVID-19 is, to put it bluntly, to prepare students to build back better, not just to prepare them for the past, and this requires innovation and change, not just restoring the pre-existing status quo. This urgency to innovate is the reason to ask whether there were any lessons learnt during the pandemic of value to understand how to innovate better, in order to build back better.

In this chapter, I examine some of the educational innovations which were generated in the early phase of the pandemic, rapidly designed efforts intended to sustain educational opportunity at a time of much confusion for the education community. In particular, I focus on a subset of innovations which were documented as part of a collaborative effort among the Global Education Innovation Initiative at Harvard University, the Directorate of Education and Skills at the OECD, the Education Group at the World Bank, and the organisation HundrED. In looking at these case studies of innovation, which are the focus of this publication, I ask two questions:

1. What was the focus of those innovations in the early phase of the pandemic?
2. What conditions enabled the emergence of these innovations?

The premise of this analysis is that the pandemic represented a significant disruption, of unprecedented scale, which tested the organisational resiliency of education and upended many of the bureaucratic norms that govern education systems. Such disruption of education systems created a rare event in which the normal boundaries, constraints and roles that regulate the behaviour of individuals in education organisations were suspended, in this way freeing the practices and interactions among educational actors and institutions allowing new forms of collaboration leading to novel ways to teach and learn. Even as the pandemic created other, new, constraints and challenges – resulting for example from the social distancing norms instituted by public health authorities to contain the velocity of the spread of the virus, or from inadequate resources or infrastructure to rapidly shift to digital platforms -- it was precisely the existence of those new challenges and constraints, together with the temporary freedoms, which created the occasion for educational innovation.

The case studies of educational innovation

In March 2020, as the World Health Organization declared COVID-19 a Global Pandemic, I reached out to colleagues working in several international education organisations to explore ways in which we might contribute to mitigating the potential educational fallout of the crisis. Andreas Schleicher, OECD Director for Education and Skills, responded right away to that outreach and within days we had begun a collaboration to generate evidence that would help education leaders navigate the crisis.

Our first effort was a cross-national survey examining the anticipated education effects of the pandemic, the strategies in place to mitigate the crisis, and the areas where education authorities felt they needed more support. The main finding of that survey was that few education authorities had, at that moment, at the end of March of 2020, a coherent education strategy for how to educate during the pandemic. Our report presented the results of that study, along with a series of recommendations for the development of an education strategy, which benefited from input from experienced senior education leaders in various countries, a 24-item check list to guide the development of a strategy of educational continuity and a process of change management that would assist education leaders in navigating the crisis. The checklist is presented in Box 2.1.

Box 3.1. Check list to guide the development of a strategy of educational continuity during the first waves of school closure

1. Establish a task force or steering committee that will have responsibility to develop and implement the education response to the COVID-19 pandemic. To the extent possible ensure those in the task force represent different constituents in the education system or school network and bring important and diverse perspectives to inform their work, for example various departments curriculum, teacher education, information technology, teacher representatives, parent representatives, students, representatives of industry when relevant.
2. Develop a schedule and means of frequent and regular communication among task force members, during the period when social distancing will be in effect.
3. Define the principles which will guide the strategy. For example: protecting the health of students and staff, ensuring academic learning and providing emotional support to students and faculty. These principles will provide focus for the initiatives to be undertaken and will help prioritise time and other limited resources.
4. Establish mechanisms of co-ordination with public health authorities so that education actions are in synch and help advance public health goals and strategies, for example, educating students, parents, teachers and staff on the necessity for social distancing.
5. Reprioritise curriculum goals given the reality that the mechanisms of delivery are disruptive. Define what should be learnt during the period of social distancing.
6. Identify the feasibility of pursing options to recover learning time once the social distancing period is over, for example, an intensive review period during the break prior to the start of the new academic year.
7. Identify means of education delivery. When feasible, those should include online learning, as it provides the greatest versatility and opportunity for interaction. If not all students have devices and connectivity, look for ways to provide them to those students. Explore partnerships with the private sector and the community in securing the resources to provide those devices and connectivity.
8. Clearly define roles and expectations for teachers to effectively steer and support students' learning in the new situation, through direct instruction where possible or guidance for self-directed learning.
9. Create a website to communicate with teachers, students and parents about curriculum goals, strategies and suggested activities and additional resources.
10. If an online education strategy is not feasible, develop alternative means of delivery, they could include TV programmes, if a partnership with television stations is feasible, podcasts, radio broadcasts, and learning packets either in digital form or on paper. Explore partnerships with community organisations and the private sector to deliver those.
11. Ensure adequate support for the most vulnerable students and families during the implementation of the alternative education plan.
12. Enhance the communication and collaboration among students to foster mutual learning and well-being.
13. Create a mechanism of just in time professional development for teachers and for parents to be able to support learners in the new modality of instruction. Create modalities that foster teacher collaboration and professional communities and that increase teacher autonomy.
14. Define appropriate mechanisms of student assessment during the exigency.

