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LEARNING TO BUILD BACK BETTER FUTURES FOR EDUCATION

Lessons from educational innovation during the covid-19 pandemic

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Global Education Innovation Initiative

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Global Education Innovation Initiative

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Ms Stefania Giannini, UNESCO
Assistant Director-General for Education

For quite a long time, we have known the inevitable need of rethinking the education level provision and learning environments, as well as the curriculum and pedagogical dimensio to support learners and learning. With the advent of the COVID-19 pandemic, the inevitabilit of transforming education and education systems has become an urgent matter of globa scale. Indeed, the pandemic has shined a harsh and worrisome light on the vulnerabilitie inequalities and pending challenges humanity and education systems face. Yet, this curre crisis can also represent a golden opportunity for reimagining the role of education systen in contributing to shape our ways of life and transforming the world into more sustainabl democratic, inclusive and fair societies.

This book, therefore, comes at a crucial and timely moment as UNESCO'S agship repor Futures of Education: Learning to Become is published. It shares a vast repertoire of forwa looking and transformative local innovations led by diverse education stakeholders, commu nities, civic and international organizations in responding with determination, openness ar programmatic richness to the challenges posed by the pandemic.

As such, Learning to Build Back Better Futures for Education: Lessons from educational in vations during the COVID-19 Pandemic, exempli es the renewed role played by students educators, schools, families, communities, civil society and NGOs in forging renewed col lective learning environments for all in light of the pandemic and post-pandemic era. Fro the integration of low/high and no-tech innovations to socioemotional learning, teacher's personalized and collective professional development, culturally responsive community en gagements and transformative curriculum and pedagogical perspectives, this book illustrat local case studies that potentially represent a new paradigm shift towards more integrated holistic, interconnected and intersectoral responses in education.

This book reaf rms my deep conviction that education and the curriculum are crucial in ou mission towards positioning education, knowledge and learning as global common goods, and to building the blocks towards alternative sustainable futures for humanity and the pl net. Undoubtedly, while this crisis has shown the deep-rooted existing structural inequalit in education and society at large, these case studies provide a hopeful and robust vision education grounded on values, principles and strategies relating to solidarity, cooperation local decision-making, democratic participation, innovation and sustainable modes of lear ning, interacting, and connecting diversity of stakeholders.

Mr Yao Yotto
Director of the UNESCO International Bureau of Education

We are at a turning point in the history of mankind as we are facing the challenge of lay
the foundations for a sustainable, fair and inclusive future for the new generations. We
renewed visions, lens, paradigms, strategies and actions to orientate and lead us to
sage a better future, and crucially, to understand the complexity, multidimensionality
interconnectedness of worldwide issues that are common to all of us regardless of reg
countries, af liations, contexts and circumstances. More than ever, we need to reaf rm
binding interdependence as a collective endeavour grounded on strengthening educat
as a global common good.

Education is at the core of rethinking and making possible a sustainable and common f
Its legitimacy and relevance mainly lie in equipping all learners with the determination
lues, knowledge, dispositions and competencies required to strengthen their autonomou
creative thinking, the enjoyment of freedom and their resilience, as well as to lead, ma
and be accountable for their own lives. This cannot be done without a robust, engaging
friendly curriculum that connects to societal expectations and demands as well as to lea
dreams and motivations.

This book Learning to Build Back Better Futures for Education: Lessons from educationa
vations during the COVID-19 Pandemic exempli es the critical role played by the curricu
within any educational and societal debate and collective construction. The richness o
case studies illustrates how, through the appropriate structural and institutional mecha
and the alignment, solidarity and cooperation between the educational community, em
gency situations can represent an opportunity in order to co-construct more local, conte
lized, meaningful, empathetic, human and community-centered curriculum(s).

This book symbolizes, more than ever, that curriculum matters for the welfare and dev
ment of all learners. It is via the curriculum, connected to other components and piec
the education system, that we think and revisit the way we organize content, the mann
relate to each other, to our communities and nature, the ethical and human-centered usa
technology and the empowerment of students and educators, among many other aspec
short, this book highlights the urgent need to reposition the why, what, how, when, and w
of education, learning, teaching and assessment at the core of the education system.

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कक्षा 2

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Fernando Reimers and Renato Opertti

Chapter 1.

Educational innovation during a global crisis

Fernando M. Reimers and Renato Opertti

PURPOSE

This book attempts to contribute to the development of operational strategies for change education that will help prepare students for the future, while addressing the impact of th COVID-19 pandemic and making education systems more resilient to future disruption Drawing on the goals and extensive work of the Global Education Innovation Initiative at th Harvard Graduate School of Education in advancing knowledge on how to transform public education, the aspirations of the Hybrid Education, Learning and Assessment (HELA) initia of the UNESCO International Bureau of Education (IBE) and the inspiring vision of UNESCO Futures of Education initiative, we set out to identify and study examples of education innovation that emerged during the pandemic and that present pathways for transformation

This approach is informed by an insight that emerged from research on innovation: unexpect jolts and accidents often lead to innovation (Austin, Devin and Sullivan, 2012). The pandem was an unexpected event that compelled educators around the world to innovate in order t continue educating in a context in which it was not possible to meet in person in schools, a in a context in which students experienced a multitude of challenges. The shock created the pandemic offered what University of Waterloo President Vivek Goel, referring to institutio of higher education, described as a 'once-in-a-century chance to reset':

> A successful postpandemic university will be one that sees this moment for what it is: time to seize technological advances to build on centuries of expertise; to use these technologies as a tool to break down barriers to access; and to understand how these challenges are connected (Goel, 2021).

By taking stock of some of these innovations we hope to draw valuable lessons from them, well as to illustrate an approach to capturing the innovation dividend of the pandemic. Ou hope is that this may help codify further innovation and, in so doing, animate the broad-sca innovation that, alongside societal commitment and collective leadership, is necessary mitigate risk, build resilience and transform for the future.

THE COVID-19 PANDEMIC AND EDUCATION

The COVID-19 pandemic shocked citizens, workers, governments, businesses and othe institutions, disrupting the lives of everyone, everywhere. The high risk of morbidity a mortality caused governments around the world to adopt measures such as social distanci that disrupted the normal functioning of all institutions requiring people to be in close physic contact with others.

Educational institutions and students the world over were particularly affected. The closure of schools, and the subsequent disruption to in-person schooling, along with pandemic-related challenges experienced by students, teachers and staff, consider diminished the capacity of schools to achieve their goals. While schools and educa systems put in place alternative means of instruction, foregrounding remote and o learning, emerging evidence indicates that many students did not learn what was expe during the academic year (Reimers, 2021a). Along with lost opportunities to learn, stud experienced a loss of knowledge and skills, as a result of lack of engagement with acad work (Reimers 2021a, Reimers, Amaechi, Banerji, and Wang, 2021). They also repor negative social and emotional effects of school closures, as well as loss of motivation to and of engagement with schooling. As school closures continue in many parts of the w the interruption in learning is ongoing (Ibid).

In retrospect, it is easy to see that education systems were not adequately prepared disruption such as that caused by the pandemic. It is also evident that some educ systems, and some schools, were more ready than others to nd effective ways to contin educate remotely (Reimers, 2021a).

As is the case in other spheres, such as public health and the economy, the global edu recovery from the pandemic is a two-track process. In high-income countries, schools reopened, while students have experienced lower losses in education because the strat of remote learning were more effective. In contrast, in lower-income countries, w experienced longer school closures and where the strategies of remote education were effective, interruption of schooling continues for many students (Reimers, 2021a). differences in the effectiveness of strategies to ensure continuity of learning re ect no differences in availability of technological infrastructure, connectivity and digital skills also differences in institutional and innovative capacity. As this book will show, there direct relationship between the number of innovative dimensions addressed by the sol studied here and their reliance on either high or low tech. Some high-tech innovations mere forms of content delivery, a way to maintain educational continuity but not improvement, whereas some low-tech solutions innovate in expanding the goals instruction, providing more agency to students on their learning and extending educat opportunity to previously underserved groups. However, this clari cation notwithstanding obvious that access to technology and resources to support innovation is a signi cant advar

These differences in the levels of disruption the pandemic has caused to educati opportunity in the Global North and the Global South have been mirrored in the respons the public health crisis and in the prospects for social and economic recovery. As a r students in the Global South have experienced the combined effects of disruption to education, their health systems, their economies and their home circumstances. In ac

education systems in the Global South were already experiencing more serious educatio challenges in terms of access, low effectiveness, and relevance. The interaction of the various processes places educational opportunity in the Global South at serious risk o suffering the most signi cant decline in history.

An appropriate educational response to the pandemic involves addressing the losses cause by the disruption to schools, building preparedness to teach remotely and building back better (Reimers, 2021b). Addressing the ongoing decline in educational opportunity is urgen It would be misguided, however, to assume that there is a clear point in time when the disrupt to face-to-face learning caused by the pandemic will be over, never to return. There is uncertainty as to when the sanitary crisis will be under control given challenges wit producing, nancing and distributing vaccines and in getting populations to agree to be vaccinated. In the meantime, the virus mutates, creating new foci of infection which ma require additional lockdowns. It is therefore essential to build greater resilience to futur disruptions because, as has been noted in a recent report from an independent task force the G20: 'Scaling up pandemic preparedness cannot wait until COVID-19 is over. The threa of future pandemics is already with us. The world faces the clear and present danger of mo frequent and more lethal infectious disease outbreaks. The current pandemic was not a bla swan event. Indeed, it may ultimately be seen as a dress rehearsal for the next pandem which could come at any time, in the next decade or even in the next year, and could be eve more profoundly damaging to human security' (G20 High Level Independent Panel, 2021, p. 1)

Furthermore, an exclusive focus on 'learning loss' and addressing the decline in learnin opportunity implies a troubling conservative bias, emphasizing the restoration of educatio systems as they functioned prior to the pandemic, and neglecting the fact that, for man children, they did not deliver very much. The response to the calamity in education caused the pandemic needs to go beyond addressing the loss caused by the disruption to school and beyond increasing preparedness for future interruptions of face-to-face schooling Crucially, it needs also to address pre-existing de ciencies of schools and education system

BUILDING BACK BETTER: THE FUTURES OF EDUCATION

In the context of the educational devastation caused by the pandemic, the United Nation has emphasized the concept of 'building back better', to strive not just to restore the conditio that preceded the pandemic, but also to foster greater inclusion and human ourishing A UN document outlining the organization's comprehensive response to COVID-19, frames the challenge in the following terms:

> The pandemic is more than a health crisis; it is an economic crisis, a humanitarian
> a security crisis, and a human rights crisis. It has affected us as individuals, as famili
> as societies. The crisis has highlighted fragilities within and among nations. It is no exagg
> to suggest that our response will involve remaking and reimagining the very structu
> societies and the ways in which countries cooperate for the common good. Coming
> of this crisis will require a whole-of-society, whole-of-government and whole-of-th
> world approach driven by compassion and solidarity (United Nations, 2020).

The idea of 'building back better' in education makes sense given the many challenges fa
education systems that predate the pandemic, what the World Bank described as
learning crisis' (World Bank, 2018). The efforts to rebuild educational opportunity need
look towards the future, to the skills students will need to build a better and sustainable

Contributing to global dialogue on the need for education reform, UNESCO launched
Commission on the Futures of Education in September 2019. Over the course of its 75
history, UNESCO has asked three Commissions to develop a framework on the Futu
Education. The rst, a seven-member independent international commission chaired by
Faure, published its report in 1972, arguing that lifelong learning should become more cr
as technological change transformed economies and societies. The second, a fteen-me
commission chaired by Jacques Delors, reported in 1996, contending that lifelong lear
should be aligned with a vision of education anchored in four pillars: to know, to do, to
and to live together. The third, a 17-member commission chaired by Sahle-Work Zew
President of Ethiopia, will publish its nal report in November 2021. It is expected
underscore the urgency of preparing people to live together peacefully and to relate
nature and the environment in sustainable ways. Uniquely, the report on the Futu
Education will be launched during the most serious global education crisis in history.

It may seem like a contradiction that, during the global education crisis caused by
pandemic, governments and societies should contemplate how to build back better
embrace an ambitious vision of the future of education. After all, the pandemic will caus
least in the Global South, an economic recession that will constrain the resources avai
for education, and the great efforts to sustain education amid the challenges created b
pandemic have already brought many educators and education systems to the brin
collapse.

Despite the evident education challenges created by the pandemic, the urgency of buil
back better in education is underscored by the diverse challenges exacerbated by
pandemic: the challenges of poverty, inequality, climate change, social cohesion, inclusiv
and governance. Education is our best hope to support humanity in building a better

sustainable future at a time when this could not be more necessary. The issue is not wheth will be challenging to transform education to address the three goals mentioned earlie (mitigation, building resilience, and transformation), it is that we have no choice if we are t repair the serious, multifaceted forms of harm to communities and nations caused by t pandemic. Three resources will be critical to sustain those efforts: 1) societal commitment educational transformation as well as the institutional support and the nancial resource to fund them; 2) collective leadership; and 3) educational innovation because, drawing on Albert Einstein's discussion of the dangers of atomic weapons 'a new type of thinking essential if mankind is to survive and move toward higher levels' (Einstein, 1946).

Paradoxically, amid the educational devastation caused by the pandemic, there has been considerable educational innovation aimed at maintaining opportunity and addressing the needs created by the crisis. Learning from such innovation may provide valuable knowledg to shape the innovation needed to mitigate, build resilience, and build back better. This boo aims to learn from some of the innovations that took place during the pandemic.

LEARNING FROM THE EDUCATIONAL INNOVATIONS OF THE PANDEMIC

This book is the product of a collaboration between the Global Education Innovation Initiativ at the Harvard Graduate School of Education and the Hybrid Education, Learning and Assessment (HELA) initiative at the UNESCO International Bureau of Education (IBE).

The Global Education Innovation Initiative is a research-practice consortium that seeks advance the transformation of public education to empower students to participate and contribute, civically and economically, in increasingly complex societies. We advance this goal through three inter-related initiatives: applied research, informed dialogue and the development of tools and protocols that support educational practices that empower students. So far, we have conducted 10 studies, most of them comparative studies of ambiti education reforms focusing on the role of transformative curriculum and teacher professior development, or studies of the conditions which sustain the effective implementation of tho reforms (Reimers, 2020a, 2020b, 2020c). Our most recent studies include a comparative study of the educational impact of COVID-19 (Reimers, 2021a) and a comparative study of the role of universities in partnering with schools and education systems for the purpose sustaining educational opportunity during the pandemic (Reimers and Marmolejo, 2021). The informed dialogues involve the creation of learning opportunities bringing togethe practitioners, policy-makers and researchers, for the purpose of advancing collective leadership in the transformation of education. These include several publications wit

re ections based on the practice of education leaders as they faced the challenges crea by the pandemic (Reimers, 2020d, 2020e, 2021c). The tools we have developed inclu curriculum resources aligned with the UN Sustainable Development Goals.

Since March 2020, the Global Education Innovation Initiative has oriented most of its ef to advancing knowledge which could help guide effective education responses to disruption caused by the pandemic. Such efforts included a collaboration with Organisation for Economic Cooperation and Development (OECD) and the World Ba which resulted in about 100 case studies of educational innovation that emerged durin pandemic, and two cross-national studies of responses of education authorities to pandemic. We have also conducted two comparative studies of education during COVID mentioned earlier and published three books on the role of education leadership in addres the challenges created by the pandemic. The study presented in this book is part of efforts.

Established in 1925, the International Bureau of Education was created to mobilize resea based knowledge to support education reform. Initially created to promote educati initiatives in Geneva, it became more internationally focused in 1929 with the appointme Jean Piaget as director. In 1946, the IBE began to collaborate with the newly crea UNESCO, convening an international conference in education. In 1969, the institute bec part of UNESCO. Throughout its history, the IBE has focused on the study and dissemi of educational innovations, particularly with respect to curriculum, pedagogy and learni

In the context of the challenges created by the COVID-19 pandemic, and in recognitio the many challenges faced by countries in the developing world which had the le developed educational technological capabilities, the IBE launched the HELA initia (UNESCO-IBE, 2021a). Its aim is to advance and share knowledge that could support development of blended systems, integrating technology with in-person instruction wi goal of addressing pre-pandemic education challenges such as effectively respondin diverse students' expectations and needs in a variety of education contexts, as we supporting the development of breadth of competencies through effective pedagogy assessment. HELA seeks to support a broadening of how curriculum is understoo developed (Opertti, 2021), and to emphasize greater and more democratic learni opportunities for all learners through better integration and complementarities between to-face and remote education.

The HELA initiative seeks to support countries in identifying, developing, experime assessing, evaluating and scaling-up the most effective evidence-based modes of integ and combining face-to-face and distance education to ensure that all learners are prepared to address a diversity of life challenges and opportunities as persons, citi workers, entrepreneurs and community members.

The HELA initiative aspires to help build the resilience of education systems for future disrup
as well as to help transform education systems so they can prepare students for the future.
based on eight interdependent goals:

Goal 1: Promote the integration and complementarity of face-to-face and distance education

First, hybrid modes combine and integrate face-to-face and distance learning methods an
strategies in order to broaden and democratize learning opportunities for all learners, in a
way that is tailored to their needs and expectations (personalization of education). Thi
requires nding the most effective ways of balancing face-to-face and distance education so
that students – whatever their circumstances, contexts, abilities and preferences – can deve
their full learning potential.

This does not entail simply adding online educational platforms, resources and materials
face-to-face education, or replacing it with online classes. Instead, one big challenge is to
craft a continuum of face-to-face and distance learning which integrates different initiative
platforms, resources, strategies and activities to enhance the learning experience of eac
student. This involves balancing opportunities for access to high-quality content, fo
engagement, and for formative feedback in a way that gives students, as well as teache
and other administrators, the opportunity to learn.

Goal 2: Support a diversity of hybrid modes to help learners develop the breadth of competencies they need

Second, hybrid modes do not imply a single model of organization, and do not function
equally and in a prescriptive manner for all education centres. Rather, hybrid modes ar
sustained on the basis of the guidance and follow-up ensured by the central level of th
education system with regard to the development of a set of interconnected competencie
that makes explicit what to teach, learn and assess, and why. These competences are bindi
for all education centres as they de ne the content through which new generations will be
educated for a better, sustainable and fair world.

Goal 3: Support the development of structured progressions of learning trajectories across educational levels and provisions

Third, hybrid modes are characterized by the detailed selection, prioritization and sequencin
of what are considered essential knowledge and core competencies. They allow educators
to focus on identifying the most fundamental elements in education from early childhood ca

and education (ECCE) onwards, ensuring continuity and uidity in addressing diverse is as well as prioritizing the learning progression of each student, with no gaps or bre between educational levels. Indeed, hybrid modes cannot operate on the assumption each subsystem or educational level, whatever it may be, de nes its contents by itself.

Likewise, teacher education, as well as teacher professional development, must serv purpose of strengthening teachers' competencies in the design of courses, activities resources, grounded in the combination of face-to-face and distance learning. Versa teachers are essential to hybrid modes as they are equipped to combine different lear environments according to the needs of each student.

