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LEARNING

TO BUILD BACK BETTER FUTURES

FOR EDUCATION

Lessons from educational innovation
during the covid-19 pandemic



EDITORS

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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 levels, provision and learning environments, as well as the curriculum and pedagogical dimension to support learners and learning. With the advent of the COVID-19 pandemic, the inevitability of transforming education and education systems has become an urgent matter of global scale. Indeed, the pandemic has shined a harsh and worrisome light on the vulnerabilities, inequalities and pending challenges humanity and education systems face. Yet, this current crisis can also represent a golden opportunity for reimagining the role of education systems in contributing to shape our ways of life and transforming the world into more sustainable, democratic, inclusive and fair societies.

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

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

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



Mr Yao Ydo

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 laying the foundations for a sustainable, fair and inclusive future for the new generations. We need renewed visions, lens, paradigms, strategies and actions to orientate and lead us to envisage a better future, and crucially, to understand the complexity, multidimensionality and interconnectedness of worldwide issues that are common to all of us regardless of regions, countries, affiliations, contexts and circumstances. More than ever, we need to reaffirm our binding interdependence as a collective endeavour grounded on strengthening education as a global common good.

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

This book *Learning to Build Back Better Futures for Education: Lessons from educational innovations during the COVID-19 Pandemic* exemplifies the critical role played by the curriculum within any educational and societal debate and collective construction. The richness of the case studies illustrates how, through the appropriate structural and institutional mechanisms and the alignment, solidarity and cooperation between the educational community, emergency situations can represent an opportunity in order to co-construct more local, contextualized, meaningful, empathetic, human and community-centered curriculum(s).

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





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Fernando Reimers and Renato Opertti

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 in education that will help prepare students for the future, while addressing the impact of the 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 the Harvard Graduate School of Education in advancing knowledge on how to transform public education, the aspirations of the Hybrid Education, Learning and Assessment (HELA) initiative of the UNESCO International Bureau of Education (IBE) and the inspiring vision of UNESCO's Futures of Education initiative, we set out to identify and study examples of educational 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: unexpected jolts and accidents often lead to innovation (Austin, Devin and Sullivan, 2012). The pandemic was an unexpected event that compelled educators around the world to innovate in order to continue educating in a context in which it was not possible to meet in person in schools, and in a context in which students experienced a multitude of challenges. The shock created by the pandemic offered what University of Waterloo President Vivek Goel, referring to institutions 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: a 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, as well as to illustrate an approach to capturing the innovation dividend of the pandemic. Our hope is that this may help codify further innovation and, in so doing, animate the broad-scale innovation that, alongside societal commitment and collective leadership, is necessary to 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 other institutions, disrupting the lives of everyone, everywhere. The high risk of morbidity and mortality caused governments around the world to adopt measures such as social distancing that disrupted the normal functioning of all institutions requiring people to be in close physical contact with others.

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

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

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

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

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

An appropriate educational response to the pandemic involves addressing the losses caused by the disruption to schools, building preparedness to teach remotely and building back better (Reimers, 2021 b). Addressing the ongoing decline in educational opportunity is urgent. It would be misguided, however, to assume that there is a clear point in time when the disruption 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 with producing, financing and distributing vaccines and in getting populations to agree to be vaccinated. In the meantime, the virus mutates, creating new foci of infection which may require additional lockdowns. It is therefore essential to build greater resilience to future disruptions because, as has been noted in a recent report from an independent task force of the G20: 'Scaling up pandemic preparedness cannot wait until COVID-19 is over. The threat of future pandemics is already with us. The world faces the clear and present danger of more frequent and more lethal infectious disease outbreaks. The current pandemic was not a black swan event. Indeed, it may ultimately be seen as a dress rehearsal for the next pandemic, which could come at any time, in the next decade or even in the next year, and could be even 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 learning opportunity implies a troubling conservative bias, emphasizing the restoration of education systems as they functioned prior to the pandemic, and neglecting the fact that, for many children, they did not deliver very much. The response to the calamity in education caused by the pandemic needs to go beyond addressing the loss caused by the disruption to schools, and beyond increasing preparedness for future interruptions of face-to-face schooling. Crucially, it needs also to address pre-existing deficiencies of schools and education systems.

BUILDING BACK BETTER: THE FUTURES OF EDUCATION

In the context of the educational devastation caused by the pandemic, the United Nations has emphasized the concept of 'building back better', to strive not just to restore the conditions that preceded the pandemic, but also to foster greater inclusion and human flourishing. 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 crisis, a security crisis, and a human rights crisis. It has affected us as individuals, as families and as societies. The crisis has highlighted fragilities within and among nations. It is no exaggeration to suggest that our response will involve remaking and reimagining the very structures of societies and the ways in which countries cooperate for the common good. Coming out of this crisis will require a whole-of-society, whole-of-government and whole-of-the-world approach driven by compassion and solidarity (United Nations, 2020).