15. Define appropriate mechanisms for promotion and graduation.
16. As needed, revise regulatory framework in ways that make online education and other modalities feasible, and in ways that support teacher autonomy and collaboration. This includes providing school day credit for days taught in alternative education plans.
17. Each school should develop a plan for continuity of operations. As a way to support them, education authorities can provide curated examples of plans in other schools.
18. When the school provides meals to students, develop alternative means of distribution of food to students and their families. 19. When the school provides other social services, such as mental health supports, develop alternative forms of provision.
19. Schools should develop a system of communication with each student, and a form of checking-in daily with each student. Perhaps in the form of texts from teachers if parents have access to mobile phones.
20. Schools should develop mechanisms of daily check-in with teachers and school staff.
21. Schools should provide guidance to students and families about the safe use of screen time and online tools to preserve student well-being and mental health as well as provide protection from online threats to minors.
22. Identify other school networks or systems and create forms of regular communications with them to share information about your needs and approaches to solve them, and to learn from them as a way to foster rapid improvement in delivering education in the new modalities.
23. Ensure that school leaders get the financial, logistical and moral support they need to succeed.
24. Develop a communications plan. Map key constituencies, and key messages to support the execution of the education strategy during the exigency, and ensure those are effectively communicated through various channels.

Source: (Reimers and Schleicher, 2020, pp. 5-6[3])

The report generated considerable interest. It was discussed at virtual global convenings, as well as at forums involving a variety of education stakeholders from the same country. In a context of great need and absence of a playbook on how to face the crisis, the report served as a provocation for essential conversations between governments and teachers, and other members of civil society, in making sense of the crisis and discerning how to proceed. It was a way to generate collective intelligence in trying to discern how to educate students amidst great educational and social disruption.

Participating in these conversations impressed upon us the urgency to advance knowledge that would guide more effective actions to sustain education during the emergency. It was not enough to know what challenges governments anticipated, what needs they faced, or to provide guidance on how to develop a strategy, or to have conversations in real time in large virtual convenings, it was necessary to offer specific guidance on what kind of programmes and interventions could sustain educational opportunity during the crisis.

To meet that need, it was important to extend the circle of collaborators and we invited other colleagues at the OECD, the World Bank and the organisation HundrED. Together, we set out to document, rapidly, emerging education responses as a way to facilitate rapid exchange of that knowledge, and in this way support educational innovation globally which would contribute to sustaining educational opportunity.

Our approach was inspired in some of the basic tenets of appreciative inquiry, an approach to action research and organisational change that consists of identifying and leveraging areas of strengths in organisations, as a way to support further improvement (Cooperrider, Whitney and Stavros, 2004[4]). Our premise was that in every society, amidst the crisis created by the pandemic, there would be individuals

and organisations, in government and in civil society, that against the odds were creating ways to sustain educational opportunity. These efforts represented “goodness” in a moment of crisis, and we thought that by finding and spotlighting such goodness, by focusing on those positive deviants, this would animate further innovation and improvement in those jurisdictions, and inspire similar efforts in others.