Goal 4: Revisit the relevance and organization of knowledge in the curriculum

Fourth, hybrid modes imply rethinking the organization and hierarchy of knowledge area the curriculum (Ng, 2021), as well as revisiting instructional times. This is based o understanding that each learner may require different combinations of face-to-face distance education in order to engage with, develop and achieve the objectives and learn outcomes established. Instructional time can no longer be thought of as xed and static f learners. Instead, it can be a powerful tool to support the diversi cation of learning strate customized to the unique needs of each student, in order to achieve equally meanin outcomes for all learners.

To this end, hybrid modes rely heavily on education centres playing a proactive, empow role in determining, implementing, and taking responsibility for delivering what and ho teach, learn and assess. It is not a question of 'delegating or attributing responsibility' w a frame of reference, but rather of providing robust guidance to schools so that educators effectively lead, manage, and take responsibility for the education of new generations.

Goal 5: Reimagine the relationships between educators and students

Fifth, hybrid modes rede ne the relationships between educators and students. By expa the spaces for interaction, educators and students have the possibility of getting to know other better, and, in different situations and contexts, generating conditions for greater of rapprochement and empathy, and potentially reducing intergenerational gaps. At same time, they can pro t from a vast range of opportunities and resources to craft id integrating different types of knowledge. The production, dissemination and discussio knowledge by educators and learners is a key feature of hybrid modes.

Goal 6: Reinforce partnerships between education and a diversity of stakeholders

Sixth, hybrid modes entail a renewed dialogue and collective construction between education and social policies at large. On the one hand, this should mean that the state strengthened in its role as guarantor, ensures that all families and households have acces terms of physical infrastructure and equipment, as well as to connectivity, platforms ar devices that enable hybrid modes to become a lever for social and educational equity (Rivas, 2021

At the same time, the state must also guarantee the implementation of social protecti networks. This includes, among other fundamental components, providing food, health ar psycho-emotional support services for students, within the framework of an intensive promot of healthy, sustainable and caring lifestyles likely to have a positive impact on students' over wellbeing.

To this end, it also implies a closer relationship, based on trust and collaboration, between t state and civil society in ensuring the use of different spaces and activities so that each stud can nd ways to ful ll their aspirations. It is a matter not only of reinforcing learning space and instructional time – key though these are to the well-being and development of each student – but also of enhancing diverse and mutually reinforcing learning experiences. Thes when coming from different institutions and actors, can contribute to the comprehensiv formation of the learner.

Goal 7: Use technology to democratize access to knowledge

Seventh, a proactive use of technologies as part of hybrid modes can serve to enhance th opportunities for the production, circulation and dissemination of knowledge without border or obstacles. In this sense, the use of arti cial intelligence (AI), within the framework of a so humanistic and ethical vision (UNESCO-IBE, 2021b), can be a fundamental driving force that can support educators and learners in exploring personalized answers to their needs Likewise, AI can support the development of innovative projects outside of the tradition 'boxes', which allow educators and learners to integrate different ideas, knowledge and resources to respond to challenges that propels them to learn.

Goal 8: Strengthen the bonds among schools, families and communities

Eighth, hybrid modes present a unique opportunity to rethink the relationships betwee schools, learners, students, families and communities. Trust between institutions and actors be reinforced – not just in terms of collaborating with the school, but also with the aim o

developing capacities and committing to collective action to ensure that each learner ha effective learning opportunity. For example, this would imply that families could be traine how best to accompany their children in education, in order to ful ll the role of learn 'coaches'.

These eight goals are aligned with the vision of UNESCO's recent report on the Futur Education Report, which emphasizes the importance of learning to become toget collaborating with others for the purpose of improving the world and strengthening educa as a global common good. The report underscores the urgency of strengthening educa and reimagining the social contract with education so that it can effectively prepare stu to address current disruptions in sustainability, democratic backsliding, the transforma work, and the challenges of a future ever more reliant on technology (UNESCO, 2021).

The report further emphasizes the importance of pedagogies that foster cooperation solidarity, and that connect students with the world via an interdisciplinary, problem-orie curriculum which engages them in collaborative learning. Of special importance in the re is the notion that the curriculum of schools should go beyond the basics and contribute development of the full range of human potential, promoting the integration of knowle and socio-emotional competencies, fostering global competency, strengthening scie literacy and the humanities, as well as digital skills and arts education. The report also fo on the primacy of supporting teachers as agents of education transformation, and leveraging digital technologies in support of schools (UNESCO, 2021).

The report emphasizes also that the transformation of the culture of education req partnership and broad social dialogue with numerous actors involved in education. This help translate these broad principles and aspirations into operational strategies which guide educators with clarity as to what it is they should do differently to contribute to transformation of the educational experience (UNESCO, 2021).

THE STUDY

To systematize some of what can been learned from the educational innovation generat response the pandemic, from kindergarten to twelfth grade (K-12), we identi ed 31 innova programmes created to support students during the crisis. We selected these progra because they address elements of a vision of the future of education that is ambitiou forward-looking, that seeks to educate students holistically, that is designed to strength resilience of students and schools, and of communities at large. We selected them because they demonstrated an ability to scale up, and to do so in sustainable ways. book is an analysis of those programmes, a distillation of the lessons they offer on edu

students for a better and sustainable future, and an examination of the type of innovatio these programmes represent, and of the conditions and processes which made them possib

In selecting the programmes, we drew on a framework to mitigate the educational impact o the pandemic and to build back better, recently presented in a joint publication of the UNESCO International Bureau of Education and the International Academy of Education (Reimers, 2021b). This framework proposes that responses must pursue three interrela goals: improve the effectiveness of education strategies during the outbreak; recover an rebuild educational opportunity after the outbreak; and build the resilience of the educatio system to function during future outbreaks. These goals involve actions in three broad are assessing how the context has changed for students, families, teachers and communities, for the education delivery system; developing a strategy to teach during the outbreak or t recover from one; and increasing the capacity of schools, teachers, school leaders, studen families, and the system. The framework suggests the following speci c actions:

I. Assess both how the context has changed and the needs such changes have created.
   a. Assess student well-being and disposition to learn.
   b. Assess student access and engagement and identify children who have dropped out.
   c. Assess teacher and staff well-being and teaching readiness and provide support.
   d. Assess changes in context and the impact of the pandemic on communities.
   e. Assess the operation of the education system.

II. Develop a strategy at the school or system level to teach during the outbreak or to recover from it.
   a. Commit to supporting all learners.
   b. Develop a delivery platform that balances face-to-face and remote learning and allows personalization and differentiation.
   c. Prioritize the curriculum. Focus on competencies and on educating the whole child.
   d. Accelerate learning and personalize.
   e. Support student mental health and emotional well-being.
   f. Assess the effectiveness of innovations that have taken place.
   g. Integrate services that support students (health and nutrition).

III. Increase capacity.
   a. Develop the capacity of schools. Align roles and responsibilities of school staff so the support a holistic approach to student development.
   b. Build the capacity of teachers, school leaders and other staff. Teacher professiona development.
   c. Create partnerships between school and other organizations.
   d. Communicate with parents and develop parenting skills.
   e. Build school networks.

This book uses Appreciative Inquiry, an approach to advancing organizational change
builds on identifying and studying strengths of organizations, societies and systems, whi
help advance a shared vision of the future based on the study of strategic innovation.

Every organization has something that works right – things that give it life when it is mos
effective, successful, and connected in healthy ways to its stakeholders and commu
Appreciative Inquiry begins by identifying what is positive and connecting to it in ways
heighten energy, vision, and action for change. (Cooperrider, Whitney and Stavros, 2004, pp

The authors of the cases were asked to address the following questions:

- Brie y summarize the key features of the initiatives/innovations which were generate
  sustain education during the pandemic? What was their theory of action?
- How were these initiatives/innovations generated? Were they government initiatives
  were they school or civil society initiatives? Were they initiated in a top-down or bott
  up fashion, or as some combination of the two? What conditions supported the emerge
  and implementation of these innovations?
- What is known about their results, effectiveness and shortcomings? What lessons
  learned about implementation and the results of these initiatives?
- In what way are those initiatives/innovations aligned with the Futures of Education vis
- How can these initiatives/innovations be scaled up and pave the way for hybrid mod
  of education? What needs to happen for that?

The cases were presented and discussed at a conference attended by all participants i
project. Each case received feedback from three other participants. The cases were
revised on the basis of that feedback.

Our goal in selecting these case studies was not to be exhaustive in covering all pos
domains of innovation which emerged from the framework described above, but to illus
what innovative and forward-looking approaches that embodied the principles articulate
the framework could look like. We see these cases simply as instances of a much larger
of educational innovations that were created in response to the jolt caused by the pande
and we see this study as an example of an approach to learning from such innovatio
order to seize the once-in-a-century chance to reset and transform education describe
Vivek Goel. Our aspiration is not only to offer a practical resource from which educa
leaders can draw useful insights to animate their own efforts to 'build back better', but a
offer an approach which can be used to document and learn from other educatio
innovations which were created in response to the pandemic, so that the innovation divi
of this challenging time for humanity does not go to waste.

DOMAINS OF INNOVATION

The 31 case studies re ect a variety of innovations, for the most part to support learning fro home. Some of them involve developing multimedia platforms or other technological platforn to support students, teachers and parents, while others focus particularly on supporting t socio-emotional wellbeing and development of students, or on supporting teachers in developing new capacities to engage students, provide feedback, and design learning experiences. Most cases contain not just one of these features, but are multidimension including, for example, both a platform to deliver digital content and support for teachers t develop digi-pedagogies. Furthermore, all the innovations which focus on developing particular student competencies in order to provide them with more agency over their learnir contribute to developing both the competencies which are the focus of the innovation (suc as literacy, numeracy or science) and competencies for independent study. Similarly, a some of the innovations provide guidance to parents so they can support their children whi learning remotely, they are in effect contributing to parenting education, even if that is not their main g

With the exception of the case study examining the International Institute of Online Educati in the People's Republic of China, all cases focus on innovations at the preschool, primary secondary level. The cases which focus on digital applications to support self-study and tho focused on supporting family engagement are more likely also to focus on the education c children at pre-school, as well as other education levels, whereas other innovations are mo likely to focus on children in compulsory schooling.

The innovations studied can be grouped into the following ve categories, which, as mentioned, are not mutually exclusive:

Supporting student-centred learning

One of the immediate concerns of many educators was to provide students with access t alternative forms of education, so they could learn from home. A variety of technologie framed within an educational vision were used for that goal, with varying degrees of interactivity. Because this shift to alternative forms of education took place rapidly, and wi limited support, there were obvious limitations in what was attempted. One of the challenge faced by many educators was the realization that many children, and many of their teacher lacked access to technologies essential to interactivity, including broadband internet acces

However, even the most basic forms of remote education required teachers to think rst abo students as learners, rather than about content delivery. In that sense, they represent important innovation and step forward from traditional forms of education that are teacher and content-centred. In addition, many of the innovations provided greater opportunities fo

personalization than traditional teacher centered instruction allows. For example, some
uses of technology involved teachers producing and recording lessons using various de
including video, audio and print materials, such as study guides. That innovation a
represents an improvement on the traditional form of instruction, which depends on tea
communicating ideas in real time to all students in a class. When students read a text, s
a guide, which includes questions to check understanding, this provides more opportuni
accommodate personal differences in how people learn. The text can be re-read or rea
various speeds, and can be discussed with others, in ways the in-class lecture canno
same opportunity to modulate speed of information intake is provided by a pre-recor
teacher lecture or podcast. If, in addition, students receive feedback to their work on a g
whether from peers, parents or teachers, this enhances the opportunities for learning r
to passively sitting in a class listening to a teacher lecture. If, on top of that, students
work on a digital platform, and receive feedback on that platform, they can respond to
feedback, creating a powerful loop, a conversation, with their teacher, that supports lear
more effectively than the delayed loops that feedback provided on written assignment
paper provide. These simple innovations have powerful effects in allowing for more us
formative assessment to guide instruction, thus increasing personalization.

There are, of course, limitations to the potential bene ts of the personalization that
approach offers. Students must have adequate reading competencies to be able to d
meaning from text, self-study competencies to be able to learn independently, a
appropriate conditions to learn at home, perhaps a quiet place to study, to make indepen
learning, or listening to a recording, possible and productive. Most obviously, they nee
have access to the content, in whatever format is being used to distribute it, and if they
the support of a knowledgeable adult who can check their understanding and guide th
they will likely draw more bene ts than if they lack such support. When a greater propor
of instruction shifts to the home, as is the case with these innovations, differences in
conditions and resources have a greater impact on learning, relative to instruction w
relies on learning in school.
Examples of low-tech approaches to distributing content include the Har Ghar Schoo
India (Chapter 4), which combined low-tech resources and engagement from commu
volunteers to support learning in low-income communities. Also in India, the Madhi Ha
Learners model (Chapter 4) offered students worksheets, enhanced with a layer of techno
to support learning from home.

In Liberia and Sierra Leone, Rising on Air (Chapter 6) used radio education, combined
text messaging and phone, to support foundational skills for very marginalized stud
Printed and digital instructional guides to learning at home were provided in the stat
Guanajuato, in Mexico (Chapter 7).

In Uganda, Pangea Publishing (Chapter 13) distributed culturally relevant reading material (children's books) on paper, as well as digital media, to provide students with informatio related to public health measures to contain the spread of the coronavirus.

Several of the cases describe innovations that used technology to support access to digit resources and lessons. The Egyptian Knowledge Bank (Chapter 3) offered a variety of digit resources to support learners. WhatsApp was one of the most utilized technologies, given ubiquity. In India, for instance, the Swadhyay model (Chapter 4) relied on WhatsApp messages to create personalized learning for children. In Indonesia, Sekolah Enum Indonesia (Chapter 5) offered a digital application via phone or tablet which provided young learners with access to individualized learning. It is an application based on univers design-for-learning principles that allowed for gami ed self-study. Taking account of poor connectivity, Sekolah Enuma Indonesia did not require internet access once downloaded Similarly, the Madrasati e-learning platform in Saudi Arabia (Chapter 12) provided access to digital resources for all students. In Uruguay, Ceibal Integrado (Chapter 15) provided a learning management system reaching all students by providing laptops and connectivity, well as platforms and resources, to all students and schools.

Some of the innovations enhanced the distribution of content to students with mor personalized forms of support, either through technologies that allowed personalized learning, or with tutors. In Bangladesh and Pakistan, ELAN (Chapter 2) provided access to self-instructional literacy application, supported by tutors, through smartphones. In Mexic students most at risk of exclusion were provided with access to face-to-face instruction a tutoring (Chapter 8). Tutoring for struggling students was also a strategy adopted in th United Kingdom of Great Britain and Northern Ireland (Chapter 14), using communications technology to deliver it.

Student evaluation was another area of innovation, used to provide teachers with feedbac on student knowledge which could be used to personalize instruction. Often, this double also as formative evaluation for students. In Mexico, for example, the Independent Learni Measurement Initiative (Chapter 9) used learning assessments to adapt instructional practic to teach at the right level. Also in Mexico, the national programme for recovering learning loss (Chapter 10) used assessment tools ('learning pulses') to obtain feedback on studen socio-emotional state and academic learning. In Norway, digital competency-based assessment (Chapter 11) was used to provide students with formative feedback.

Some of the innovations enhancing students' agency over their learning focused o independent study, typically as a complement, rather than a replacement, of learning with t assistance of teachers or parents. For instance, digital learning platforms such as the Egyp Knowledge Bank, Madrasati in Saudi Arabia and Ceibal Integrado in Uruguay, and the

reading resources produced by Pangea in Uganda, provided lessons and resources supported independent study. Some of the digital apps were speci cally designed independent study, such as Sekolah Enuma Indonesia, or the literacy and numeracy a Bangladesh and Pakistan. The same was true of radio education innovations such a Colombia Plays Well programme for socio-emotional development (Chapter 19) and Ris on Air in Liberia and Sierra Leone. Independent study was supported through self-s guides produced in Guanajuato, Mexico, and worksheets provided by the Madhi Happ Learners model in India.

Supporting deeper learning

Surprisingly, few of the innovations focused on the development of deeper learning transferable competencies, supporting higher-order cognitive competencies. Only a co relied on project-based and experiential learning as a way to help students learn from own activity and experimentation. Research shows that project-based learning is partic effective with disadvantaged students (Anderson and Pesikan, 2017). The innovations engaged students in project-based learning consisted of connecting the curriculum to su teachers' or parents' work with students. For example, the Education Above All's Interne Education Resource Bank, Qatar (Chapter 18), developed resources to support proj based learning that were distributed to parents, community members and teachers to with students using a variety of channels, including group and individual phone calls, text messaging, internet-based messaging applications such as WhatsApp, print mat and even newspapers, radio and other media, depending on the availability of digi resources in the context of implementation.

In Finland, project-based learning via digital platforms supported students' collaboration engagement in science education (Chapter 16). Also in Finland, a play-based scie education programme delivered via technology (Chapter 17) was used to support parent working with their children in inquiry-based scienti c experimentation.

Supporting student socio-emotional development and wellbeing

One of the needs that emerged during the pandemic was the need to attend to the w being of learners. No one learns well when they are fearful or anxious, and a good educat therefore, requires attending to the socio-emotional well-being and development of lear This was the focus of several of the innovations examined in this book. Some of recognized attention to socio-emotional development as going hand in hand with acade learning, while others devoted focused attention to these domains. For example, Finl project-based science education innovation was designed to address feelings of loneli among students by engaging them in collaboration with peers. The Mexican natio

programme to recover learning loss in middle schools using ‘learning pulses’ obtained information on the emotional well-being of students to guide teachers’ efforts to support the in this domain. In Colombia, the Colombia Plays Well programme used radio education to support the socio-emotional wellbeing of refugee children from Venezuela. Also in Colombia the Alianza Educativa (Chapter 20)schoolwide strategy for social and emotional learning in the community educated students in self-awareness, self-regulation, social awarenes positive communication and responsible decision-making.

Teacher and school principal professional development

A number of the initiatives focused on supporting teachers and principals to augment the competencies either to teach more effectively, develop higher-order competencies, suppo social-emotional learning or use digi-pedagogies. Two-thirds of the innovations examined i the cases address teacher professional development, either as the primary or exclusive foc or as a component of an innovation including other elements. For instance, the Educatio Above All Internet-Free Education Resource Bank, while primarily a bank of lessons ar activities to support active learning, includes instructions for parents or teachers to work w learners on those lessons, in this way embedding a professional development component the innovation. A number of the innovative programmes mentioned in the previous secti covering learning outcomes for students also included professional development componen including: Ceibal Integrado in Uruguay; the family, school and community engagement programme in the United States; the Madrasati platform in Saudi Arabia; the project-based inquiry science programme in Finland; the school as community learning centre and independent learning measurement initiatives in Mexico, as well as the country’s nation programme for recovery of learning loss; the multipronged approach to continuity in Keny (Chapter 28); the Egyptian Knowledge Bank and Educate Me Foundation school transformation programme (Chapter 25) in Egypt; the innovative feedback practices in Norway; and the Alianza Educativa’s social and emotional learning programme in Colombia.