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

Contributing to global dialogue on the need for education reform, UNESCO launched its Commission on the Futures of Education in September 2019. Over the course of its 75-year history, UNESCO has asked three Commissions to develop a framework on the Futures of Education. The first, a seven-member independent international commission chaired by Edgar Faure, published its report in 1972, arguing that lifelong learning should become more critical as technological change transformed economies and societies. The second, a fifteen-member commission chaired by Jacques Delors, reported in 1996, contending that lifelong learning should be aligned with a vision of education anchored in four pillars: to know, to do, to be and to live together. The third, a 17-member commission chaired by Sahle-Work Zewde, President of Ethiopia, will publish its final report in November 2021. It is expected to underscore the urgency of preparing people to live together peacefully and to relate to nature and the environment in sustainable ways. Uniquely, the report on the Futures of 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 the pandemic, governments and societies should contemplate how to build back better, to embrace an ambitious vision of the future of education. After all, the pandemic will cause, at least in the Global South, an economic recession that will constrain the resources available for education, and the great efforts to sustain education amid the challenges created by the pandemic have already brought many educators and education systems to the brink of collapse.

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

sustainable future at a time when this could not be more necessary. The issue is not whether it will be challenging to transform education to address the three goals mentioned earlier (mitigation, building resilience, and transformation), it is that we have no choice if we are to repair the serious, multifaceted forms of harm to communities and nations caused by the pandemic. Three resources will be critical to sustain those efforts: 1) societal commitment to educational transformation as well as the institutional support and the financial resources 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 is 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 knowledge to shape the innovation needed to mitigate, build resilience, and build back better. This book 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 Initiative 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 to 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 ambitious education reforms focusing on the role of transformative curriculum and teacher professional development, or studies of the conditions which sustain the effective implementation of those 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 of sustaining educational opportunity during the pandemic (Reimers and Marmolejo, 2021). The informed dialogues involve the creation of learning opportunities bringing together practitioners, policy-makers and researchers, for the purpose of advancing collective leadership in the transformation of education. These include several publications with

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

Since March 2020, the Global Education Innovation Initiative has oriented most of its efforts to advancing knowledge which could help guide effective education responses to the disruption caused by the pandemic. Such efforts included a collaboration with the Organisation for Economic Cooperation and Development (OECD) and the World Bank, which resulted in about 100 case studies of educational innovation that emerged during the pandemic, and two cross-national studies of responses of education authorities to the pandemic. We have also conducted two comparative studies of education during COVID-19 mentioned earlier and published three books on the role of education leadership in addressing the challenges created by the pandemic. The study presented in this book is part of these efforts.

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

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

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

The HELA initiative aspires to help build the resilience of education systems for future disruptions as well as to help transform education systems so they can prepare students for the future. It is 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 and 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). This requires finding the most effective ways of balancing face-to-face and distance education so that students – whatever their circumstances, contexts, abilities and preferences – can develop their full learning potential.

This does not entail simply adding online educational platforms, resources and materials to 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 initiatives, platforms, resources, strategies and activities to enhance the learning experience of each student. This involves balancing opportunities for access to high-quality content, for engagement, and for formative feedback in a way that gives students, as well as teachers 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 are sustained on the basis of the guidance and follow-up ensured by the central level of the education system with regard to the development of a set of interconnected competencies that makes explicit what to teach, learn and assess, and why. These competencies are binding for all education centres as they define 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 sequencing 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 care

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

Likewise, teacher education, as well as teacher professional development, must serve the purpose of strengthening teachers' competencies in the design of courses, activities and resources, grounded in the combination of face-to-face and distance learning. Versatile teachers are essential to hybrid modes as they are equipped to combine different learning 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 areas in the curriculum (Ng, 2021), as well as revisiting instructional times. This is based on an understanding that each learner may require different combinations of face-to-face and distance education in order to engage with, develop and achieve the objectives and learning outcomes established. Instructional time can no longer be thought of as fixed and static for all learners. Instead, it can be a powerful tool to support the diversification of learning strategies, customized to the unique needs of each student, in order to achieve equally meaningful outcomes for all learners.

To this end, hybrid modes rely heavily on education centres playing a proactive, empowered role in determining, implementing, and taking responsibility for delivering what and how to teach, learn and assess. It is not a question of 'delegating or attributing responsibility' without a frame of reference, but rather of providing robust guidance to schools so that educators can effectively lead, manage, and take responsibility for the education of new generations.