We further anchored our approach on two premises which had guided previous work of the Global Education Innovation Initiative at Harvard University. The first, that when practitioners solve problems they gain knowledge that can be valuable to solve future problems if it can be made visible and communicated to others. The second, that there are insights and nuances about how programmes and policies are implemented which are best understood by those who participated in their design and implementation. For this reason, we decided to identify innovations and work alongside with those who had led them in documenting these innovations. These would be case studies of innovations relying heavily on the perspectives and insights of the participants.

It was an audacious proposition, for sure, at a time when we were all in lock down and relying on digital technologies to communicate, to design and execute a global study of innovation when it was obviously too soon to know what was working, for whom and with what results, and to do this remotely. Our goal was simply to try to offer hope and inspiration to those who, like us, were determined to prevent the complete interruption of education, in a context in which we were learning, from our virtual conversations with colleagues in many jurisdictions discussing the results of our first survey, that many education leaders were on the edge of giving up, and governments were ready to focus all their energies on the public health emergency, declaring education something that would have to wait until the public health crisis could be controlled. To be sure, our effort was guided by the ethical imperative that education should continue against all odds, and to support this goal we sought to identify and disseminate examples of how this was being done, however imperfectly, as schools were shut down.

At that time, in April of 2020, we did not know how long it would take to come up with vaccines that could help address the crisis, much less how those could be delivered to the majority of the world population. Adding to the confusion and the crisis, some political leaders denied the gravity of the public health crisis and ignored the advice of public health authorities, contributing to a wide range of responses from the public, some of which, such as not using masks and refusing to be vaccinated, worsened the crisis.

It was in that context that we set out to identify and document the case studies of educational innovation which are presented in this book. We wanted to know who had found ways to sustain some form of education while schools were closed, and how they were doing it. We used a process of convenience to identify the cases, essentially drawing on our collective networks to identify bright spots. We relied on the same networks to engage collaborators who could work with us documenting those efforts, attempting to include as authors people with first-hand knowledge of the innovations we were documenting and always basing our studies on interviews with those who designed them. We developed a common protocol to write the cases, and began in earnest to write these cases and to disseminate them in a website created specifically for that purpose. While we did not use a formal process of peer review, the drafts of the cases went through the OECD editorial and clearance process, with an editor raising valuable questions, criticism and suggestions, challenging the teams writing the cases – often a combination of an ”insider” to the organisation documented alongside one of the different organisations’ representatives. The objective was to write an account supported by the best available evidence. The focus of the cases was to describe the initiatives, to identify key points for successful adaptation to different contexts and lessons learnt.

We developed this mechanism of documentation of educational innovations in the spirit of rapid prototyping, adjusting and improving as we went along. We started with a basic framework of the information that should be contained in each case study, and refined it as we began to work on the first case studies. Each case would identify the challenge the innovation was addressing, would describe the innovation, with attention to the operational detail of how to implement it, would discuss implementation challenges, describe monitoring and evaluation, and provide existing evidence on use of the innovation

and impact, if available, to then discuss adaptability to new contexts, and highlight key points to support transfer and adaptation of this innovation to varied contexts.

Over the following six months, we published 45 case studies, covering a range of education responses to the crisis in 34 countries, efforts from municipal, state and national governments, from school networks, from private and public institutions. The only requirement for the cases we included in the project was that the efforts needed to have demonstrated the ability to reach children at some scale (a city, a state, a nation), and that they were providing more opportunities to learn than the alternative, which for most children at that time was to stay home and wait out the pandemic. We also attempted to include a diversity of countries. The countries we covered varied in terms of resource level, infrastructure, size, and other characteristics. They included: Belgium, Brazil, Chile, Colombia, Egypt, Finland, France, India, Japan, Jordan, Kenya, Latvia, Lebanon, Liberia, Mexico, the Netherlands, New Zealand, Nigeria, Pakistan, Peru, Russia, Samoa, Sierra Leone, Spain, Taipei, Turkey, Uganda, Ukraine, the United Kingdom, the United States of America, Uruguay, Vietnam and Zambia. As of December of 2021, the case studies had been accessed, collectively, by 35 000 unique viewers.