A number of the innovations, however, were principally about teacher professional development. These programmes attempted to help teachers cultivate a breadth o competencies that would help their students, in turn, develop a range of competency domain They included accelerating change in teachers’ in-service training in Brazil (Chapter 22) scaling blended systems of teacher development in Peru (Chapter 29); leveraging huma connection in virtual teacher professional development programmes in Guatemala (Chapte 26); accelerating the development of digital competencies in Costa Rica (Chapter 24); fostering entrepreneurship among school leaders in India (Chapter 27), including throug support for teachers’ professional development); supporting the professional development the higher education workforce (including faculty in schools of education) in the People’ Republic of China (Chapter 23); and supporting continuity of learning in São Paulo, Brazil (Chapter 2

Because of the physical distancing requirements of the pandemic, most of these progra
relied on a variety and hybrid use of remote technologies.

In Brazil, efforts to accelerate change in teachers' in-service training involved creatin
online peer-to-peer teacher support programme to help students develop digi-pedagog
and the skills to support the socio-emotional well-being of their students.

Also in Brazil, São Paulo's initiatives to support learning during the pandemic used re
learning to support teachers and school principals in using formative assessment for curriculum mar

In China, the International Institute of Online Education created an inclusive ecosyste
support university faculty, including those in teacher education institutions, in the develo
of a wide range of teacher capacities utilizing remote learning.

In Colombia, the Alianza Educativa social and emotional learning initiative relied
communities of practice to develop the pedagogical skills of teachers and support tea
professional development.
Costa Rica's programme of teacher professional development used an assessment of
competencies to align the support teachers received with their needs.
The Educate Me Foundation in Egypt offered support to schools, using technology
blended learning to help teachers to improve their pedagogical skills.

Profuturo in Guatemala primarily supported teachers in developing digital and twenty
century skills, relying on virtual learning and online courses.

India's Rehnuma programme cultivated the entrepreneurial and innovative competenci
school leaders in low-fee private schools, through a community of practice and mento
and support.
Kenya's multipronged approach to education continuity emphasized professior
development for school leaders to help them support teachers in developing a compete
based curriculum, addressing socio-emotional development, improving pedagogy a
supporting home-based literacy.

Mexico's Independent Learning Measurement Initiative, described earlier as an effor
facilitate the personalization of education, used online activities to support teachers in lea
to assess students so they could personalize instruction.

Mexico's national programme to recover learning loss in middle schools offered teach
professional development via a community of practice which enabled teacher collabora
in the development of pedagogical skills to support social and emotional learning.

Peru's blended systems of teacher development in rural areas combined high-, low- and n tech approaches to support the professional development of teachers by fostering a range mindsets and competencies to teach twenty- rst century skills.

The Ceibal Integrado initiative in Uruguay, described earlier as an integrated learning management system, included a strong emphasis on teacher professional developme across a wide range of domains.

Family engagement

Asstudents had to learn from home, the role of parents in supporting their schoolwork becam critical. A number of the innovations focused on developing the competencies of parents support their children's learning more effectively.

For example, the Internet-Free Education Resource Bank, developed by the Education Abo All foundation in Qatar, was designed so that parents in underserved communities coul engage their children in project-based learning. This was ensured by simpli ed project instructions designed with parents' varied literacy levels in mind, and the incorporation tasks that required meaningful yet realistic parental or family input.

One of Finland's two project-based science initiatives used play activities supported b parents to engage children in inquiry-based STEAM – science, technology, engineering, th arts and mathematics – education.

India's Rocket Learning (Chapter 30) project used an SMS text-messaging system to supp family engagement in activity-based learning in literacy and mathematics.

The development of instructional guides in Guanajuato, Mexico, was intended to produce a resource to support self-guided learning, sensitive to the level of maturity of each student. the youngest learners, they included guidelines and support for family engagement to he students learn.

South Africa's structured family support programme (Chapter 31) used low tech, hard-cop structured materials to support caregivers in promoting literacy.

The family, school and community school engagement initiative in the United States (Chap 32) focused on a systemic and statewide culturally responsive framework, developed acros sectors, to build dual capacity and two way communication of both LEAs and SEAs an families, in order to address inequities enhanced through the pandemic.

WHAT TYPE OF INNOVATIONS DO THESE PROGRAMMES REFLECT?

The 31 programmes examined in this book represent entrepreneurial innovations in resp
to a moment of acute crisis. They all incorporate new ideas about how to make educa
more responsive, more effective or more relevant, which, while developed amid the const
created by the crisis, have implications beyond them. The underlying issues they addre
signi cant in their own right, irrespective of the pandemic. In other words, these innova
are not just means of mitigating the educational losses created by the interruption to scho
or of building resilience to teach remotely, but provide also a roadmap to building ba
better, addressing some of the pre-existing de ciencies of schools and education syst
and preparing students to develop the competencies necessary to create a better
sustainable future. While these innovations indeed represent practical ways to enhance
support learning with new ideas, they are more than ideation; they involve the creatio
value for the purpose of solving pre-existing and enduring problems or meeting unmet n

Innovations can vary by degree. They can be incremental, evolutionary or revolutiona
study in the eld of business innovation, characterizes as an incremental innovation one
involves the gradual improvement of a process or product, for example through impro
ef ciency. Evolutionary innovation involves extending offerings for existing customers a
as nding new customers for existing offerings. Revolutionary innovation creates new off
for new customers (Matthews and Brueggeman, 2015, pp. 31–33).

We draw on this characterization of innovation to develop a typology of educationa
innovations. They can occur along three dimensions, concerning: 1) who should be educ
2) what goals education should pursue, and 3) how people should be educated
The rst dimension de nes who the learner is. In a formal education system, the learn
typically de ned as a student in the age group that is expected to enroll at a particular le
whether ECCE, primary, secondary or upper secondary. The second dimension de nes
competencies education aims to help learners develop: basic literacies, socio-emoti
competencies, civic competency, entrepreneurship, and so on. The third dimension d
how learners should be educated. This dimension goes from pedagogies that are m
teacher-centric to pedagogies that are more learner-centric. Taking two of these dimens
into account – what goals education should pursue and how – we can develop the follow
typology of innovation:

Table 1. Typology of innovations.

	What goals: Basic literacies	What goals: Breadth of competencies/whole child
How: Student-centric	Evolutionary	Revolutionary
How: Teacher-centric	Incremental	Evolutionary

For example, a method to improve the effectiveness of teaching early literacy, by gettin teachers to adopt more effective pedagogies, for example through more reliance on formative assessment, would be an incremental innovation. The goal remains basic litera and the pedagogy remains teacher-centric. Incremental improvements are importan because they improve the effectiveness of the instructional process. More students will able to learn if their teachers improve their skills. In contrast, an improvement in pedagogy teach basic literacy that provides more agency to the learner, for example through the use personalized learning guides or through the provision of books from which students ca choose, is an evolutionary improvement, because while the goal remains improvement basic literacy, the innovation provides more agency to the learner over how to learn. Similarl an innovation that broadens the goals of the curriculum, but remains teacher-centric, such structured pedagogy to support literacy with support for socio-emotional development, is evolutionary because it represents an innovation in one dimension of the instructional proce (goals) while keeping other dimensions constant. Finally, an innovation that broadened th goals of the curriculum, while also providing students more agency over their learning, su as supporting team- and project-based learning with formative assessment to provide personalized pathways to students that gave them opportunities to develop a range o competencies with more agency over their learning, would be revolutionary.

To this two-dimensional characterization of the process of innovation we should add th dimension of who should learn, which could remain stable or be expanded, for example as when an educational innovation targets a population previously underserved, such as students with special needs, girls, socially marginalized students, or refugees.

The use of these three dimensions to describe innovations results in the following characteriza of either 1X or 2X incremental, evolutionary or revolutionary innovations. The rst three ro in the table characterize innovations that do not change the intended population of student while the next three rows include innovations which expand learning opportunities to ne populations of students, previously excluded. The top half of the table is identical to the tab presented previously, while the bottom half augments the level of innovation by also expandi the students which are included.

Table 2. The process of innovation.

Who should learn: Established population of students	What goals: Basic literacies	What goals: Breadth of competencie whole child
How: Student-centric	Evolutionary	Revolutionary
How: Teacher-centric	Incremental	Evolutionary

Who should learn: Expanded de nition of students (reaching out to excluded groups)	What goals: Basic literacies	What goals: Breadth of skills/whole ch
How: Student-centric	2X Evolutionary	2X Revolutionary
How: Teacher-centric	2X Incremental	2X Evolutionary

This taxonomy of innovations is descriptive, not evaluative. That an innovation is incre does not make it better or worse than an evolutionary or revolutionary innovation. In a w in which many children fail to read in elementary school, incremental improvements tha them succeed at reading are very valuable, just as much as evolutionary improvement do the same in ways which give students more agency over their learning, or improver which expand what they learn or widen access to students previously unserved. All t innovations are valuable. It is the aggregate effect of the diversity of educational innova in a system that de nes how adaptive the system is at meeting the various needs improvement. A more adaptive system has a balanced portfolio of innovations that cove full range of types rather than relying on a restricted set of types of innovation.

In this sense, we can assess whether the range of innovations re ected in this book of balanced portfolio or is unduly skewed in favor of a more limited range of types of innova The 31 case studies examined in this book represent a variety of types of innovation, le towards the incremental and evolutionary, with a predominance of 1X innovations. context in which basic access to school was at risk, the importance of simply mainta access through incremental improvements, rather than attempting, at the same time, to i agency, expand the goals of instruction or widen access, should not be underestimated

Incremental

The family, community and school engagement initiative in the United States represe incremental improvement to a pre-existing approach to engage parents in supporting learning of their children. This innovation augments the effectiveness of the instruc process, even though it does not alter the goals and how of instruction or the population of stu

ProFuturo's programme to develop teacher ICT competencies increases students' access digital education, while maintaining the focus of the curriculum and the pedagogical contro on the teacher.

Costa Rica's programme of teacher professional development in ICT, customized to the respective levels of digital pro ciency, increased the digi-pedagogies of teachers, resulting in an improvement in the ef ciency of the instructional process.

Mexico's programme of independent learning measurement, using assessment to personali instruction, improved the ef ciency of the delivery of education.

Rising on Air, which used radio education to reach children, increased the ef ciency of education delivery given the constraints created by physical distancing requirements.

India's Rehnuma programme to foster entrepreneurship provided leaders of low-fee privat schools with the skills to solve emerging challenges during the pandemic. It ensured contin of learning and improved the ef ciency of education, while maintaining instructional and pedagogical focus.

The International Institute of Online Education, in China, supported the development of dig pedagogies among university faculty, thus improving the ef ciency of pedagogy at this leve While the case provides no evidence that this use of pedagogies helps university facult broaden the range of competencies they help their students develop, nor provides studen with more control over their learning, clearly this innovation has the potential to be multidimensional.

The national tutoring programme in England provides marginalized students with mor opportunities to recover lost learning, thus improving the effectiveness of instruction, even i focus remains on the competencies that guide the curriculum and the control students ha over their learning remains unchanged.

Egypt's Educate Me programme to support school transformation provides whole-schoo support and professional development to improve the effectiveness of schools.

Norway's use of digital feedback for students improves the effectiveness of the instructional proce

São Paulo's programme of professional development to support the use of learning activiti and formative assessment improved teachers' effectiveness in teaching remotely, wh maintaining the focus on basic literacies and the locus of pedagogical control with teachers

The Har Ghar School programme in India was another incremental programme t supplemented in-school learning with a volunteer-led, contact intensive at-home lear programme using printed materials. WhatsApp and SMS text messaging were leverage support layers while low-skilled volunteers leveraged high-quality content to accele student learning.

Also in India, Madhi's Happy Learners was also an incremental programme that suppleme basic literacy and numeracy skills through family engagement, directed at home lear leveraging technology to support parents and teachers, giving instructions and gau progress of learning.

Evolutionary

Brazil's programme to accelerate change in teachers' professional development, us technology to support peer-to-peer learning and communities of practice, created opportunity for teachers to develop pedagogies to help them teach a breadth of sk perhaps in new ways, making this a potentially evolutionary innovation. However, un these platforms bring in new knowledge and expertise beyond those the teachers alre have, the communities of practice could simply remain an incremental innovation, a w improve the ef ciency of existing pedagogy, while maintaining a focus on the same nar set of learning outcomes and keeping the locus of control of the instructional process wi teacher.

South Africa's use of scripted materials to enable families to support their students in literacies while explicitly developing social and emotional skills via games, physical p contextual learning, and creative expression represents another evolutionary innovation enhances the effectiveness of the instructional process by extending learning time productive time at home, while maintaining the how of the instructional process and expa the goals of instruction.

Uruguay's Ceibal Integrado programme is an incremental improvement on an exis learning management system, which can make education more effective, but also students more opportunities to direct their learning through direct access to digital conte their own laptops, making this is an evolutionary innovation.

The Sekolah Enuma Indonesia digital application for self-learning of literacy, maths English provided students with more control over their learning, while maintaining the foc basic literacies. Madrasati e-learning platform in Saudi Arabia provided students a parents with access to digital resources, also thus promoting student agency.

Peru's blended systems of professional development in rural areas provided teachers wi support to improve their pedagogical effectiveness in teaching twenty- rst century skills.

Finland's project-based approach to supporting collaborative learning in science expanded the range of competencies to include collaboration and socio-emotional well-being, representing an evolutionary innovation.

Pakistan's programme to support literacy and numeracy through smartphones provided mo control over the learning process to students, while keeping the focus on basic literacies.

Mexico's national programme to recover learning loss expanded instructional focus to the socio-emotional wellbeing of students, constituting an innovation in that dimension.

Mexico's schools as community learning centres project sustained the delivery of in-perso instruction for at-risk students during the pandemic, representing an improvement in t ef ciency of existing remote learning options while focusing on supporting the developmen of basic skills as well as socio-emotional wellbeing.

Kenya's multipronged approach to supporting school leaders addressed socio-emotional learning and thus broadened the instructional focus, while supporting principals to augme the effectiveness of schools.

The guides for learning at home produced in Guanajuato, Mexico, provided students with more control over their learning, innovating in this dimension even while maintaining th instructional focus on basic competencies.

The various technologies used in India to support learning at home provided more opportunities for student-directed learning and personalization.

Egypt's Knowledge Bank gave students more opportunity for self-directed learning, representing an evolutionary innovation.
Colombia's Alianza Educativa's programme on social and emotional learning increased the capacity of teachers to support the socio-emotional development of students, in this wa innovating in the dimension of instructional goals.

In India, Leadership for Equity's Swadhyay programme is an evolution of a simple WhatsAp technology that could be used as an assessment tool. The data dashboards generated by th WhatsApp bot can be used to inform teachers and parents on what children are strugglin with and the support they need, thus completing the loop between assessment and instruct and providing students more agency over their learning.

Revolutionary

None of the innovations under examination simultaneously expanded the goals of educa
while providing more agency to students over their learning.

2X Incremental

The Colombia Plays Well play-based radio programme in socio-emotional developme
provided opportunities to support the socio-emotional well-being of students previo
underserved (refugees), thus representing a ‘2X incremental’ innovation.

2X Evolutionary

None of the innovations encompassed innovating in at least one dimension (goals
education or more student agency) while also expanding the reach to new learners.

2X Revolutionary

Education Above All’s Internet-Free Education Resource Bank was designed to su
project-based learning and expand the range of competencies that students can deve
thus supporting deeper learning. Projects are designed to enable students to ach
foundational literacy and numeracy, curricular learning outcomes, and a range of twenty
century skills and socio-emotional learning skills. In addition, the resources are intenti
designed to include populations generally poorly served, such as students in low-reso
communities and students categorized as having special needs. Furthermore, by bri
these methodologies to the homes of students and promoting self-led learning, this solu
also potentially expanding student agency over their learning, becoming a 2X revolutio
innovation.

In providing culturally relevant materials to students, Pangea provided students with
control over their learning, representing, in this sense, an innovation in the how of instr
In addition, by focusing on health content and on culturally relevant materials, these
books also innovated in terms of the goals of education, making this a revolutionary innov
Because these resources were available to all at home, they also expanded the de nitio
the target population of learners, making it a 2X revolutionary innovation.

Kide Science, the play-based inquiry science education programme that supported par
in working with their children in project-based activities in Finland innovated in term
instructional goals as well as in providing students with more control over their lear
Potentially, this is also a 2X revolutionary innovation in that it expanded the populatio
learners to include parents.

India’s Rocket Learning programme provided students with more control over their lea
and delivered more personalization, while broadening the range of competenci

emphasized in using activity-based learning. The special focus on marginalized familie meant an expansion also in the range of learners served, making this a 2X revolutiona innovation.

WHAT PROCESSES SUPPORTED THOSE INNOVATIONS?

The crisis created by the pandemic induced a generative perspective on leading innovatior begin with the learner and their needs; see them as multidimensional whole people, wit diverse and complex motivations, embedded in particular social contexts. Anchoring the ta of forging new approaches to education in students and their needs led to innovations mor relevant than those that begin with content, or with other goals extrinsic to the learners. T needs of students were prioritized over other concerns and interests which also govern ho education systems operate. While the idea of beginning with the learner and their needs simple, there is much about the regular functioning of schools which is better explained terms of the interests of the adults in the system, than in terms of the interests of learner example, we group students in grades not because it is the best way to educate them, b because it is administratively and nancially ef cient. We organize the curriculum in subject not because this is the best way to help students develop valuable competencies, but becau it makes the preparation and management of human resources easier. We rely on summati assessments of low-order cognitive competencies not because this is a superior method formative assessment of complex ones, but because it is less expensive to administer at sc While these arrangements, made for practical rather than pedagogical reasons, serve the purposes, there are also cases where these means take precedence over their intended air working at cross purposes with them, as when students are made to repeat an entire grad because there are a few things in some domains they failed to learn, or when a siloed curriculum prevents students from understanding the relationships between the things t learn in various subjects.

This focus on learners and their needs has allowed a reimagining, recon guration and reengineering of the roles of various stakeholders in the service of the process of learning a teaching. Teachers and students had more agency and voice than is the norm in how schoo and education systems are ordinarily managed. For example, faced with the limitations o approaches designed by national governments, many authorities opened up opportunitie for innovation in the creation of options to ensure educational continuity to local and stat governments, and to civil society. The innovations examined here involved a diversity stakeholders as co-creators and partners and re ected multiple arrangements combining bottom-up and top-down perspectives and approaches.

All these innovations started with a clear focus on the questions of who should be educ
to what end and how, and then used appropriate technologies in the design of the innova
solution. They are student-centred designs, rather than innovations designed ar
technology. They do not begin with technology, asking what uses could technology serve
rather with the question of how to help students learn what they need.

Some of these innovations use low- or no-tech solutions. For instance, the Interne
Education Resource Bank developed by Education Above All requires no technology a
except as a means of distributing the instructions, which can also be distributed via pap
fact, these resources were developed as a solution to the limitation of many of the i
responses to teaching during the pandemic which relied on technologies which did not re
a considerable number of children because they started with the question of how to de
curriculum through technology, rather than with the question of how to help students
Furthermore, there is no apparent correlation between the number of innovative dimen
addressed by the innovation and the use of technology, that is, in some of the innova
technology is merely used to sustain access, without transforming the educational goals
provide more agency to learners, or expand access to previously underserved learn
These are the incremental innovations described earlier. In contrast, some of the innov
that address further dimensions rely on low- or no-tech approaches, such as Pangea o
Internet-Free Education Resource Bank.