As we wrote these case studies, it became apparent that, in the midst of the very challenging conditions created by the pandemic, considerable innovation had been unleashed to find novel ways to sustain student engagement with learning while in person instruction was interrupted for all or most children. The case studies included initiatives such as using radio, printed materials, educational television, and a variety of digital platforms, with and without Internet, to sustain educational opportunity. They also included initiatives to develop the capacities of teachers to teach remotely, and to support parents as they supported the education of children at home. Some of them focused on novel ways to assess student knowledge remotely. This realisation that innovation was taking place was also the conclusion of a second cross-national survey which we conducted in May of 2020 among education authorities. Our report based on that survey concluded that the pandemic had generated an innovation dividend and that perhaps such innovation could help education systems address some pre-existing deficiencies and challenges (Reimers and Schleicher, 2020[5]).

As the months continued, countries began to diverge in their response. From the initial closures which had affected the majority of schools and schoolchildren, some countries began various efforts to reopen schools, while in other schools remained closed.

Sixteen months after we began to write these case studies, we thought it would be valuable to look back and try to take stock of what these early innovative responses to the onset of the pandemic say about how we faced the crisis.

What competencies were the focus of those innovations in the early phase of the pandemic?

The 45 innovations studied focused on a range of educational outcomes, from maintaining students' engagement with learning – in activities of review of previously covered material – to covering new content in academic subjects, to supporting the well-being and socio-emotional development of students. This heterogeneity in early-stage innovations reflects the absence of consistent standards for education continuity strategies, and the predictable variability in attempted approaches and intended results.

In spite of this variability, most of these cases address, at least to some extent, competencies beyond cognition, recognising perhaps the salience of socio-emotional well-being during the crisis, and the foundational nature of attending to such well-being before any other form of learning could be productive. For example, Fundación Sumate in Chile, a network of second chance schools for school dropouts, prioritised the emotional well-being of students, as the foundation to meet their needs during the pandemic, and to maintain engagement with learning.

In Colombia, the Alianza Educativa rapidly developed printed materials to support distance education during the school closures. Their initial focus was on the emotional well-being of the students, to then add an academic component to the materials.

In India, Reality Gives, a community-based organisation which supports low-income youth in developing English language skills, pivoted to delivering the second language curriculum online, adding a component to support the emotional well-being of students.

The Rising Academy Network on Air in Liberia and Sierra Leone, focused on delivering academic lessons via radio, embedded with health messages related to the pandemic, and to the risks students would be exposed to out of school.

What conditions enabled the emergence of these innovations?

These case studies illustrate that innovation was made possible by the entrepreneurial use of existing resources, which created new value as a result of repurposing existing assets, or combining existing resources, for instance existing digital assets, or creating novel collaborations among diverse institutions. Many of these innovations were created as rapid prototypes, to be improved as a result of feedback and experience.

For instance, Ensena por Colombia created a rapid prototype of radio education, drawing on existing education materials from various organisations with which Ensena por Colombia had pre-existing partnerships; based on those resources the team of Ensena por Colombia created 10-minute episodes. The same organisation was able to produce at fast pace one new episode per day by engaging students, usually an underutilised resource, along with teachers, in the development of new programmes. Ensena por Colombia learnt from the experience of other organisations in the Teach for All network, which had used radio education to deliver content, adding the use of a WhatsApp feedback loop in which teachers discussed the radio lessons with their students, in effect building a flipped classroom with low-cost technologies as the platform. In India, the government of Madhya Pradesh created a rich multimedia platform to support remote learning, which repurposed and remixed existing digital assets. For instance, to create a radio programme, they relied on pre-existing radio school content developed by the state as well as on assets curated by UNICEF. The platform included also a library of high-quality digital resources from existing providers such as Khan Academy, Pratham Open School, the Teacher App and others.