Relatedly, another process which supported these innovations was the mobilization
engagement of a diversity of stakeholders, and a reimagining of the roles various stakeho
– parents, students, teachers, communities – could play in a context which called fo
hands on deck'. The crisis made visible the importance of education as a commons; a
institution for the public good. The fragility of this commons, made apparent by the interru
of in-person instruction, invited many actors to step up and engage in extraordinary out
the-box ways. In facilitating this engagement, ordinary mindsets about who does what w
suspended, barriers across institutions were relaxed, and the institutions of education be
exible and uid, allowing the reimaging of what it meant to learn and how.

The 31 innovations are all the product of collaboration and partnerships between governm
civil society, businesses, and other organizations. However, they vary with respect to wh
the initiator is a government or a private entity, and with respect to whether they were des
to go to scale from the get-go or launched on a small scale, to grow subsequently.

For example, digital education platforms such as Ceibal Integrado, Egypt's Knowledge B
Madrasati in Saudi Arabia, or Brazil's programme to support teacher digi-pedagogies a
government initiatives, designed to be of national reach and scale. The same is tru
Finland's project-based science education initiative, Norway's digital feedback initiative

England's national tutoring programme. Some of them involve a number of partnerships w civil society organizations and private-sector entities to augment the capacity and reach o the platform. The nationwide implementation of the Ceibal Integrado programme, for example, relied on partnership between public and private organizations to provide connectivity and access to resources for all students. Other government initiatives we national or regional in scope, such as São Paulo's digital strategy for education continuit Mexico's schools as community learning centres programme and its programme to recove lost learning and the interactive learning guides in Guanajuato, Mexico.

In contrast, a number of programmes were initiated by civil society organizations, launche on a smaller scale to grow gradually. These required partnerships with the public sector fo effective implementation and to go to scale. Examples of this approach include the commun and school engagement initiative in the United States, South Africa's programme to suppo family engagement with scripted resources, the professional development programme fo rural teachers in Peru, the enhanced literacy and numeracy programme in Pakistan and t programme of teacher professional development in digi-pedagogies in Costa Rica. The Kid Science programme in Finland was also privately initiated. Sekolah Enuma Indonesia wa initiated by a private sector company in collaboration with foundations.

A number of the programmes led by civil society organizations involved transnationa foundations or non-governmental organizations (NGOs), for instance, the Education Above all Internet-Free Education Resource Bank, developed by an international educatio foundation, required partnership between NGOs and school systems for effective implementation. Similarly, ProFuturo, in Guatemala, is a programme supported by a education foundation in Spain, working with local partners and national governments. Pangea Publishing is an international NGO-led programme, which reached scale as a resu of partnering with governments. Technology enabled the creation, implementation and scaling of these innovations, regardless of whether the innovation itself involved technolo Even for the innovations which relied on low-tech, the process of generating the innovatio during the pandemic, and of distributing it, involved collaborations within and across organizations, and such collaboration was enabled by technology. In fact, it was because o technology that, in some cases, relatively small organizations and groups of people had considerable impact, exceeding the resources they directly controlled. For instance, th resources developed by Education Above All, by Pangea and by Rising on Air reached considerable scale in distribution over a relatively short period because their reliance o technology and partnership with other organizations allowed the creation of a delivery structure of considerable scope. Furthermore, technology also supported the profession development of teachers and others involved in adopting and supporting these innovations

WHAT COULD THESE 31 CASES MEAN FOR THE FUTURE OF EDUCATION?

The 31 innovations analysed in this book reveal that educational innovation is possible under adverse and challenging contexts. These innovations contributed to regaining maintaining trust in the transformational power of education in the lives of students a communities and societies at large at a most challenging time in which people w concerned for their lives and livelihoods. The following implications for the future of educ emerge from a cross-cutting analysis of these cases.

(1) Most of the cases illustrate either incremental or evolutionary improvements in eith goals of education or providing students with more agency in their learning. Fewer ca tackled simultaneous innovation in goals and student agency, and very few innovat involved reaching populations previously excluded. Perhaps this is to be expected i context of the emergency created by the pandemic, but this points to an area in nee attention as we think about the future. The failures of the education system befor pandemic lay not only in how they educated the students who had access to school, also in how they excluded many students from access. Completing the un nished ta providing genuine access to all is an imperative given the dislocations caused by pandemic, especially the increases in socio-economic exclusion. Also, given the demands to participate economically, there is a new urgency around educating t whole student and preparing them for lifelong and lifewide learning, and innovation essential to build the ecosystem that will create and sustain those opportunities.

(2) The innovations studied in this volume re ect the power of looking at the strength organizations and systems, rather than focusing on losses and de cits. There is no that the pandemic produced considerable educational losses, but an exclusive focu those losses might be more likely to support efforts to restore the levels of functioning education system prior to the pandemic than to rebuild the education systems we nee the future. The case studies of innovative programmes created during the pandemic optimism, hope, positivity, determination and evidence around the conviction reimagining education post-COVID-19 can contribute to laying the foundations for better, sustainable and inclusive future for learners, teachers, families, communitie society at large. Though the chapters in this book acknowledge the considera implications of the learning losses and gaps augmented by the pandemic, they a provide clues and pathways to rethink and strengthen schools and education syste the post-pandemic era to enhance and democratize learning opportunities.

However, these innovations do not have a built-in mechanism for sustainability beyond th pandemic. It was inherent to the disruption created by the pandemic that rules were upende silos broken, and collaborations enabled that made it possible to reimagine the roles of a variety of actors: learners, teachers, parents, communities, governments and civil soci organizations. In a context of great need, many hands were welcomed to help sustain educational opportunity. Mindsets about what was possible were transformed in the wake o these extraordinary needs. In a context in which little of what had been initially created t sustain education remotely during the immediate phase of lockdown seemed effective i reaching all children, governments were more open to novel ideas and partners. But it is be expected that as the emergency recedes some of the norms, bureaucratic barriers, ar mindsets about the roles of the various stakeholders that form the education system m reassert themselves and push back against some of the innovations that were accepte during the crisis. For instance, many private education companies offered resources at no very low cost during the crisis, which contributed to the creation of alternative mechanisms education. But this spirit of contributing to an educational commons may diminish as the sh of the initial crisis wanes.

In order to think about the sustainability of these innovations beyond the crisis, it will b necessary to think about system transformation, about the integration of these innovatio within structures, roles and processes of the regular operation of the school system, a possibly also about how to change those structures, roles and processes so they enab innovation. For instance, some of the innovations supported students in gaining agency ov their learning, choosing what to learn and when, and accessing rich repositories of lesson and resources. This was easier to do in a context in which schools were placing few deman on students, other than expect them to engage with learning, and where the usual mechanis of accountability – student examinations, for example – were suspended. If schools return a mode of functioning that is primarily driven by the goal of delivering content, this will crow out the gains made in empowering students to be in control of their own learning.

In this sense, it is essential to distinguish innovation from systemic change. The case studie have examined are examples of innovations, a point of departure towards systemic chang but not a destination. They were opportunistic in nding a point of entry into the educatio system created by the crisis, but they were not designed to produce coherence with the re of the system and to transform processes that maintain the education system of the past. are 'add-ons' rather than interventions to transform the systems in which they are operati They have the potential to contribute to systemic change, but systemic change is not t automatic corollary of these innovations. Change at scale requires multi-dimensional attenti to the process as a cultural, psychological, professional, institutional and political proces (Reimers, 2020a, 2020f).

The conversation about change, however, has been made easier as it becomes possib examine what these innovations achieved and to then ask which of them should replace existing practices and norms. In order to support that conversation, it is imperative to stock of the innovation which took place and to learn from it. Without such learning, predictable result is a return to the education conditions before the pandemic.

CONCLUSION

The COVID-19 pandemic took a considerable toll on educational opportunity the wor over. In response to this crisis, many stakeholders collaborated to create novel way sustaining education at times when this was very challenging. These efforts are importa just because of what they did at a time of great need, but because of what they show a what is possible in reimagining education. There is much to be learned from studying innovations, particularly when it comes to supporting the necessary transformation of sc and school systems around the world. Such an exercise is important not only to restore was lost during the crisis, but also to help students learn what they need to learn to bu better, sustainable and fair future.

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INNOVATIONS SUPPORTIN

STUDENT-CENTRED LEARNIN

Chapter 2. Bangladesh and Pakistan

ELAN: Enhancing literacy and numeracy through smartphones

Mariam Imran Mian

ABSTRACT

During the COVID-19-mandated school closures, Teach the World Foundation used existin infrastructure, such as the smartphone of a child's parent or sibling, to enable K-5 (Kindergar to Grade 5) students to learn at home using gami ed applications in Bangladesh and Pakistan. The initiative mitigated learning loss during the COVID-19 pandemic and produce positive gains in student learning. Students became more independent learners by usi highly engaging and interactive content in the form of games. As schools reopened, th programme adapted to serve as a quality-enhancement tool for students in under-resource schools, who traditionally receive poorer-quality education. Where schools are still closed this programme continues to be the main source of education for participants.

KEYWORDS

Digital education, information and communications technology, bottom-up change, digita skills, independent learning, individualized learning, personalized learning, multimedia platforms, literacy

BIG IDEAS

Using gami ed applications on smartphones to develop independent learning for low-income students who do not have access to quality education.

INTRODUCTION

COVID-19-mandated school closures presented an opportunity to innovate for the future of education. Teach the World Foundation (TTWF), a non-pro t organization operating in Bangladesh, Malawi and Pakistan, had to adapt its digital learning programmes to ensure continuity of learning and prevent learning loss. TTWF's agship K–5 (kindergarten to Grad 5) literacy programme, delivered through digital devices using gami ed learning apps, was adapted for Android-based smartphones, through which students could learn at home an follow the same content as in school.

CONTEXT

In Pakistan, where approximately 22.2 million children were already out of school, COVID-19 pandemic posed a risk to an additional one million children, who wer expected to drop out due to the pandemic's socio-economic impact (Azevedo et al, 202 Additionally, COVID-19 school closures affected 32 million K–5 students (UNESCO, 202 In Bangladesh, 38 million children have had their education disrupted due to the sch closures that began in March 2020 and are, at the time of writing, ongoing (Rahman Sharma, 2021). This presented a serious issue of access. In parallel, there is also a co regarding the quality of education available. In Pakistan, the learning outcomes for in-sc children are very poor, as approximately 40 per cent of fth-graders fail to perform at second-grade level (ASER, 2019). In Bangladesh, 57 per cent of children were estimated in not to be able to read or understand a simple text by the end of primary school (World Bank, 2

SMARTPHONE PROGRAMME

Thesmartphone programme presented an opportunity to ensure uninterrupted learn without reliance on physical space. The programme uses existing infrastructure, su the smartphone of a child's parent or sibling, to provide gami ed applications that a administered by the TTWF team, either remotely or through an onsite facilitator – this especially crucial as students' families, in many cases, lacked the literacy skills requi offer adequate support at home. The target demographic is either out-of-school childre children in schools offering a poor quality of education.

It was thought that if students were able to self-learn using highly engaging content, minimal reliance on infrastructure, teachers or other resources, they would be able to mi the learning losses experienced due to school closures. This continuity of education w ensure that they were not left behind in comparison to their peers who continued in sc or who come from better-resourced backgrounds. Additionally, once schools reopened, format would serve as a quality-enhancement tool to aid learning and address inconsiste in the quality of traditional teaching methods students experience in-school. This w eventually reduce educational inequality.

The students are given a syllabus, schedule and details of the requisite number of h per day to be spent on each subject. Subject-speci c gami ed applications are the ma source of content, including award-winning applications such as Footsteps2Brilliance Google Readalong for literacy, and local applications such as Sabaq and Taleemaba for mathematics and local languages. Each group of students is assigned a facilitator, remotely manages and supports the student, providing regular check-ins with student parents and offering technical support.

The key features of the programme are its low cost and its non-reliance on physical locatio The students learn at home, in their own time, while most of the management is done remot through the implementation partners. There is minimal infrastructure investment, as the de used are already available in the household, and there is easy access to applications whic are either delivered to students by the facilitator through an SD card, or downloaded from the Google Play Store. TTWF bears the cost of the licenses for the applications, and th applications can work of ine or in a low-connectivity setting, requiring an internet connectio once a week, for data analytics upload.

The programme is implemented through a network of local partners. In Pakistan, th implementation partners are Junior Jinnah Trust in Islamabad and Rawalpindi, Moawi Foundation in Sheikhupura, and CARE Foundation in Lahore and its surrounding areas. these organizations run either privately-adopted government schools or low-cost privat schools. Over 900 children are involved in the programme in Pakistan, of whom 100 are out-of-school students with no educational background, and the rest students who hav been affected by COVID-19 school closures. In Bangladesh, TTWF's network partner i six cities is OBAT Helpers. There are nearly 1,400 students enrolled, from refugee camp or urban slums where education has been disrupted due to COVID-19 school closures. Th partner organizations offer the programme to their existing cohorts, as well as identifyin additional out-of-school children who could be included. Their existing teachers and staff ar trained as facilitators by TTWF, who then monitor and support the students and parents for programme's duration.

This initiative was undertaken by TTWF in response to the school closures that resulted from pandemic. TTWF has been operating in the digital learning sphere for more than four year with robust results from a proof-of-concept intervention and several pilot projects that sho the impact of digital education. When its agship tablet initiative was disrupted by school closures, the same content was moved to smartphones, through a bottom-up approach. T students were able to continue their education at home despite the disruptions. Since t basis of the model is self-learning, a facilitator is there only to support and troubleshoo the students lead their learning themselves. Geographical proximity made monitoring an support easier, as these students live in close-knit neighborhoods in Pakistan, or in refug camps in Bangladesh. While this was initiated as a COVID-19 response strategy to mitigat learning loss, it expanded into a supplementary programme for students. Once school reopened, students continued to use the same applications at home to reinforce learning school and improve the quality of learning.

RESULTS AND LESSONS LEARNED

TTWF conducted a proof-of-concept exercise in 2016, which showed that learning ga increased almost twofold for students studying on the tablet-based learning program compared to those studying through traditional methods. This data supported adaptin intervention to smartphones and provided a potential solution to the global education c through the scaling-up of the programme.

Twenty- ve students from among those enrolled on the programme in Islamabad a Rawalpindi were evaluated at three-month intervals, showing signi cant learning ga (averaging 50 per cent) and mastery over subjects (English, mathematics and Urdu) at grade level. Half of these students were promoted to the next grade level within six mon being enrolled on the programme. These results con rmed previous ndings as to the ef of gami ed learning applications in building literacy and numeracy skills.

Focus groups with parents were also conducted, yielding overwhelmingly positive re regarding their children's interest and engagement in education. Children were s disciplined when following their timetable and eager to share their learning with their par Parents found that their children's digital literacy skills developed rapidly, and they were enthusiastic about learning on smartphones compared to other traditional learning meth Analytics from applications supported these ndings, with the students' in-app times sho high engagement levels. In some cases, parents (especially mothers) reported joining children in using the applications, building their own literacy. This spillover effect demons potential for this to become a family literacy programme, and this unexpected result has become a key priority for TTWF in tackling the issue of adult literacy, and women's lite in particular.

However, there were some challenges which emerged during implementation. Some the core applications failed to run optimally on smartphones with low speci cations, a alternative applications had to be sought. Another challenge was the lack of contextual content for subjects introduced at higher primary school levels, including science and s studies. While the current application repository is effective for building functional literacy numeracy skills, a key focus going forward is researching and identifying suitable applica for other subjects.

One of the most signi cant ndings of the programme was that parental engagement w crucial to children's success. Higher engagement levels were reported among students w parents ensured access to smartphones and supported their child's learning through h interest in their children's assessments and increased interaction with the facilitators. L

ahead, an avenue to increasing student engagement levels is to offer minimal moneta incentives to parents to promote increased parental involvement.

IMPACT AND FUTURE PLANS

The smartphone programme is aligned with the vision of the Futures of Education initiati using digital innovation to tackle many problems that contribute to the global educatio crisis. Repurposing available smartphones to provide educational content at home solve one problem of access to education. The applications used are award-winning, delivering effective learning content through games, thus supporting an improvement in the quality education. These applications provide engaging, fun and interactive content and formativ assessment through instant feedback – all of which supports self-learning. The students actively engaged in education, rather than being passive learners. Through this, the childr are equipped with twenty- rst century skills, as independent learners taking responsibility f their own learning and education. It is a wholly student-centered and student-driven mode which caters to each student's learning trajectory and abilities, as they navigate their wa through the applications. The applications are designed for the students to move ahead a their own pace, depending on their grasp and mastery of the content. They develop essenti literacy and numeracy skills, which serve as a foundation for their education beyond K–5 Moreover, they close the digital divide by bringing education home. In the smartphone model, the role of the teacher is eliminated, and the entire onus of learning is on the stude This could be a breakthrough in areas where there are teacher shortages and issues wi teacher quality. It also has the potential to aid ipped classrooms in the future, supportin blended learning.

The global digital landscape is conducive to scaling-up such a programme. Global smartphone penetration is at an all-time high. Smartphone penetration in Pakistan currently over 45 per cent (Pakistan Telecommunication Authority, 2021) and expected t grow exponentially. Internet and smartphones are becoming more affordable and more readily available. There is great potential for schools across the world to incorporate digita learning, especially given its successful use during COVID-19-mandated school closure This programme has already had success and could be used as an engaging quality- enhancement tool for students, supporting traditional, in-class learning. It is also transfera to public or low-cost private schools that may not have the resources for incorporating digit learning in their classrooms, especially in developing countries. Internet service provide could play a vital role in scaling-up this programme, by providing subsidized rates for data usage of speci c educational applications. If advocated for at the systemic level, this ca bring a digital revolution in education.

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About the author

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Chapter 3. EGYPT

Egyptian Knowledge Bank (EKB): Embedding a digital learning platform into pre-tertiary education

Ebtehal Elghamrawy and Nelly El Zayat

ABSTRACT

This chapter showcases the government-led Egyptian Knowledge Bank (EKB), one of th largest digital learning platforms in the Middle East and North Africa (MENA) region, bringing together more than 150 partners in a private-public partnership. EKB started pre COVID-19 in 2016. It grew in response to remote and blended learning needs – by May 2021, it had 3.5 million registered users and over 250 million views. Initial steps have been taken to integrate it into the current pre-tertiary education reform in Egypt (EDU 2.0). Th chapter will explore the intersection between EKB and K–12 (kindergarten to Grade 12) formal education, to and examine the development, implementation, limitations and potenti implications of a large-scale, free of charge, national, digital learning platform integrated into pre-tertiary education.

KEYWORDS

Digital learning platforms, blended learning, national multimedia platform, private-public partnership, middle-income country, MENA, pre-tertiary education.

BIG IDEAS

Explore how a national, digital learning platform can be integrated into K–12 formal education, focusing on its development, implementation and limitations, and the potential implications of a large-scale, free of charge private-public partnership.