Among the conditions which enabled the innovations examined in these cases were pre-existing networks across schools, and in some cases across schools in different countries. For instance, the network Teach for All, a federation of national organisations aligned in goals with pre-existing experience and structures to support the exchange of information, learning across the various national organisations in the federation, and collaboration, catalysed innovation by rapidly sharing emerging innovative practices designed to teach during the pandemic. A newsletter which reaches all teachers in that network was the vehicle through which teachers in Chile learnt that their peers in Nigeria had used podcasts to deliver content remotely, inspiring them to do the same. The rapid creation of a radio education curriculum by the Ensena for Chile organisation, spread throughout the network inspiring similar programmes in Colombia and Peru. Teach for Colombia, for example, used existing social networks of educators to help spread the programme within the network and beyond.

The cases illustrate also the power of collaboration, as the innovations involved, in many cases, the collaboration among teachers, and other stakeholders: members of the community, civil society organisations, and the private sector. To some extent the case studies illustrate the possibility of true collective leadership, in which various stakeholders come together to collaborate for the purpose of improving the performance of the education system. The challenges of achieving effective leadership are well known, one of the reasons the “system” aspect of the education system is broken, and it is somewhat

counterintuitive that the context of the pandemic, in which each of the stakeholders who came together in service of the greater good was in turn more challenged, would create the occasion for out of the ordinary collaboration.

The State of São Paulo in Brazil, for instance, developed in a matter of weeks a multimedia centre, which delivered education content via TV, radio, an app and printed materials, to sustain educational continuity during the period of school closures as a result of establishing partnerships with private providers and organisations of civil society. Of particular interest is the fact that this invitation to share leadership and responsibility extended by the State Ministry of Education to some of the most influential business leaders in the state, was followed by donations of services from telecommunication and education companies, which allowed the creation of the centre, amounting to 0.6% of the annual education budget of the State. A number of different organisations collaborated in providing access to various elements of the education platform to students, for example, police officers visited the homes of the most marginalised students to deliver printed materials, and donated cloud-computing time to host the technology platform.

For example, in the State of Maranhão, Brazil, a public-private partnership enabled the development of content to support remote education of children from 0 to 6 during the period when centres were closed. This partnership focused on supporting caregivers, rather than students directly as did most of the other components of the remote education strategy of the state. The focus of the programming was to use structured opportunities that enabled caregivers to transform everyday interactions with their children into opportunities for learning and development.

In Chile, the delayed response from the national government in the early phase of the pandemic caused other levels of government, business and civil society organisations to step up, as illustrated by the partnership between Ensena Chile, a network of mayors of cities and of local radio stations, in developing a distributing radio education.

Also in Chile, the work of the Fundación Sumate maintaining socio-emotional support to vulnerable youth during the pandemic built on support they had received from UNESCO in developing a curriculum to support the development of socio-emotional skills.

In India, the State of Madhya Pradesh developed a multimedia strategy of remote learning which involved the curation and repurposing of a variety of content, and collaboration among a range of national and international organisations, such as the Central Square Foundation, the Boston Consulting Group, Pratham, Khan Academy and others. In a relatively short period, this collaborative had created a rich repository of lessons and learning materials, aligned to competencies in the curriculum.

Similarly, in Vietnam, the creation of a TV-based education delivery strategy relied on collaboration across a variety of stakeholders, including the national and provincial departments of education, schools and teachers, TV stations, private education companies who donated lessons and learning materials, the alignment among these many stakeholders was facilitated by the existence of national education guidelines and curriculum.