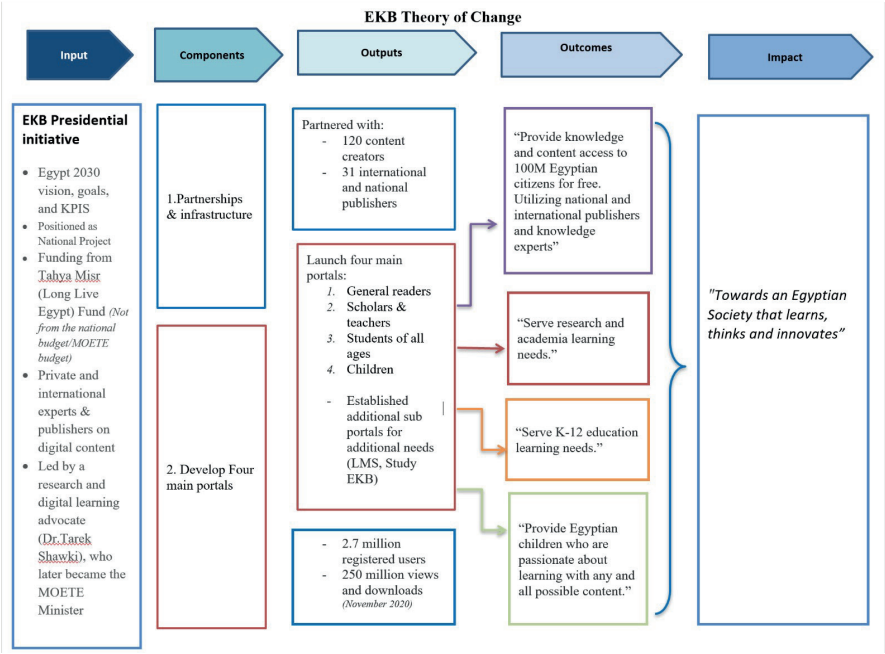
BACKGROUND

To better understand the Egyptian Knowledge Bank (EKB) and its link to pre-tertiary educ it is essential to consider Egypt's K–12 (kindergarten to Grade 12) education system. It oldest and largest in the Middle East and North Africa (MENA) region, yet, for years, it been ranked in the bottom 5 per cent of international assessments such as TIMSS (Tre International Mathematics and Science Study) and PIRLS (Progress in International Re Literacy Study) (TIMSS, 2015), which monitor international trends in student achieve in mathematics, science and reading. It faces persistent pressure from a rapidly incre student population, deteriorating teaching quality, a rigid curriculum, inequality, and a of resources (USAID, 2020). In 2017, the Ministry of Education and Technical Educat (MOETE) announced a transformation of the education system, Education 2.0 (EDU 2018–2030), with an aspiration to address these challenges through modernizing t country's education system. By focusing on substantial utilization of technology and ble learning models, a process that began before the COVID-19 pandemic (RDP, 2021c) aimed to increase students' competencies in twenty- rst-century skills while moving a from rote memorization and teaching to, and learning for, the test. As a result, when COV hit and schools shut down in March 2020, the MOETE leveraged the existing infrastruc of the EKB, to meet some of the challenges. The following section explains the EKB the change, its implementation, the COVID-19 response for pre-tertiary education, the key re and lessons learned, its limitations, and the implications.

THE EGYPTIAN KNOWLEDGE BANK

The Egyptian Knowledge Bank (EKB) is one of the largest digital learning platforms i MENA region, offered free to all Egyptians. Launched in 2016, the EKB was designed provide higher education researchers with high-quality free resources and internati journal access (RDP, 2020). EKB has been growing and evolving since then, aimin address a wide variety of needs and accommodate all Egyptian citizens (RDP, 202 RDP, 2021b; EKB, 2020a; Elzayat, 2020). EKB's current long-term goal is to develop a serve an Egyptian society that learns, thinks and innovates. It is divided into four key p general readers; scholars and teachers; students of all ages; and children (RDP, 2020). portal includes encyclopedias in English and Arabic, online journals and periodicals, or dictionaries, interactive lessons, and various books and scienti c articles, covering a range of needs, from early childhood to graduate-level studies (EKB, 2020b EKB 2021; R 2021b), as shown in Figure 1.

Figure 1. EKB Theory of Change[1] (EKB, 2020b; EKB 2021; RDP, 2021b)



> "EKB is designed in a way that all parts of society, with various specializations and interests and ages, can bene t from, to develop scienti c research for researchers, human knowledge for youth, promote teaching methods for teachers and develop ways to attract students to learn … EKB is Egypt's spring on the path of progress and glob competition in the age of science and information." Of cial presidential spokesman Alaa Youssef (EKB, 2020a).

The EKB has great scope to support change in Egypt, providing certain conditions are i place to support its development. The following assumptions underpin the programme ar its theory of change:

- Funding EKB as a national project outside the MOETE budget could ensure sustainabili in the face of internal challenges.
- Utilizing existing international and national expertise in content development, manageme and training allows scalability, ef ciency and dissemination of high-quality content.
- Enabling EKB to be accessible from phones as well as laptops will increase outreach.
- Internet penetration is increasing in Egypt.
- Egyptians' love of learning will grow if a comprehensive knowledge platform exists to support their engagement.

1. There is no of cial published EKB theory of change; this is a compiled outline based on published data.

IMPLEMENTATION OF EKB

EKB began as a presidential initiative for scienti c researchers and has become a plat for the general public and K–12 students (RDP, 2021b). It developed into a private-pu partnership (PPP) model, with more than 150 partners from private and internati organizations, such as Britannica, National Geographic and Discovery Education, and lo Egyptian partners, such as LIMS Egypt and NahdetMisr. The PPP model works horizo meaning that each publisher is responsible for the content and training, while the core team manages the coordination and technical support in partnership with the Egyp National Scienti c and Technical Information Network (RDP, 2020; RDP, 2021b).

The EKB's four portals (general readers, scholars and teachers, students of all ages children) can be accessed by users registering with their national ID number or details a their school. They can then pick one of the portals to be their primary source of focus. portal is divided into sections by discipline; from there, users can navigate topics of in using a search engine or drop-down lists based on grade, subject, publisher and keywo

EKB, PRE-TERTIARY EDUCATION REFORM (EDU 2.0) AND COVID-19

EKB and pre-tertiary education reform (EDU 2.0)

EDU 2.0 introduced a new curriculum for earlier grades (K–3) in 2020 and a new struct for assessment of higher grades (secondary grades). The link between EDU 2.0 and began pre-COVID-19, with the establishment of digital learning and assessment for students in public secondary schools. In 2018, to provide an equitable learning opportu and introduction to digital learning, 750,000 Grade 10 secondary school students receiv a free tablet with the EKB application . Textbooks were updated to include website l to resources and exercises on EKB, connecting the formal curriculum with specialist-s publishers to replace non-school books (revision for exams) with EKB content (RDP, 2 Elzayat, 2020). With the onset of the pandemic in its second year of operations, , the stru and partnerships already established enabled a fast response.

EKB in response to COVID-19

From March 2020, as schools closed in response to the COVID-19 pandemic, the connec between EKB and K–12 formal education scaled-up further. The launch of Study EKB (Za an offshoot of the original EKB site, ensured curricula spanning K–12 grade levels w

mapped and curated in the form of a digital library, with educational material and interactive digital lessons for all subjects for all grades. Under the supervision of and in alignment wi the Center of Curriculum and Instructional Materials Development (CCIMD), the site use existing content from over 31 partners, to mirror Egyptian curriculum standards (EKB, 2020 EKB, 2020b EKB, 2021; RDP, 2020; RDP, 2021a; RDP, 2021b; RDP, 2021c). Additionally, new resources and tools were developed to assist remote learning, including three hours newly produced online video programmes, broadcast daily on WebEdTV, customized to the Egyptian K–12 national curricula for all grades (EKB, 2020b; EKB, 2021).

Moreover, in an attempt to reach all students, especially those with little or no access t technology, EKB has been complemented with the new MOETE TV channels, Our Scho (Madrasetna). These channels are different from older educational TV channels as they off newly developed, game-based, engaging content, as well as some resources from EKB, an reference back to EKB. Such of ine TV channels reported an estimated one million view while YouTube views reached more than 14 million vin the nine months from October 202 to May 2021 (Shawki, 2021).

EKB RESULTS, LESSONS LEARNED AND LIMITATIONS

EKB results

As of June 2021, EKB had 3.5 million registered users, not including the thousands of gu users on pre-setup computers in libraries, government institutes and schools (EKB, 20 RDP, 2020; RDP 2021a). Breaking the gures down, the majority of users, 76 per cent, ar teachers and students in pre-tertiary education, while general readers account for 5 pe cent, scholars 6 per cent, university students 13 per cent, and children less than 1 per ce Users have access to 46,012 content resources (RDP, 2021b) on the four portals, whic have been viewed more than 250 million times. In comparison, the Study EKB (Zaker) alon offers more than 48,942 content resources, attracting more than 462 million views and ove 41 million sessions. The majority, over 80 per cent, of those views and sessions are w students, primarily from their secondary school tablets. The remaining 20 per cent are view by parents and teachers (EKB, 2021).

This analysis shows how the connections between EKB and MOETE have encouraged high usage and reach than did EKB's traditional pathways. However, additional data on the impact, retention and satisfaction are needed to understand the mid- and long-term impa of EKB as a national digital learning platform.

Lessons learned

As with many innovations that grew from the COVID-19 pandemic, the integration a adoption of new ways of working generated lessons for future developments and initiati

Horizontal management structure and PPP utilization: Organizing the information over 150 specialist providers in a horizontal management structure, enabled tim high-quality and relevant digital content, despite Egypt's central governance syst

Attempts to address equity gaps: Recognizing that EKB might not be universally accessible, for various reasons, it was important to invest in solutions to addres equity gap. This included distributing free tablets to all secondary schools, offerin of ine app, installing EKB applications on computers in public schools and instituti and reviving platforms, such as TV channels, to complement EKB learning reso and ensure inclusivity and access to all students.

Leadership continuation and integration in formal education (EDU 2.0): Dr. Tarel Shawki, the current MOETE minister, led the development and launch of EKB p to taking up his ministerial role. This high-pro le government leadership, for the seven years, enabled the continuation and scaling-up of the programme, as wel connecting the various stakeholders, allowing EKB to become and integral part of formal education reform (EDU 2.0).

Political support: Given the ambition of the project and the need for extensiv resources, its position as a national/presidential project and recognition that it is long-term investment (RDP, 2021c) has facilitated the continuation of funding and scala

Target audience design variations: The EKB content curation, design and organization, based on various target audience needs, has enabled a smoother u experience; for example, Study EKB (Zaker) does not upload textbooks or hyperl to static resources, but offers an interactive resource drawn from various partne any topic.

Limitations

Higher Engagement: EKB's ambitious goal to reach 100 million Egyptian citize demands higher audience engagement and awareness, which is still an area of grow

Mass communication and public awareness: There has been no national advertisi campaign on EKB since its establishment. While some reference to EKB in p

conferences, at events and in short videos has raised awareness with a limited rang of audiences, to ensure higher audience penetration, mass communication and promotion are needed.

Cultural change to encourage learning: Developing a rich and comprehensive digital learning platform is not enough if there is no cultural desire to learn. The MOET is aware of such limitations (RDP, 2021c), and is attempting to address it for younge generations through EKB and EDU 2.0 connection. However, to be far-reaching, direct interventions, centered around increasing the desire to learn, are needed.

Limited published impact data: As noted above, the outreach and output results of EKB signal positive progress, but there is little published data on learning improvement, retention or satisfaction. These are needed to better understand th returns on investment, and analyse gaps and strengths.

Internet infrastructure and access: Despite the signi cant undertaking of building digital infrastructure, with only a 57.3 per cent internet penetration rate in Egypt (World Bank, 2019), there is a widespread need throughout the country to increase internet connectivity and to develop a universal learning management system tha could support online learning (World Bank, 2018).

Implications and conclusion

The development of national digital learning platforms has been increasing in the last decad with examples from Mexico, Uruguay and Brazil, among other countries. Such platforms an new ones are expected to continue to develop in response to COVID-19. Consequently, discussing EKB, an in-progress case, offers insights from a sizeable middle-income cour with the ambitious goal of serving all its 100 million citizens.

The case study shows a country attempting to integrate its digital learning platform with the ongoing reform of a complex education system. this has resulted in a set of limitatio and lessons learned, such as: how horizontal management structure and building o experts' knowledge through PPP can advance the development of a digital learning platfor by enabling timely and high-quality content; And how limited public awareness and a low desire for learning can limit the potential of such a project. Additionally, with lifelong learning and strengthening a common public education central components to the Future of Education framework, this experience contributes to the knowledge surrounding blende learning, private-public partnerships, and mass digital learning usage targeting variou academic levels in specialized and general audiences – an area on which limited research has been conducted, as the scholarly focus has primarily been on higher education rathe

than the general population or K–12 (Linton, 2018). As a result, EKB offers insights w reviewing when planning a large-scale digital learning platform serving various stakehol simultaneously.

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Nelly El Zayat is the co-founder and director of Newton Education Services and is the advisor to the Minister of Education on Early Childhood Education and Education Policy. Sh holds a Master's degree in International Education Policy from Harvard University, a Maste of Arts in Middle East Studies and a Bachelor of Arts in Economics, both from The Americ University in Cairo. For over 20 years, she has been working in international education speci cally in student advising, scholarship management, admissions, curriculum desig e-learning, learner-centered teaching, and bridging the gap between education and the job market. She has held positions in several educational organizations including AMIDEAST, t Institute of International Education, Georgetown University, and the American University Cairo. She has been part of the core team working on Education 2.0, Egypt's new educatio system, since 2017.

Chapter 4. INDIA

Home-based learning programmes

Akshar Madhavaram, Sushruti Sachdev and Anustup Nayak

ABSTRACT

The COVID-19 pandemic forced schools in India to shut for an inde nite period. W in-school learning no longer an option, students had to adapt to various home-learn programmes launched by the state governments. Three such programmes, remedial le through WhatsApp chatbots, activity-based learning through worksheets supplemente interactive voice response (IVR) and text messaging, and volunteer-led community-b learning, informed the formulation of a framework that tackles the challenges in impleme home learning in India. While the above-mentioned programmes independently fell s in some aspects, they helped us identify ve key components of a holistic, 360-deg home-learning programme: access, content, roles, adoption and monitoring.

KEYWORDS

Blended learning, at-home learning, information and communications technolo personalized learning, assessment informed instruction, guides for learning at home.

O BIG IDEAS

An effective home-learning programme is a function of 'touch' (consistent motivation, guidance and scaffolding) and 'stuff' (contextualized and engaging curricular content) while leveraging technology (access and personalization) to act as a multiplier to reach scale.

INTRODUCTION

In March 2020, the COVID-19 pandemic forced 1.5 million schools in India to shut for inde nite period. With in-school learning no longer an option, close to 250 million stude had to adapt to various home-learning programmes launched by state government partnerships with various non-governmental organizations (NGOs). While well-intentior most of the home-learning programmes were suboptimal in their design and compr sharing content that was readily available rather than including content targeted towa building speci c competencies.

Based on a study conducted by the Azim Premji Foundation (2021), on average 92 per cen of children across India have lost at least one speci c language ability and 82 per cent have lost at least one speci c mathematical ability during the previous year, across all grades For every month of school closures, children have lost twice the amount of learning (UI 2021) they would have gained in that period. Moreover, less than 40 percent of children were able to access any form of home learning. From this, one can assume that learning t children going to government and low-cost private schools in India has been minimal durin the COVID-19 school closures. While the disease itself is a visible crisis in terms of impact health and livelihood, there is an invisible generational crisis unfolding due to the massiv learning loss children are experiencing. Unfortunately, the situation is unlikely to improve as the time of writing, schools continue to remain closed in India and are not expected to ope before the next academic year.

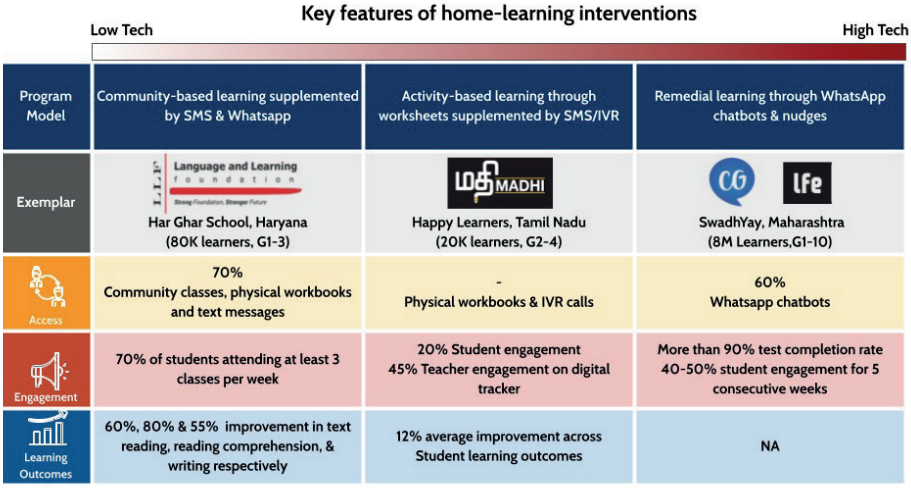
Although most home-learning interventions failed to deliver learning gains at scale several home-learning programmes did deliver on their promise. Three such programme implemented in different geographies in India, are discussed in this chapter. They sho learning as a function of 'touch' (consistent motivation, guidance and scaffolding) and 'stuf (contextualized, engaging curricular content), while leveraging technology (access and personalization) to act as a multiplier to reach scale.

$$\text{Learning} = f((\text{Touch}+\text{Stuff})*\text{Technology})$$

KEY HOME-LEARNING INTERVENTIONS IN INDIA

Based on the ASER Survey (2020), approximately one-third of all enrolled children acros India received learning materials or activities from their teachers during the week before th survey was conducted. These were shared most commonly by WhatsApp (74.2 per cent) followed by personal visits (24.8 per cent) and phone calls (11.5 per cent). Individual states deployed a combination of high-tech, low-tech and no-tech interventions to provide home-learning initiatives across all sections of society. The three case studies that follow cover spectrum from low to high-tech interventions that delivered learning gains at scale. Figure provides an overview of how each of them tted this scale and their key ndings.

Figure 1. Summary of Findings



REMEDIAL LEARNING THROUGH WHATSAPP CHATBOTS

The Government of Maharashtra (a large state in Western India) launched the Swadh programme, in partnership with ConveGenius (https://convegenius.com/home) India's leading EdTech social enterprise, and Leadership for Equity (LFE) (https://w leadershipforequity.org), an education systems-change organization working with state of Maharashtra. Within six months of state-wide roll-out, over 8 million students enrolled on the programme and over 4 million students in Grades 1–10 had started do the assessments and home-learning activities each week.