Many of the cases illustrate the power of digital platforms to support teacher collaboration among teachers and administrators, within and across schools, and of education resource digital networks, in sharing practices they had found effective in teaching remotely, and in problem solving together. While there is nothing novel in the creation of professional learning communities or in shared repositories of education resources, with the forced immersion in digital instruction the pandemic also led teachers to use digital platforms to support such professional learning communities. Out of necessity, many more teachers than might have otherwise been the case learnt to communicate with colleagues on line, and relied on these online forums for the purposes of professional collaboration. For example, in Liberia and Sierra Leone Rising Academies created a radio education curriculum and lesson scripts which they shared with other organisations, using collaborative platforms such as Slack to facilitate communication among those organisations using the curriculum to exchange lessons learnt and ideas for improvements. In Colombia,

the Alianza Educativa used technology to support the collaboration of 500 teachers, who were able to rapidly develop printed instructional resources for students without access to the Internet.

Ten lessons learnt from these case studies of innovations in educational continuity during the pandemic

The first most obvious lesson we drew from this collaborative work to rapidly identify and document strategies for education continuity during the early phase of the pandemic was that modern communication technologies allow networks of individuals and organisations to very rapidly identify, document and disseminate emerging educational innovations, and that this can support education decision making in a context of high uncertainty. In effect we built a global education radar that helped us identify positive deviants in defying the odds the pandemic was creating in real time. This has potential significant implications for educational policy and planning.

The fact that teachers and others in the frontline of education are capable of generating innovative solutions to address the challenges they face is certainly not novel, though it is perhaps significant to realise that these local actors can also do this in the considerably more challenging context created by the pandemic, when their own health was at risk. Ordinarily, many of these local innovations, however, take a long time to spread and diffuse; some never do. At the same time, education policies are often handicapped by insufficient grounding on the conditions on the frontlines, a problem aggravated when those conditions are shifting. The ability to systematically capture and disseminate information about educational innovations in a matter of weeks, through the deployment of digital technologies and the articulation of networks of educators, has important consequences for the future of education decision making. It brings new meaning to the idea of the world as a "global education laboratory" from which we can rapidly learn, generating collective intelligence which can be rapidly shared to solve education challenges at a global scale.

The generation and dissemination of these case studies provided a proof of concept of a mechanism for rapid dissemination of educational innovation, relying on a rapidly organised partnership among four institutions, a rapid prototype in international co-operation, on the volunteer efforts of many collaborators in the countries who worked on writing (or supporting the writing of) the case studies, and on the technology which made communication and co-ordination feasible. For the most part, those we invited to collaborate as part of this effort accepted, even as they were facing the challenge of leading organisations and programmes with all the uncertainty which the situation presented. It is significant that education leaders facing the daunting challenge of continuing to educate during the disruption caused by a global pandemic, would see enough value in knowledge about the way in which others around the world were sustaining educational opportunity, to commit time and effort to share their own efforts in order to build a global commons of knowledge to face a crisis for which no playbook existed. In effect, technology allowed us to create a digital strategy for rapid documentation and research, and this in turn invited partners to not just be recipients of the knowledge such strategy was generating, but to be contributors and participants.

It should be noted that the stories of education continuity we documented with the case studies referred, principally, to initial responses to the crisis, those taking place during the months of April through June of 2020. As such, these innovations represent rapidly developed approaches to sustaining educational continuity. It is likely that, as the pandemic continued, and education systems had time to assimilate what they had learnt from them, that some of these innovations might have evolved in various ways, or become perfunctory as schools reopened. It was not part of this effort to follow up that evolution, or to capture innovations which were generated at later stages of the pandemic. Emerging studies of innovations that took place over a longer period during the pandemic, including beyond the initial stages of the crisis, illustrate that some of them anticipated changes in educational practice aligned with UNESCO's recent report on the Futures of Education (Reimers and Opertti, 2021[6]).

A second obvious lesson illustrated by these studies is the importance that societies the world over afforded to education. It is remarkable that in the midst of a global pandemic governments and civil society organisations would go to such lengths to look for ways to continue to educate students when they deemed teaching in school unsafe. This speaks to the normalisation of the idea that education matters. An alternative response, indeed one a number of countries opted for, would have been to put education on the back burner while governments and society addressed the most pressing aspects of the public health crisis and wait out the most acute initial stage of the crisis. The fact that societies afforded education sufficient attention to create alternative strategies to educate should not be underestimated, for it signals how much education is valued as a societal activity.