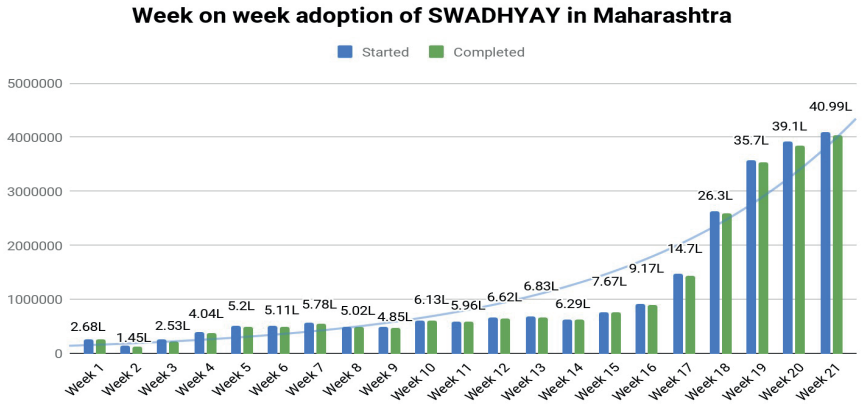
The programme uses a nudged learning model and has three core components: form assessments; remedial learning; and adaptive teaching. Each student has a persona learning journey, drawn up from the formative assessments administered via Whats Based on the performance in the formative assessments, parents or students receive nudges through the automated conversational software, the WhatsApp bot, each w focusing on a particular learning outcome, facilitating remedial learning. The teachers re nudges in the form of summary reports of each cohort, facilitating adaptive teaching (Figu

Figure 2. Assessments and content nudges on WhatsApp, Swadhyay programme, Maharashtra

KEY FINDINGS

- Of cers at block, district and state levels, as well as teachers, use data from the programm to track the participation and performance of the students ensuring high engagemen – completion rates week-on-week were above 90 per cent (ConveGenius, 2021) (see Figure 3).
- The SWADHYAY programme has demonstrated that assessment-informed instructio offering users very targeted content, increases engagement metrics compared to conte and videos delivered to students in a cascaded manner.
- Participation and performance of students can be monitored at a state, district and block lev
  - The performance data at a learning-outcome level is useful in designing training sessions, teaching and learning materials, and support plans for the teachers both a the local and central levels.
  - The platform is useful in conducting diagnostics and evaluations to support the stat in data-based decision-making.

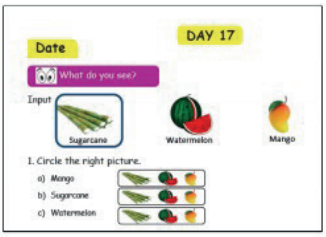
Figure 3. 90% completion rates, Swadhyay public dashboard



ACTIVITY-BASED LEARNING THROUGH WORKSHEETS SUPPLEMENTED BY SMS/IVR

The Government of Tamil Nadu (TN), a large state in Southern India, with the help Madhi Foundation (https://www.madhifoundation.org/), implemented the Happy Learners programme focused on strengthening foundational learning in two of its dis reaching approximately 20,000 students and 850 teachers. The programme leveraged prevalence of feature phones in children's households, the dominant phone type in rura Learning content was delivered through an interactive voice response system (IVRS hardcopy workbooks were made available for children to learn. Each child would call t IVRS learning system, once a day, and complete the associated learning worksheet check for understanding questions where necessary (see Figure 5), with support from parents. Teachers used 15-minute voice calls to conduct assessments, based on the te guide provided to them, with all the students in their class and uploaded the data inputs the digital tracker every week. Automated short message service (SMS) nudges were to teachers and coaches who did not update their trackers, along with reminders of reg review meetings.

Figure 4. Sample activities from Happy Learners programme



Building reading comprehension through audio stories, print material and comprehension questions with guided audio instructions

Building literacy comprehension and reading fluency through audio inputs, images and vocabulary introduction

KEY FINDINGS (MADHI FOUNDATION, 2021)

- Learning outcomes. There was a 12-per-cent-average improvement across student learning outcomes. Tamil literacy and critical thinking (in numeracy) showed the greate improvement in student learning outcomes, which is further corroborated by the fact th students chose to interact with these learning modules on the IVRS platform the most.
- Student engagement. The engagement rate was 20 per cent, which is four times the average engagement rate of massive open online courses (Coffrin et al, 2014). The Happy Learners programme provided an interesting and unique learning opportunity fo rural households, re ected in the nuanced data, wherein engagement from more rural blocks is higher compared to semi-urban/urban blocks.
- Teacher engagement. 44 per cent of teachers conducted student assessments and updated them on the digital tracker. There was also a 21 per cent increase in teacher data entry in the weeks where SMS-reminder nudges were sent to the teachers.

COMMUNITY-BASED LEARNING SUPPLEMENTED BY SMS AND WHATSAPP

Digital learning has been hailed as a savior of the education system during the COVID-19 pandemic. Yet, digital learning opportunities are accessible to only a small proportion o rural households in India. Furthermore, according to the ASER 2020 Survey (2020) almos a quarter of all children have parents in the 'low' education category, families where both parents have completed Std V or less (22.5 per cent). The vast majority of these children stu in government schools (84 per cent) and less than half of their families have a smartpho (45.1 per cent).

The Language and Learning Foundation (LLF) (https://languageandlearningfoundation.org) launched the Har Ghar School (HGS) programme in seven districts of Haryana, with a cohort of 80,000 students. The focus was on offering home-based support to children by

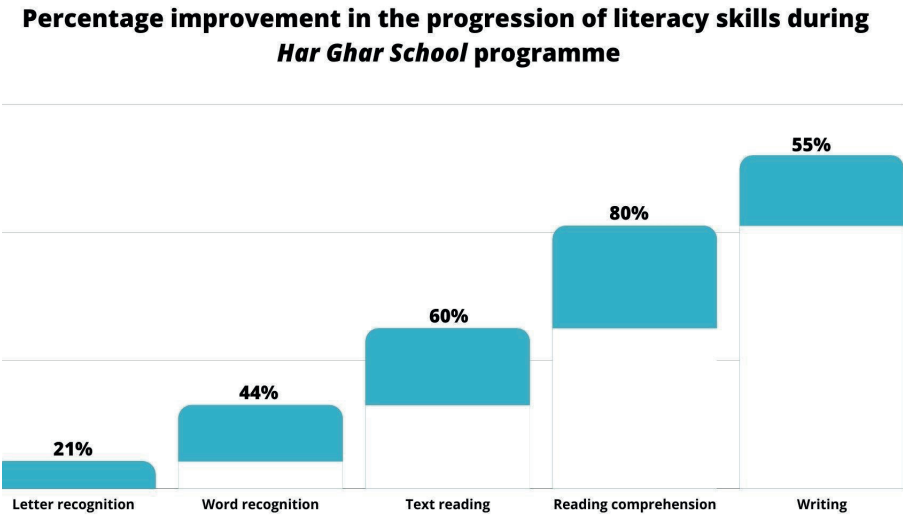
providing graded workbooks and reading books at home and ensuring extensive ho visits from teachers, volunteers and LLF staff, to support students learning through f face interaction. Volunteers conducted community classes at least three days a week f minutes with a class size of 3–10 students. Students received daily homework throug messages via SMS or WhatsApp. The responses were tracked, and automated report c and certi cates were sent out to students to keep them motivated. Teachers and coa conducted regular assessments to track student learning. It is envisaged that once s reopen, students who are lagging behind in their learning level will continue to get face face support after school hours and on weekends by community volunteers.

Figure 5. Pictures from the Har Ghar School programme in Haryana

KEY FINDINGS (LLF, 2021)

- Learning outcomes. Improved levels of pro ciency over baseline in the skills such letter recognition (by 21 per cent), word reading (by 44 per cent), text reading (by 6 per cent), reading comprehension (by 80 per cent) and writing (by 55 per cent). T programme focused on inclusive learning for the students at the bottom of the pyra academically. The average scores of the lowest-performing 20th percentile learners n than doubled in eight months, and the gap between 25th percentile score and med reduced.
- Engagement. Around 90 per cent of schools conducted community classes w approximately 70 per cent of students attending at least 3 classes per week. Approxima 75 per cent of the parents on WhatsApp groups actively responded to home-base activities.

Figure 6. HGS learning outcomes



LIMITATIONS OF THE CURRENT APPROACHES TO OUT-OF-SCHOOL LEARNING

While the programmes described above showcase how home-learning can be used to deliver learning gains in such unprecedented times, they are still far from being replicable: The Har Ghar School programme is a low-tech model that leverages the power of a large on-the-ground volunteer base that enhances the 'touch'. The 'stuff' or the content was design to be instructor-led and not for self-use by the student or the parent. Moreover, the limited u of technology to counter the effects of the digital divide leads to a high dependency on the well-trained human volunteer force to deliver learning which might not be scalable given th dearth of resources in a country like India. This programme shows us that a high-touch mo can counter the impact of any gaps in content design.

The Swadhyay programme showed us how leveraging technology for scale alone cannot guarantee improved learning outcomes in the absence of high-quality relevant content Technological nudges need to be supplemented with a human 'touch' to ensure sustaine motivation for the learners over time.

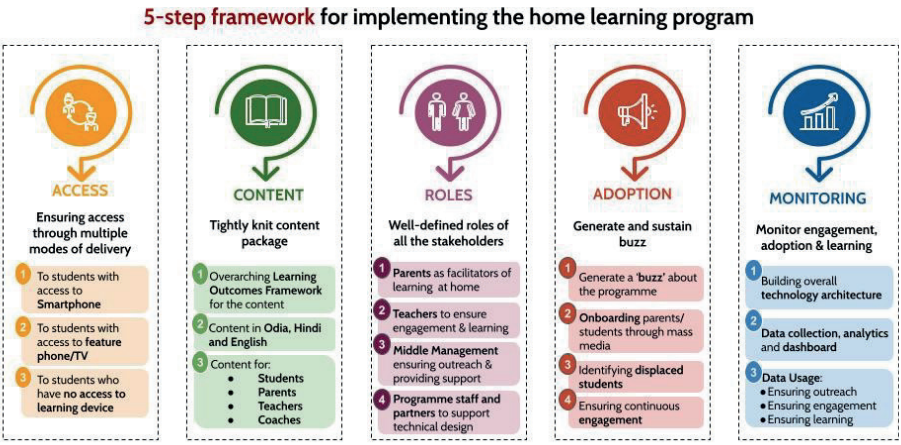
The Happy Learners programme was designed using a good balance of human and technological touch combined with contextual content accessible by all children. However this programme failed to leverage technology as a multiplier and merely used technology t provide a layer of supplementary content above physical content.

IMPLICATIONS FOR THE FUTURE

With the prolonged COVID-19 school closures, it has become clear that home learn is no longer a good-to-have but a must-have component of education. Schools are longer the only places of structured learning and instructional time needs to be split bet home and school to ensure continuity of learning, even in times of normal schooling. H learning not only helps us mitigate the learning loss accrued by children over the two y of the pandemic but can act as an enabler for learning in the case of continued unfores disruptions, even after schools reopen.

While the above-mentioned programmes independently fell short on some aspects, helped us identify ve key components of a holistic, 360-degree home-learning program access, content, roles, adoption and monitoring (see Figure 7).

Figure 7. Programme implementation framework



Home-learning interventions can be improved by bundling a set of high-touch and low-t technology interventions. This 'bundled' approach is in the spirit of the multifaceted pov alleviation programme studied by Banerjee et al. (2015). The ve-step framework helped study various interventions and arrive at few successful technology solutions which c bundled together to improve learning at home:

- Access: Access needs to be ensured for all categories of children, i.e. those with acces learning devices (smartphone, laptop), those with restricted access to a learning de (limited time, bad internet connection), and those with no access to learning devi It is also evident from the above-mentioned cases that physical material delivere children can ensure access to all and counter the effect of the digital divide. Pu distribution systems and volunteers can be leveraged to ensure learning material rea

all the students. Teachers and volunteers must be supported with devices and intern connections to support ease of scaling, as evidenced by the HGS programme that reimbursed volunteers for internet data recharges.

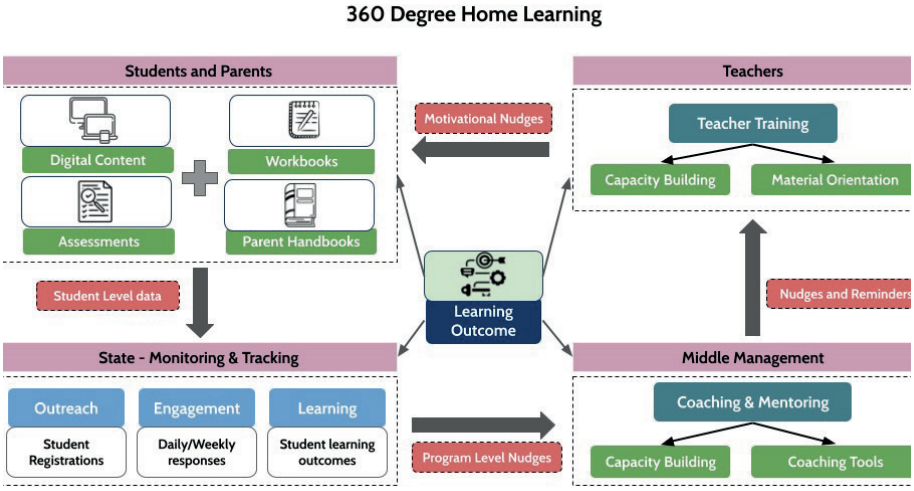
- Content and assessments: Printed student workbooks, parent handbooks, and poster need to be designed for self-use without the need for a trained instructor. This can b supplemented by byte-sized, multi-modal content that can be used to deliver instruction as well as dynamic learning. HGS had success with printed material while Swadhyay and Happy Learners programmes have demonstrated high engagement with digital conten and high task-completion rates.
- Roles and responsibilities: Roles and responsibilities of all the key stakeholders nee to be clearly de ned and communicated. Cascaded WhatsApp groups ensure content ows from the state department to district level, principals, teachers, volunteers, and nal students. This provides an opportunity to deliver key updates and orientation videos t volunteers, parents and teachers. This facilitates agile decision-making amid continuo disruptions. Physical handbooks with clear instructions for parents and volunteers, as us by the HGS programme, can also act as effective aids to fostering role clarity.
- Adoption: Targeted efforts need to be made to enrol students and sustain the motivation of parents, volunteers and teachers to support their children. State governments in Ind have access to newspapers and advertising agencies that can reach remote communitie Volunteers and top-performing teachers can be empowered with tech tools that can support social media campaigns. As evidenced by the Swadhyay programme, driving adoption through local government authorities can not only build but also sustain engagement over time.
- Monitoring: The technology architecture needs to be strengthened to monitor access, engagement and learning. Data collected from different sources must be available in usable formats for teachers, volunteers, parents and local government of cials to mak informed decisions for the future. Engagement and learning data can themselves act a a motivational nudge for parents and students to sustain learning as seen in both Happ Learners and Swadhyay programmes.

CONCLUSION

As we work towards building our education system back, there is an urgent need to rethin how we educate our children and build a system that is resilient to withstand the impact future disruptions. With disruptions and school closures becoming the new norm in som regions even before the pandemic, due to natural calamities, protests, riots, etc., incorporati various home-learning strategies into the traditional public school system will prevent loss instructional time due to disruptions.

The key to ensuring an effective home-learning experience lies in a tight-knit programm
has the right balance of 'touch' and 'stuff' layered with 'technology'.

Figure 8. Primary scenarios mapped to modes of teaching and learning



Such a home-learning programme includes:

- High-quality, multi-modal 'stuff' or content rooted in student learning outcomes whi
packaged for self-use by parents and students.
- Training and on-the-job support for teachers and volunteers on how to deliver conten
well as sustaining the engagement and motivation of the users.
- Consistent 'touch' through human and technological nudges at each level to sus
engagement and learning over time.
- Data tracking and monitoring to identify gaps in implementation and inform next step
- A well-de ned linkage between what each stakeholder is learning, when they a
learning and how they are learning.

A blended model of at-home and in-school learning is the future of education po
pandemic. It is imperative that governments do not see home-learning as a stop-gap so
but an essential supplement to in-school education, even after schools reopen, and inv
strengthening it.

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Chapter 5. INDONESIA

Sekolah Enuma, A digital application for young learners

Pam Vachatimanont

ABSTRACT

Enuma School is a digital application that aims to support young children's learning o basic literacies: reading, writing and mathematics, as well as additional language learning It functions without internet access, promotes individualized learning, and is designed f self-directed learning too. Enuma School was rst created for use in Indonesia as Sekola Enuma Indonesia. It supported 586 children in Lampung and Medan to continue learning in early 2021, during the COVID-19 pandemic. Since mid-2021, it has been rolled out to an additional 2,000 learners through 47 kindergartens and primary schools across Java, as education systems continue to navigate intermittent school closures and attempt to build ba better. This case study describes Sekolah Enuma Indonesia and reviews the experience o use in Lampung and Medan.

KEYWORDS

Independent learning, individualized learning, digital skills, literacy.

BIG IDEAS

This case study shows that a well-developed digital application such as Sekolah Enuma can support children's individualized and independent learning, which assists resource-constrained environments in meeting basic learning needs more equitably, while supporting the adoption of digital skills. This may be bene cial to communities facing skilled teacher shortages, or low access to education due to health crises or other barriers. Its ability to work without connectivity prevents the programme contributing to the growing digital divide

WHAT IS ENUMA SCHOOL?

With content covering early childhood education through to Grade 2 (appropriate for 4 to 9 year olds), the Enuma School digital application, developed by Enuma, Inc, a leader in developing digital early-learning solutions, offers hundreds of activities: games, book

and videos that support young children to learn literacy, mathematics and English a additional language. The activities are organized into learning paths that follow a tig scaffolded curriculum, with placement tests, check-ins and review units that provide ch with additional support when needed or help children jump to more challenging cont when appropriate. This allows the application to individualize learning for each student, the aim of better meeting their educational needs.

In addition to enabling individualized learning, Enuma School is also an independent lear tool that children can, for the most part, use themselves without requiring constant direction and support. The application is designed in a thoughtful child-focused and cl friendly way, drawing on the principles of the Universal Design for Learning (UDL) frame 'to improve and optimize teaching and learning for all people based on scienti c insights how humans learn' (CAST, n.d.). It aims to ensure that all learners, including those with s learning needs, are con dent and empowered when using Enuma School. Allowing child to learn independently is not only bene cial in terms of developing a love of learning, also helps address operational challenges where there is a shortage of quali ed teacher support children's learning, whether generally or in a speci c subject.

Enuma School can be accessed on a mobile phone or a tablet device. Once install the application does not require internet access to function. However, when there is int access, data can be synchronized with the Enuma School Learning Management Sy (LMS) so educators can track programme and learning progress. The ability to func without the internet makes Enuma School particularly useful in low-resourced areas, often have low-connectivity.

SEKOLAH ENUMA INDONESIA

Prior to the COVID-19 pandemic, Enuma was continuing its efforts to develop applicat that young children could use independently in literacy and numeracy learning. In 2019 Kikit™ School application was co-winner of the Global Learning XPRIZE competition. 15-month randomized control trial conducted in Tanzania, Kitkit School was found to h produced the highest learning gains for children's basic literacy and numeracy in Swa involving those in rural and low-resourced communities and including children who were of school or previously illiterate (XPRIZE, 2019).

In 2020, The HEAD Foundation, PT Gunung Madu Plantations (GMP) and PT Pemuka Manisindah (PSMI) provided a grant to Enuma to further develop Kitkit School for us Indonesia: Sekolah Enuma Indonesia. GMP and PSMI communities were keen to hav tool to support children's learning in mathematics and English, in particular, as they fac

shortage of quali ed teachers for those subjects. The HEAD Foundation was also concerne with the lack of quality learning resources and teachers in the region.