A third lesson these innovations underscore is the importance of educating the whole child. No one learns much when they are in fear, when they experience violence or when they are hungry. As a number of the case studies focused on organisations serving marginalised populations, the innovations they generated sought to provide such holistic support to students. In the United States, for instance, the Phalen Leadership Academies, a network of charter schools serving low-income, ethnic minority children, sought to create a strategy to support students which included food and nutrition, emotional support, and academic learning. Similarly, in Brazil, São Paulo's strategy for education continuity, focused on the alternative delivery of school meals to children, in addition to the academic engagement and support.

A fourth lesson emerging with the benefit of hindsight, particularly as evidence begins to surface on "learning loss" during the pandemic, is that none of these innovations, or the collective result of all innovations which may have taken place during the crisis, of which these 45 case studies are just a small sample, were sufficient to compensate for the lost opportunities to learn caused by school closures. In Madhya Pradesh, India, for example, a massive effort at building a multimedia platform for remote education reached only 7% to 10% of the learners in the state. A key issue in this consideration is which counterfactual one is using to assess the contribution of these innovations. Relative to keeping schools open, operating in the conditions in which they normally operate, these innovations and all efforts expended during the pandemic appear to have netted less opportunity to learn than students would have had, had they been able to attend school instead. A key consideration here is how necessary were the school closures, in particular the longer closures. There is wide variation across countries in the duration of the closures, suggesting that to a great extent such duration was itself a policy choice. It is also the case that the public health crisis differed across countries, as a function of a range of contextual factors, including poverty, health infrastructure and public health choices of governments and individuals. It is likely that some period of school interruption was necessitated by the pandemic, and relative to that period it appears that these innovations might have been better, at least for the students who were able to partake in the platforms which were used, than the alternative of not engaging with school curriculum at all.

A fifth lesson emerging from these studies was the great many ways in which technology could be deployed to provide opportunities to learn and to collaborate, and also the significant gaps in knowledge and skill among teachers and students to use technology effectively. While in many ways the pandemic represented the greatest global experiment in immersion in online learning, and teachers should be commended for their willingness to learn and adapt in short order, this immersion was, for many, sink or swim, making evident how little preparation teachers had previously received for the use of digital instruction. Many teachers and administrators discovered – on the job and by force of circumstances – how much could be accomplished, for instance creating professional communities to collaborate in solving emerging challenges, using online platforms. It is remarkable how quickly prototypes of digital delivery platforms were developed, for example by the Department of Education of the City of Bogota, or by the State Department of Education of São Paulo, in just a matter of weeks. This approach of rapid prototyping and continuous improvement of these platforms, made possible by an entrepreneurial approach of leaders in government and civil society and by the low cost of technology is a stark contrast to the slower pace at which most education bureaucracies develop and implement programmes. In part, this faster pace was made possible by involvement of high-level authorities who worked to find exceptions to the regulations,

in procurement for instance, that shape the pace of implementation of government initiatives. In Liberia and Sierra Leone, Rising Academies, a network of low fee private schools, developed a twenty-week radio version of their structured curriculum which was shared and distributed widely by Rising and partner organisations throughout the world. In part, also, the collaboration among various stakeholders in the creation of responses, helped overcome some of the barriers that slow down programme design and implementation.

A sixth lesson illustrated by these studies concerns the power of collaboration among teachers to rapidly develop instructional materials. In surprisingly little time, teams of teachers divided the task of producing digital resources and, collectively, produced entire curricula that would have taken much longer for individual teachers to develop. In Chile, for instance, a team of 20 specialists from Ensena Chile was able to develop a rich curriculum of resources for radio education in a matter of weeks. In Vietnam, the Ministry of Education was able to develop a TV-based strategy of education continuity crowdsourcing the development of lessons to local Department of Education aligned to a simplified curriculum framework. Schools within the district each took responsibility for producing one high-quality lesson, this process engaged thousands of teachers throughout Vietnam in creating and reviewing lesson plans.