As the grant was being nalized, the COVID-19 pandemic made the development of a tool to support young children's ability to learn continuously more urgent, as communitie navigated school closures. A particular gap was for young children, as most online and digital learning opportunities were geared towards older students and Zoom classes for young children often required more supervision and support, as well as connectivity. A independent tool for young children would be particularly helpful.

With support from The HEAD Foundation, GMP and PSMI, and leveraging its experience i developing applications to help children learn in more than 20 countries, including through Kitkit School, Enuma completed development of Sekolah Enuma Indonesia in Decembe 2020. By January 2021, the application was being used by 586 children in Indonesia: 130 kindergarten to Grade 3 children from the Deli Serdang community, Medan, Indonesia, and 456 children in Grade 1 and Grade 2 from three schools located in plantation communities in Lampung, Indonesia.

In Medan, the initiative was implemented as an extracurricular programme organized by Yayasan Fondasi Hidup (Food for the Hungry, Indonesia), where groups of between seve and 16 children would gather at community sites for 60–90 minutes ve days a week to play with Sekolah Enuma. Children had been out of school for over nine months at the tim of implementation and had little access to other learning opportunities. Each child played, o average, 41 hours of Sekolah Enuma over a three-month period.

In Lampung, while the programme was initially to be implemented as a 30-minute class durin school hours in three schools, COVID-19 related school closures meant that the programm was implemented in hour-long sessions in community halls and as an at-home programm during a more severe community shutdown. Each child in Lampung played an average of 3 hours of Sekolah Enuma over three months.

A rotating schedule of group sessions in both Medan and Lampung allowed devices to be shared by multiple children, with one child playing with one device in each session. Facilitato and teachers helped support children when they gathered at community sites to play wit Sekolah Enuma, or to distribute devices for the at-home programme, for which children too a device home and could access the application anytime their families allowed.

OBSERVATIONS

Exhibiting learning ef cacy

Students took pre- and post-tests during the three-month beta-testing period. The test of Sekolah Enuma, were administered digitally through the application. The Indonesian mathematics tests were developed based on the Early Grade Reading Assessment (E and Early Grade Math Assessment (EGMA), while the English test was developed base Sekolah Enuma's English curriculum. In both Lampung and Medan, average post-test s increased from pre-test scores. The average percentage of correct answers for Lam students increased from 73 per cent to 78 per cent in literacy, 53 per cent to 59 per cen mathematics, and 44 per cent to 55 per cent in English. In Medan, the average increa from 47 per cent to 53 per cent in literacy, 41 per cent to 53 per cent in mathematics, and per cent to 29 per cent in English.[2] While future opportunities for more rigorous evaluation of learning results, such as through a randomized controlled trial (RCT), would be bene these initial results are an encouraging testimony to the programme's learning ef cacy.

Raising empowered learners

Thoughtful design considerations created a child-directed application, which learners able to use without much, if any, intervention from facilitators during play. By applying Uni Design for Learning principles to its design, children are given multiple ways of approac or understanding the learning content; for example, through auditory and visual cues, as as through a tightly scaffolded curriculum that allows children to move along an appropr learning pathway at a pace that suits them.[3] When interviewed about the project, Nanik Ernawati, the head teacher of three GMP schools involved in the programme noted, Sekolah Enuma programme has succeeded in helping reduce children's boredom … children can be independent and identify problems without guidance' (Enuma, 2021a). application provides little direct instruction, and instead relies on quality game design to a learning experience that children explore independently. Through positive feedback ongoing encouragement from the games and the learning system, Enuma School ai empower children to be con dent and independent learners.

2. Tests include timed sections that observe how many questions children can answer within a period of time. Thus, it is not realistically expected that children would attain 100% in correct answers on the tests.

3. For more information about Enuma's game design, please refer to the Kitkit School, Learning, Design & Curricular Framew Available here

Supporting innovative learning models

Stakeholders note the exibility of the programme in supporting learning for children regardless of their grade level or location. Children in both Medan and Lampung were able to participate in the programme at scheduled times irrespective of their grade or learning level, resulting in mixed learning groups. The programme has been implemente at community centres (akin to school settings), extra-curricular environments, and in hom 'Enuma's model is suitable for various learning environments. Therefore, we believe that model can be applied on a larger scale and used by children from various contexts and regions in Indonesia', said Lim Poh Ching, Operation Director, PT Gunung Madu Plantatio (Enuma, 2021a). Future visions of education may require such exibility, whether instigate by natural or human-made circumstances, but ultimately needing expanded ways of thinkin about where and how children can formally learn.

Increasing equity

'During the pandemic, we are increasingly seeing the importance of having access to good digital-based education. Once installed, Sekolah Enuma can be played without an interne connection. So, the children can still learn, even in areas where it is hard to obtain an intern connection. That is why we rmly believe that the Sekolah Enuma model is a good and creative approach and can make a good breakthrough for children's education in Indonesia,' commented Effendy Aritonang, National Director, Yayasan Fondasi Hidup (Enuma, 2021a)

Reliance on online digital programmes during school closures has contributed to increasin inequity during the pandemic. In addition to a barrier to accessing devices, both globally and locally, divisions have widened between those with access to stable connectivity as well as those with access to the requisite hardware and devices. With access to more affordable devices increasing globally, and governments and industry increasingly committed to improving connectivity, the hope is that these challenges will dissipate. T Sekolah Enuma programme so far has bene ted from donor support to purchase devices and aims to overcome one barrier by not requiring a stable internet connection to function This ability to reduce inequities while promoting access to education and digital education has helped galvanize support for the programme from a collaboration between Lazismu Muhammadiyah and 'Asyiyah, who will be using the Sekolah Enuma programme in Java 'Our concern as a philanthropic organization is how teachers and students from remote areas and isolated regions can bene t from the new technology of learning without being burdened by, among other things, the internet connection,' said Professor Hilman Latief, Ch of Lazismu (Vachatimanont, 2021).

Digital skills for young children

In addition to its of ine capabilities, Professor Hilman Latief also highlighted the applicat potential for supporting digital skills. ‘We do hope that our collaborative programme, cal EduTabMu and Sekolah Enuma, can enrich teachers’ learning perspectives and meth as well as accelerate students’ engagement in new technology and interactive learn processes in such subjects as mathematics, English, and the cultural diversity of Ind This collaboration is a strategic step to familiarize digital technology for our generation promote what I would call an “inclusive learning acceleration project,”’ (Vachatimanont, 20

With content appropriate for young learners, the digital programme also provides opportunity to expose children to digital programmes at an early age. It teaches them to tap, drag and trace on a touchscreen surface, and how to use a calculator, and provi an opportunity for them to navigate a digital programme independently and con dent ‘Today’s children are digital natives. Enuma School not only teaches basic mathema Bahasa Indonesia and English, but also digital literacy,’ observed Chrisman Bintaro, Reg Team Leader, North Sumatra, Yayasan Fondasi Hidup (Enuma, 2021a).

LOOKING TO THE FUTURE

Following Lampung and Medan, improvements were made to the Sekolah Enuma Indon application. The project is scaling up, with plans for more than 2,000 students fr kindergarten to Grade 2 across Java to use the programme. This and future projects provide more opportunity to test and showcase the impact of using the programme with communities, schools and students.

In Indonesia, Enuma is working with partners to secure more funding and further impl the programme, as well as to conduct more research. Globally, it hopes to have opportunity to develop Enuma School into more languages, so that it can be availabl children in other countries. To do so, funds and support need to be available for localiza into local languages and ongoing adoption. This is particularly important for localization ensure further divides are not created by making content available only in a few glob dominant languages. Aside from increasing the availability of programmes in relevant l languages, educators and education systems could be increasingly supported to integ digital learning, particularly independent learning tools, into their systems.

A child-directed application can support basic education and digital literacy and help bu con dent and empowered learners to engage further in twenty- rst century learning. of ine and application-based programme such as Sekolah Enuma can also integrate ex

into new learning environments or models, as schools of the future continue to evolve improve or as they face various challenges to educational delivery. As Dr Ella Yulaelawa Curriculum Developer and Advisor to Sekolah Enuma Indonesia and former Director, Minis of Education and Culture (2006–2018) noted with regards to Sekolah Enuma: 'I hope that all Indonesian children are capable of reaching their full potential when given the proper digital technologies and learning experiences towards building twenty- rst century lifelon learners' (Enuma, 2021b).

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Chapter 6. LIBERIA AND SIERRA LEONE

Rising on Air radio education

Keya Lamba, Natasha Japanwala and Felicity Burgess

ABSTRACT

During the COVID-19 pandemic, Rising Academy Network, a school network in Sierra Leone, Liberia and Ghana serving 50,000 students in more than 160 schools, developed a solution for distance learning by radio to support children without access to the interne and no access to education. It was called Rising on Air and it has since been offered to 26 countries, through 35 partners, in 12 languages, and has reached more than 12 million children. This case study discusses the use of proven high-quality content, repurposed multiple mediums of technology, to reach children in low-resource settings and suppo foundational literacy and numeracy skills without in-person teaching. In addition, the nex phase of two-way communication technology is highlighted as a potential path forward beyond the pandemic.

KEYWORDS

Blended learning, teaching at the right level, teacher professional development, rura education, individualized learning, national developed e-learning platforms, school community partnerships/school community relations.

BIG IDEAS

This case study shows that a lean organization can create an innovative intervention using high-quality content, and work with partners around the world to reach millions of children, through multiple mediums of technology in low-resource settings to support foundational numeracy and literacy skills without in-person teaching.

INTRODUCTION

Rising Academy Network is a school network in Sierra Leone, Liberia and Ghana with th mission to create schools that open doors and change lives. Founded in Sierra Leone in 201 Rising provided emergency education to children kept out of school by the Ebola epidemi before opening its rst school in April 2015. In Sierra Leone, Rising innovates through schoo it owns and operates on a low-cost private school model. It then shares the lessons and wo

with the government and other partners. In Liberia, Rising is in a public-private partne with the government, providing high-quality structured curriculum content, intensive te coaching and rapid feedback loops to their partner schools. Before the coronavirus epide they were serving 50,000 students in more than 160 schools.

THE INNOVATION

Rising on Air (ROA) shows how one lean organization can create an innovative interve during a pandemic and work with partners around the world to ensure its lasting imp What was originally designed as a short-term solution for Rising's own students in S Leone and Liberia went on to reach over 12 million children in 26 countries during pandemic, and was named by Finland's HundrED, a not-for-pro t organization that sha examples of innovative practice in education, as one of the top 100 education innovati 'changing the face of global education in 2021'. ROA also received the 2021 literacy awar from the Education Alliance.

Rising responded to the closure of schools in March 2020 by adapting their curricul content to create a radio programme to strengthen students' foundational skills, even they were out of school. The theory of change was that students who participated in the on Air programme would stay connected to school, practise foundational numeracy a literacy skills, and receive important health messages during their time out of school.

Rising on Air is a 20-week programme of free, ready-to-air radio scripts and SMS te messaging content made available to partner organizations around the world. T programme leverages Rising's high-quality structured curriculum content, re-designe delivery via existing, widely available technologies: radio, phone and SMS. The Rising Air content covers literacy, language, arts and numeracy at ve different levels across K from early childhood education to senior secondary school, with complementary con supporting teachers' professional development and safeguarding and health messages

The solution also builds on key lessons learned from the Ebola epidemic: the importar deploying a solution quickly to keep children anchored in the education system; the valu being able to access high-quality, engaging content rather than trying to start from scr and the need to weave health and safeguarding messages into the approach. Interwo throughout the content are messages designed to help keep children safe from COVI and also from the broader array of heightened safeguarding risks they will be expose while out of school.

Because the ministries of education in both countries had been through school closures on before during the Ebola epidemic, they were both able to get the radio school infrastructure up and running quickly. Rising had written and recorded the rst radio lesson within one wee of schools closing and aired it on national radio within two weeks of school closure.

RISING ON AIR ADDRESSED SEVERAL PROBLEMS

- Providing education to students in remote rural areas who do not have access to the internet. This is the rst and most urgent problem. For most children in Sierra Leone a Liberia, low internet penetration and weak infrastructure make online learning neither realistic nor an equitable solution. In Sierra Leone, for example, 81 percent of interne users are in urban areas, and 67 percent are men (BBC Media Action, 2016). By contrast, access to radio and phones is better distributed, with a 51/49 men-to-women ratio, and a 62/38 rural-to-urban ratio (BBC Media Action, 2016). In both countries, only one in eight people have access to the internet (BBC Media Action, 2016). Without an alternative mode of distance learning that leverages existing widely available technology a huge number of students would have been left behind during the COVID-19 crisis.

- Lack of learning resources at home. Most children in Sierra Leone and Liberia do no have access to any learning materials at home, digital or physical. In addition, in many households, adults cannot support their children in their at-home learning. There was great risk that, during the COVID-19 pandemic, students would become completely disconnected from school and that drop-out rates would increase once schools reopened

- Supporting teacher development during the crisis. Students were not the only group wh were disconnected from school during this time. A critical issue was how to grow and support teachers in their own professional development, especially as the medium of rad does not allow for much teacher-student interaction.

IMPLEMENTATION

One of the most incredible parts of Rising on Air was the education community that was bu during the pandemic: Collaborators on Air. Rising built a community of global partners to deliver the radio lessons to children in more than 20 different countries. Rising knew from t onset that their intention was to share these radio scripts widely so other organizations cou adapt and use them locally. This required the Rising curriculum team to create ‘standardize lesson scripts – keeping the lessons as generic as possible while highlighting what mig need to be contextualized for partner organizations. A new website was created to house

these lesson scripts and some sample audio recordings so that partner organizations download and use them. In addition, Rising created a Slack[4] platform for all of their partner organizations to collaborate and share tips, recordings and feedback about the radio less

The Rising on Air programme is very adaptable and has been used in a range of way partner organizations. Part of the reason partners have been able to adapt Rising conte quickly is because Rising had to formalize the lessons and structures early on to shar with other providers who wanted to translate them. Rising provides an overview and stru of the lessons for each grade level and subject area so partner organizations can qui understand the components of each lesson and choose which they want to use. The l frameworks were created in a consistent way with color-coded highlighting for timing contextualization to make it quick and easy for partners to adapt.

A partner organization in Pakistan was able to download, edit and translate the rst ra lesson within two days. Partner organizations have noted that the numeracy lessons are to translate than the literacy lessons because foundational phonics is hard to translat other languages.

The use of the lessons has been extremely diverse. Some partner organizations have us lessons as-is and directly translated them (particularly for numeracy lessons). Other p organizations used the content of the lessons but changed the medium of instruction radio to WhatsApp voice messages or interactive voice response messages. Organizatio other sectors used the structure and approach to develop their own content, such as my which provided radio lessons aimed at 400,000 farmers in Senegal and Mali. Rising worl with the EdTech Hub to create a how-to guide for partner organizations that suggests practice for delivering engaging radio content, from recording to evaluating materials.

THE EVOLUTION OF RISING ON AIR AS A LASTING SOLUTION BEYOND THE PANDEMIC

The Rising on Air initiative has grown enormously in the last year and has reached ov million children during the pandemic. It is important to note that this is not just a pand speci c intervention, but a lasting solution that can be used to reach the most margina children around the globe. In March 2020, the Rising on Air student radio lessons w aired in English and by May 2020 they were also available in French and Arabic. T summer of 2020 focused on developing professional development sessions for teacher radio. As mentioned above, teachers needed a connection to their school and developn opportunities as well.

4. Slack is a messaging app for business that connects people to the information they need.

The Rising on Air lessons have evolved from just being aired on the radio. They have be made available in a podcast format, easily downloadable and played on demand from most mobile devices. As the pandemic went on, it became clear that ROA lessons could b used well beyond their original intended purpose.

Although ROA was created for the COVID-19 crisis, the team realized the content could be leveraged for students who are kept out of school due to other crises as well. Rising partner with organizations such as the Norwegian Refugee Council in the Kakuma camp to suppo refugee students in Kenya. This was also the driving force behind the Arabic translation of lessons. They could then be used with students in the Middle East who had missed years school due to con ict in the region in informal learning environments.

LOOKING TOWARDS THE FUTURE

The most recent exciting development from ROA is Rising on Air Interactive (Rori), a chat tutor that is powered by arti cial intelligence (AI) and delivered via SMS and WhatsApp. Rising won R&D Funding as part of the Schmidt Futures/Citadel Tools Competition and mo recently won the Grand Innovation Prize at the Jacobs Foundation/MIT Solve competition Rori will pull text and audio from the Rising on Air content library, individualized to each students' needs. Over time, Rising will gather data on student learning in order to creat a machine learning-powered recommendation engine to provide students with the conten most relevant to their learning needs. Because it is delivered through highly accessib technologies, such as SMS and WhatsApp, Rori has an incredible potential to reach million of students globally.

Who is Rori? Rori is a chatbot tutor, powered by AI, with an overview of a unique library of structured curriculum content, including 500 hours of 'Rising on Air' audio content. Initial Rori will deliver maths content for upper-primary and lower-secondary students in Englis In the future, Rori will be expanded to cover additional grades, multiple languages and additional subjects.

How is Rori delivered? Rori can be delivered via SMS or Whatsapp/Messenger so that all students can access it regardless of the phone type.

When is Rori delivered? In the form of 15–20 minutes of personalized tutoring, after school, everyday. In the unfortunate situations when students cannot be at school, Rori enable learning to continue in a personalized way, signi cantly improving on current distance learning opportunities.

Rigorously evaluated and delivering results. Independent studies have shown that Rising's curriculum works. Research by the University of Oxford (Sierra Leone) a Centre for Global Development (Liberia) showed that students in Rising schools typ learn 2.4x faster than their peers in comparable schools (University of Oxford, 2019).

Audio content. A unique feature of Rori is that it can deliver audio clips personalized to the learning needs of each individual student to aid learning. For users struggling with literacy, audio is a more powerful way to teach concepts in a way they will grasp.

What is a chatbot? A chatbot is an AI software that can simulate a conversation with a user in a natural language style.

How does it work for learning? Rori is able to ask students questions and understand student answers to assess the learning level of each individual student. It can then autom adapt its questions to nd the right level of dif culty for the learner. By using unique IDs chatbot can recognize the student every time they engage with the bot, supporting t through the learning content over time.

Rori can help millions of students reach their potential. Rori will launch starting with t schools that Rising owns and operates in Ghana. Next, it plans to expand to its scho Sierra Leone and Liberia and other school networks in Ghana. Finally, it aims to open R as a global, multilingual product for others to utilize.

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MORE READING

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- One year later report (Mar 2021)
- R eport by the OECD, the World Bank, HundrED, and the Harvard Graduate School Education (May 2020)
- Economist Article featuring Rising (Jan 2020)

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Chapter 7. GUANAJUATO, MEXICO

Instructional guides for learning at home

Secretaría de Educación de Guanajuato [5]

ABSTRACT

With the advent of the COVID-19 pandemic, cities, states and countries around the w were forced to close schools. Guanajuato, a state in central Mexico, was no excepti On March 17, 2020 classes were suspended in the state. Education provision mov quickly towards a distance teaching-learning model. One of the initiatives undertaken b Secretaría de Educación de Guanajuato (SEG), the Educational Adaptation Study (E that involved the production of guidelines for decision-making and implementation, aim helping to ensure continuity of education during the pandemic. This chapter describes of the innovations that SEG implemented: the design of a set of instructional guides for study, both in print and interactive, aimed at all students with internet access and a n device or computer .