A seventh lesson illustrated by the case studies concerns the power of global collaboration. As teachers immersed themselves in an online environment to discuss with others the challenges they were experiencing, and to collaborate with colleagues in finding solutions to those, the constraint of place was removed, bringing teachers into contact with colleagues in a variety of schools, including in different countries. For example, the idea that a group of teachers could collaborate and develop radio education lessons, first developed by Teach for Nigeria, travelled very rapidly through the Teach for All network and inspired similar efforts in Chile, those two efforts subsequently inspired similar efforts in Colombia and Peru.

An eighth lesson emerging from the cases is the value of a coalition or organisations focused on the educational needs of marginalised children so that they are addressed. A number of the case studies resulting from this effort were of this sort, the result of organisations whose focus was on educating the poorest and the most marginalised. This focus, and their experience educating those students, drove efforts to maintain educational opportunities for them. For instance, in Chile, Teach for Chile, an organisation that works in high poverty schools, quickly realised that Internet-based options would not reach many of their children in the schools where they worked. They developed a rapid prototype of radio education lessons, which were more accessible for this population of students, and then scaled its distribution building a partnership with mayors and radio stations. Similarly, also in Chile, the Fundación Sumate, a network of second chance schools that works with vulnerable youth who have dropped out of school, understood immediately how the social distancing requirements would affect the youth they served, creating as a result a programme of socio-emotional well-being delivered via WhatsApp, which they knew would be an accessible platform to reach their students.

A ninth lesson illustrated by the cases was the need to reprioritise the curriculum, focus on competencies, and the value of interdisciplinary learning. The constraints in the capacity of the education delivery caused educators who sought to create alternative education platforms to be intentional in thinking through the competencies they hoped students would gain. It also required reprioritising and simplifying the curriculum, giving greater attention to socio-emotional skills, and rediscovering the power of interdisciplinary learning. For example, the Fundación Sumate in Chile, working with former school dropouts, realised it would need to create interdisciplinary units as a way to support the education of students in the alternative platforms for education continuity which they build based on WhatsApp. In Colombia, the Alianza Educativa reduced the time devoted to academic subjects in the distance-learning curriculum they developed, in order to increase the time to support the socio-emotional development of students.

A tenth lesson the cases illustrate is the role of information and monitoring to allow continuous improvement of the rapid prototypes developed. The novelty of the situation created by the pandemic, of trying to teach without schools, caused those who created alternative forms of education continuity to seek continuous

feedback on what was working well and what needed to improve. This, along with the rapid prototyping approach followed by most innovations, allowed a rapid response to sustain education during the emergency. In Colombia, for example, the Alianza Educativa created a centralised decision-making unit, involving the management team of the 11 schools in the network, who met daily to exchange information on what was working well, and emerging needs. This exchange of information, supported by systematic surveys to students, families and teachers, produced unprecedented co-ordination and evidence-based decision making. In Madhya Pradesh, the State government relied on continuous communication to encourage implementation of the remote strategy and to learn, for instance conducting frequent large-scale videoconferences with district education officers, webinars for teachers, mass media. As part of these multiple feedback loops which were part of the strategy, teachers had to call five students daily, to check on their engagement and well-being. The State also conducted frequent phone surveys, via call centres, to obtain feedback from teachers, parents and administrators on the implementation of the strategy and its effectiveness. In Liberia and Sierra Leone, Rising Academies built feedback loops surveying students, parents and teachers on the effectiveness of the radio education programme they developed; they also provided a hotline number and an SMS number after each lesson, inviting feedback.

To conclude, the COVID-19 pandemic caused a massive shock for schools and education systems. Much of what resulted was negative, but there were positive aspects as well. There is much we can learn about human ingenuity, society's commitment to education, teacher professionalism, the power of collaboration, and the role of educational innovation in overcoming great odds if we take the time to look for what was good during the crisis. Perhaps, as we look there, we will find the clues of how to rebuild more resilient and inclusive education systems that prepare students to invent a better future.

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