KEYWORDS

Guides for learning at home, technology, adaptation, education.

BIG IDEAS

This chapter describes the creation of interactive home-study guides, containing basic learning required at different education levels in Mexico, used by teachers and students with access to information and communication technologies during the pandemic.

BACKGROUND

Writing in the early months of the pandemic, Reimers and Schleicher (2020) encoura leaders of educational systems and organizations to ‘develop plans to continue with educational services through alternative or modalities during the necessary period of s isolation’. On this basis, the state of Guanajuato implemented its School at Home stra

5. Secretaría de Educación de Guanajuato. Dirección General de Evaluación Educativa, Guanajuato, México. email: lortega@seg.guanajuato.gob.mx

developing comprehensive guides for home study, a selection of educational programme through the local television channel (TV4), and a platform with educational content for a levels of compulsory education.

Following work undertaken by a technical-pedagogical team and state teachers, the comprehensive guides for home study were prepared and disseminated, both in print for tho without internet access and, subsequently, as an interactive option, available electronicall so that students could learn virtually through an online educational platform.

The decision to develop comprehensive guides in digital format with interactive content aros partly from the results of the Educational Adaptation Study (EAS).[6] The EAS was carried out using mixed methodology (quantitative and qualitative), with information-gathering instruments, such as questionnaires, deployed alongside conversations with teache principals, heads of sector and supervisors (in the case of basic levels of education).

Although attempts to incorporate technologies into teaching and learning are not new, th pandemic has accelerated these changes. In recent decades, information and communicatio technologies have advanced rapidly. There have also been efforts – some more successf than others – to integrate them into pedagogical thinking and to generate an initial theoretica framework.

Víctor Amar argues that education through digital media should not only focus on understanding and pro ciency, but also must be 'an action organized pedagogically and didactically with the aim of developing criteria for their enjoyment and learning' (Amar, 2010, p. 120). In this context, the comprehensive guides are pedagogically designed, with relevan content, for the particular educational level and grade of the student, while also seeking to ensure that their learning is linked to the context in which they develop, under a situat learning approach. This approach, according to Hernández and Díaz (2015), is 'a cognitive and behavioral process that allows a subject to apprehend the reality of their environment t attend to it epistemologically and af rm again in the reality of applied knowledge'.

The use of information and communication technologies (TIC) in teaching must, howeve contribute to the knowledge of students for this to happen. It must be understood that learni is not an isolated process but 'occurs within diffuse environments of changing central eleme which they are not necessarily under the control of the individual' (Keller, at Cueva et al, 201 p. 208). This implies that learning is in uenced by the environment in which it takes place. this sense, the situation of the pandemic created a complex and challenging environment f the use of TIC in the educational process.

6. The results are available here

DESCRIPTION OF THE INITIATIVE

The materials were prepared on the basis of a selection of essential learning, contained model, Curricular Speci cation of Elementary and Junior High (CONCUPRISE, as it is ca in Spanish), and organized into weekly projects, the daily activities of which integrated, transversal way, the contents and learning purposes of various subjects or areas arou articulating subject, as well as situating it in a local context.

It was decided to create a self-administered resource the activities of which could, depen on the maturity level of the child or adolescent, be developed by students with a cer degree of autonomy and, in the case of the youngest, with the support of their families material incorporated content on topics relevant to the student's immediate or every environment, with a view to creating simple, creative and playful activities.

CONCUPRISE speci es the essential basic contents in each academic subject in eleme and junior high education. It supports the acquisition of knowledge, skills, values and atti based on the current study plan and programmes of the Secretaría de Educación Pú (SEP). The model includes the main areas of: language and communication, mathem reasoning, life in society, and the natural sciences. These areas comprise the follo subjects:

- Language and communication
- Mathematical thinking
- Exploration and understanding of the natural and social world
- Critical thinking and problem solving
- Socio-emotional skills and life project
- Collaboration and teamwork
- Citizen coexistence
- Appreciation and artistic expression
- Attention to the body and health
- Caring for the environment
- Digital skills

Further data from the EAS made in Guanjuato suggest that, at the basic levels of educ 29% of students have computer equipment for the development of their school activities 39% have internet access at home (based on estimates by teachers). For its part, the Na Institute of Statistics and Geography (INEGI, 2020) reports that 48.2% of household Guanajuato have internet access.

Furthermore, teachers in conversation said that the use of digital platforms was more ef cie since it enabled them to administer and manage their own content according to their progres and that of their students, creating an opportunity for a successful interface the suppo students' learning.

The main features of the interactive guides are as follows:

- The platform interface allows students to have an engaging and interactive environment.
- The teacher can evaluate and provide feedback on the activities carried out by their students on the platform.
- The platform is enabled for use every day of the week and without time restrictions.
- Students work through tasks either by project or by work day, ensuring students are n overwhelmed with activities.
- The guides are designed by technical-pedagogical advisers, re ecting teaching-learning strategies adjusted to the respective grade and level of the student.

HOW WERE THE INTERACTIVE HOME STUDY GUIDES GENERATED?

Teachers using different educational platforms on their own initiative during the con neme period were identi ed. Some of them subsequently participated in a focus group for the design, piloting and implementation of the interactive version of the comprehensive guide for home study.

A prototype guide was designed and presented to the focus group, comprised of approximately 10 teachers from different state municipalities, which evaluated the prototyp and identi ed areas for improvement. The discussion with teachers identi ed a number of ke areas to consider in the design of the guides, including:

- Easy instructions for students and teachers to learn how to use the guides.
- An engaging interface for students.
- The possibility for teachers to upload their own materials to the platform.
- Incorporation of virtual student-teacher contact.

Once the improvements had been made, the guides for the levels of basic education wer designed and the initiative was launched through the SEG FormaT (Moodle) educationa platform. The aim was to provide a tool for students, teachers, administrators and paren with the basic elements of interaction necessary to facilitate the coordination of the at-hom educational process and to support student learning.

The resource was presented at a special webinar[7] with teachers from all over the state and with the support of local TV, demonstrating how the comprehensive guides worked, as w the process of making use of this tool, helping ensure wide acceptance within the educ community.

Currently, the following guides are in operation on the platform:

- One comprehensive home study guide for preschool education.
- Five comprehensive home study guides that cover the six elementary grades.
- Three comprehensive home study guides corresponding to the three grades of junior high s

One of the features supporting the use of these guides is that both teachers and stu have an institutional email provided by the Secretaría de Educación de Guanajuato, wh facilitates their controlled access to both the platform and the guide corresponding to level and grade of the student.

To access this technological resource, initially an interested teacher makes a request th a form, supplying information such as the regional delegation[8], school, password, and the educational level and subject. At the end of registration, teachers automatically receiv email with the registration key for the requested group, which they share with students se by the teacher to use the platform.

RESULTS OF THE INITIATIVE

As mentioned above, the interactive home study guides were based on the printed gu which were deposited in a SEG web repository called 'School at home'[9], for use and electronic distribution. The printed version of the guides had a circulation of 969,546 co between April and December 2020, while the electronic version had a total of 330,00 downloads over the same period.

The interactive guides uploaded on the FormaT platform have had the following use sin launch, up to June 4, 2021. There are 45,821 registered students of the different educati levels, distributed as described in Table 1.

7. See

8. The regional delegations are administrative units of the Secretaría de Educación de Guanajuato, which are given resource authority to attend to educational needs in the municipalities of Guanajuato

9. Available here

Table 1. Students registered for the interactive guides, 2020–2021 school year.

Level	Grade	Enrolled Students
Preschool	1, 2 & 3	3,412
Elementary school	1 & 2	3,265
	3	3,511
	4	2,249
	5	1,826
	6	1,742
Junior high school	1	9,855
	2	9,577
	3	10,384

Source: Elaborated by author.

Although the pandemic is not yet over, experts agree that some of the innovations introduc in response to it are here to stay. One of them is the greater use and appreciation o technologies in education systems. The comprehensive home study guides seek to exp and support this appreciation and use of technology in education; however, there are sti borders to institutionalizing its application, one of them being access to the internet an mobile devices for educational purposes.

A brief survey was conducted with the teachers who used the interactive guide with the students. Preliminary results include:

- 52% agreed that the platform was user-friendly when it came to registering their students.
- 66% agreed that the platform was user-friendly in terms of making the contents an activities of each module understandable.
- 57% agreed that it was easy to view the content on the platform.
- 57% agreed that it was easy to add additional information about their planning to the platform.
- 52% agreed that the platform made it easy to give feedback to students, while 14 per cen disagreed.

Locally, the use of these comprehensive guides for home study represented an innovation terms of curriculum model and the prioritization of student learning. A further leap in innovati occurred when the guides were made available on a digital platform for teachers and students with access to technological resources and the internet, thus diversifying contin strategies for teaching and learning and ensuring that, in the long term, the adoption of th tool is permanent.

The crisis caused by COVID-19 in education should be seen not as a catastrophe but as an opportunity for innovation, creativity and the reconstruction of the way we learn and teach.

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Chapter 8. MEXICO

Schools as community learning centres

Gustavo Rojas

ABSTRACT

The COVID-19 pandemic has severely disrupted education systems in developing countrie leading to what UNESCO considers a generational catastrophe. Prolonged school closures have widened the learning gap that already affected regions such as Latin America befor the pandemic. Given pre-existing incapacities to provide quality face-to-face instruction countries need to think beyond merely returning to school to address this learning crisis. T chapter explains why and how the use of community learning centres (CLCs) as part of a lov intensity return to schools in Mexico can support new thinking about the renewal of face-to face instruction. By balancing academic and socio-emotional learning, personalizing studen support, and providing increased space for teachers and families to participate in schoo governance, CLCs in Sinaloa, a state in Northwestern Mexico, offer a valuable reference for local and national education systems seeking to build back better after this pandemic.

KEYWORDS

Face-to-face instruction, personalization, tutoring, academic and socio-emotional learning shared decision-making.

O BIG IDEAS

Reopening schools is essential to protect the right to education for all students. As education systems resume face-to-face instruction following the COVID-19 pandemic, there is a unique opportunity to reimagine how face-to-face schooling can support students' academic and socio-emotional learning needs.

A MAJOR EDUCATIONAL CRISIS

With more than 236,000 deaths (Our World in Data, 2021), COVID-19 has confronted Mexico with a dramatic scenario. In response, all schools in the country have been close since 23 March 2020. During this time, Mexico has implemented remote education strategies drawing on television-based instruction and other complementary components (Ripani & Zucchetti, 2020). However, due to signi cant structural inequities, present in Mexico, as we as in other Latin American countries, (UNESCO, 2021) many learners have not been able t access any form of remote education.

The negative consequences of prolonged school closure are worrying. According to d from a recent eld study conducted by Mexicanos Primero and the MIA project nine o of 10 students in Mexico believe something bad will happen to their families; seven ou 10 indicate that they feel afraid; and nine out of 10 households say they have lost a fa member due to COVID-19 (Mexicanos Primero, 2021). Moreover, in terms of academ learning, the study showed that 61.6 per cent of students aged between 10 and 15 do understand a fourth-grade text, and 88.2 per cent of students in that same group ca solve a third-grade maths problem. Finally, although the Ministry of Education (Secretar Educación Publica, SEP) has not provided of cial information, Mexico's National Institut Statistics and Geography (Instituto Nacional de Estadística y Geografía, INEGI) estim that about 5.2 million people between 3 and 29 years old did not enroll in the 2020/21 academic year due to the impact of COVID-19 on their family and nancial circumstanc (INEGI, 2021). This corresponds to 17 per cent of Mexico's K–12 (kindergarten to Grad 12) public and private school enrollment.

These data highlight the magnitude of the educational crisis faced by many countries in America and demonstrate the urgency of resuming face-to-face instruction. However, t effects should not be attributed entirely to the pandemic. On the contrary, this evidence i indicative of a pre-existing incapacity to deliver high-quality education to all learners. T this data should also persuade education systems in Latin America to renew and improv face-to-face instruction. The following sections in this chapter provide an exploration of Sinaloa's strategy to resume school-based education after a prolonged period of rem education can also support new thinking for pedagogical innovation. All the informat contained in the following pages comes from the author's direct experience with CLCs w researching this strategy's rst implementation stage.

SCHOOLS AS COMMUNITY LEARNING CENTRES

Face-to-face instruction became feasible again in Mexican schools on 8 December 202 when former Secretary of Public Education, Esteban Moctezuma, announced that sch could voluntarily decide to operate as CLCs (SEP, 2020). According to federal guidelin CLCs can receive no more than nine students per classroom, for a maximum of two ho day. Students are grouped so that each day or week, depending on the school's decis different students can attend. CLCs can only function when the state's pandemic traf c monitoring system is at green or yellow. Health protocols such as mandatory use of masks, social distancing, and entrance and exit routines need to be observed by stu and teachers, with support from parents and the wider community. In addition, CLCs ne prioritize providing personalized academic and socio-emotional learning support to stude The Secretariat of Public Education and Culture (Secretaria de Educación Pública y Cu

SEPyC) of the state of Sinaloa was among the rst, and one of the few, local authorities t decide to implement this strategy. Its goal was to support students who had had little to n contact with their teachers during the remote education phase. During February and Marc 2021, SEPyC deployed outreach strategies to contact disengaged students and created guidelines and training materials to inform schools how to function as CLCs. This led to 2 April, the day on which 623 schools opened their doors as community learning centres Almost two months later, close to 900 CLCs were operating in Sinaloa, supporting almos 26,000 learners. The following analysis of this narrow implementation window highlights some relevant lessons and implications.

DECISION-MAKING

Federal government guidelines clearly stated that opening a CLC was a voluntary decisio for each community. But there was no guidance as to how school communities shoul approach the decision-making process. In response, SEPyC asked all school principals t discuss the options during the School Technical Council (Consejo Tecnico Escolar, CTE) recurrent meeting teachers and principals hold on the last Friday of each month. To orient t discussion, SEPyC sent all principals a report (APA Report) containing data about the scho virtual attendance and personalized information about students with whom there had bee little to no communication. While some schools arrived at the nal decision solely based on the school principal's choice, others allowed teachers to vote and offer their opinions, whil some schools included families and caregivers in the decision-making process.

Giving school communities the responsibility to decide was an effective way to neutralize th resistance of teachers' to resuming face-to-face instruction. But this transfer of responsib also limited SEPyC's capacity to secure the availability of more CLCs; this is relevant since 26,000 learners attending CLCs represent a low percentage of the state's student populatio in Sinaloa, with more than 844,000 students in K–12 schools.

To understand why 85 per cent of all K–12 private and public schools in Sinaloa decided to remain closed is beyond the scope of this chapter. However, in those functioning CLC the main factor behind the decision to re-open the school was the awareness that principa and teachers had about their student's need for face-to-face instruction, which in all case was communicated directly to families by teachers and principals. This success might of interesting implications when thinking about how to persuade more schools to start operati as CLCs.

ACADEMIC AND SOCIO-EMOTIONAL PROVISION

A second lesson emerged from the pedagogical challenges associated with deliver face-to-face academic and socio-emotional instruction to students. In all cases, CLCs operating with much smaller class sizes and reduced instruction time relative to pre-pan levels. While this created challenges associated with the prioritization of learning goa also provided opportunities for more personalized interactions that were not availa before CLCs.

The SEPyC developed a prioritized version of the national curriculum, creating mate and guidelines to help teachers assess achievement against these prioritized learning g and providing online training sessions and digital resources focused on socio-emoti learning. However, teachers' engagement with these materials has been mixed; for inst according to school principals, most teachers use only experiential and anecdotal inform to assess their students' needs and, as a consequence, more structured formative asse frameworks or instruments are ignored.

Finally, relevant pedagogical considerations arose from the complexities borne fr supporting students who, in many cases, arrive at school from dif cult family circumsta facing social and emotional distress, and are highly disengaged from academic activ Neither CLCs nor regular public schools in Mexico have access to psychological supp from specialized professionals, so the provision of socio-emotional support mainly dep on the teachers' capacity to implement the activities and strategies included in SEP materials. Interestingly, some CLCs have complemented these strategies with altern such as mentoring programmes in which teachers are personally responsible for coac small groups of students.

DISCUSSION

CLCs in Sinaloa offer valuable experiences for countries striving to nd ways to resume to-face instruction. Operating with a set of precise and clear guidelines and limitations, on out of almost 900 CLCs have had to close temporarily due to COVID-19 cases (Trejo, 20 But the most valuable lessons do not come from the health and safety protocols obse by CLCs. Instead, they emerge from the organizational and pedagogical implications resuming face-to-face instruction after almost one and a half years of remote education

Although recent national reforms have attempted progress towards more decentral education system governance (Granados & Dávila, 2018), public schools remain hig restricted by federal guidelines. Shifting this trajectory is seen to be necessary to im

the educational quality in schools. Shared decision-making (SDM), namely 'a formal syste for the representation of teachers in a decision-making body' (Weiss, 1992, p.1), has been introduced as a way to improve school performance, increase teacher professionalism and act as a symbol of democratic participation (Weiss, 1992). Complementary parental involvement in school decision-making is also part of a vast repertoire of parental engageme practices that offer several bene ts for children's learning (Redding, n.d.).

The current situation, brought about by the COVID-19 pandemic, has allowed teachers and learners to experience face-to-face instruction in a much more personal way. Personalizatio refers to teachers, students and families interacting in ways that 'scaffold each student's learn and enhance the student's personal competencies'. (Twyman & Redding, as cited by Murph et al., 2016). Some of the essential traits of personalized education strategies are: to focu on understanding the learner's preferences, interests, and aspirations; developing quali relationships that increase student engagement; and enhancing personal competencies (4). As evidenced by the lack of rigor in the learning assessment methods used by teache CLCs in Sinaloa are still far from displaying a well-developed version of personalized pedagogy. However, through partnerships with public or civic society organizations, there can be great opportunities for improvement. For instance, SEPyC could seek to partne with Mexico's National Council for Educational Promotion (Consejo Nacional de Fomento Educativo, CONAFE) which has had pioneering experiences with the Learning Communit Project (LCP), an educational change initiative focused on empowering students to mast new knowledge that they can then teach others through becoming tutors (Rincón-Gallard & Elmore, 2012).

Personalization and innovative approaches, such as student-centred tutoring, can be powerful vehicle for more effective academic and socio-emotional learning. A stronger focus on balancing academic and socio-emotional learning should not be considered a priority exclusively because of the pandemic's disruption; robust evidence suggests th increasing academic achievement requires nurturing school environments (Elias, 2003 Exploring frameworks such as the one provided by the Collaborative for Academic, Social and Emotional Learning (CASEL) can help schools to transform socio-emotional learning in a fundamental building block of face-to-face instruction.

Embracing this crisis as a renewal opportunity for school systems is essential for all count that want to help learners to recover from the effects of prolonged school closures. Accordin to data from the teaching and learning international survey (TALIS) 2018, eight out of 10 teachers in Mexico believe that their colleagues are open to change and innovation and seven out of 10 school principals see themselves as leaders capable of fostering collaboratio and innovation (OECD, 2020). Similarly, nine out of 10 Mexican students believe that they