Goal 5: Reimagine the relationships between educators and students

Fifth, hybrid modes redefine the relationships between educators and students. By expanding the spaces for interaction, educators and students have the possibility of getting to know each other better, and, in different situations and contexts, generating conditions for greater levels of rapprochement and empathy, and potentially reducing intergenerational gaps. At the same time, they can profit from a vast range of opportunities and resources to craft ideas integrating different types of knowledge. The production, dissemination and discussion of 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 access in terms of physical infrastructure and equipment, as well as to connectivity, platforms and 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 protection networks. This includes, among other fundamental components, providing food, health and psycho-emotional support services for students, within the framework of an intensive promotion of healthy, sustainable and caring lifestyles likely to have a positive impact on students' overall wellbeing.

To this end, it also implies a closer relationship, based on trust and collaboration, between the state and civil society in ensuring the use of different spaces and activities so that each student can find ways to fulfill their aspirations. It is a matter not only of reinforcing learning spaces 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. These, when coming from different institutions and actors, can contribute to the comprehensive 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 the opportunities for the production, circulation and dissemination of knowledge without borders or obstacles. In this sense, the use of artificial intelligence (AI), within the framework of a solid humanistic and ethical vision (UNESCO-IBE, 2021 b), 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 traditional '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 between schools, learners, students, families and communities. Trust between institutions and actors can be reinforced – not just in terms of collaborating with the school, but also with the aim of

developing capacities and committing to collective action to ensure that each learner has an effective learning opportunity. For example, this would imply that families could be trained on how best to accompany their children in education, in order to fulfill the role of learning ‘coaches’.

These eight goals are aligned with the vision of UNESCO’s recent report on the Futures of Education Report, which emphasizes the importance of learning to become together; collaborating with others for the purpose of improving the world and strengthening education as a global common good. The report underscores the urgency of strengthening education and reimagining the social contract with education so that it can effectively prepare students to address current disruptions in sustainability, democratic backsliding, the transformation of 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 and solidarity, and that connect students with the world via an interdisciplinary, problem-oriented curriculum which engages them in collaborative learning. Of special importance in the report is the notion that the curriculum of schools should go beyond the basics and contribute to the development of the full range of human potential, promoting the integration of knowledge and socio-emotional competencies, fostering global competency, strengthening scientific literacy and the humanities, as well as digital skills and arts education. The report also focuses on the primacy of supporting teachers as agents of education transformation, and of leveraging digital technologies in support of schools (UNESCO, 2021).

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

THE STUDY

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

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

In selecting the programmes, we drew on a framework to mitigate the educational impact of 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 interrelated goals: improve the effectiveness of education strategies during the outbreak; recover and rebuild educational opportunity after the outbreak; and build the resilience of the education system to function during future outbreaks. These goals involve actions in three broad areas: assessing how the context has changed for students, families, teachers and communities, and for the education delivery system; developing a strategy to teach during the outbreak or to recover from one; and increasing the capacity of schools, teachers, school leaders, students, families, and the system. The framework suggests the following specific 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 they support a holistic approach to student development.
 - b. Build the capacity of teachers, school leaders and other staff. Teacher professional 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 that builds on identifying and studying strengths of organizations, societies and systems, which can 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 most alive, effective, successful, and connected in healthy ways to its stakeholders and communities. Appreciative Inquiry begins by identifying what is positive and connecting to it in ways that heighten energy, vision, and action for change. (Cooperrider, Whitney and Stavros, 2004, pp. xv)

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

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

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

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

DOMAINS OF INNOVATION

The 31 case studies reflect a variety of innovations, for the most part to support learning from home. Some of them involve developing multimedia platforms or other technological platforms to support students, teachers and parents, while others focus particularly on supporting the 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 multidimensional, including, for example, both a platform to deliver digital content and support for teachers to develop digi-pedagogies. Furthermore, all the innovations which focus on developing particular student competencies in order to provide them with more agency over their learning contribute to developing both the competencies which are the focus of the innovation (such as literacy, numeracy or science) and competencies for independent study. Similarly, as some of the innovations provide guidance to parents so they can support their children while learning remotely, they are in effect contributing to parenting education, even if that is not their main goal.

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

The innovations studied can be grouped into the following five 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 to alternative forms of education, so they could learn from home. A variety of technologies 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 with limited support, there were obvious limitations in what was attempted. One of the challenges faced by many educators was the realization that many children, and many of their teachers, lacked access to technologies essential to interactivity, including broadband internet access.

However, even the most basic forms of remote education required teachers to think first about students as learners, rather than about content delivery. In that sense, they represent an 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 for

personalization than traditional teacher centered instruction allows. For example, some of the uses of technology involved teachers producing and recording lessons using various devices, including video, audio and print materials, such as study guides. That innovation alone represents an improvement on the traditional form of instruction, which depends on teachers communicating ideas in real time to all students in a class. When students read a text, such as a guide, which includes questions to check understanding, this provides more opportunities to accommodate personal differences in how people learn. The text can be re-read or read at various speeds, and can be discussed with others, in ways the in-class lecture cannot. The same opportunity to modulate speed of information intake is provided by a pre-recorded teacher lecture or podcast. If, in addition, students receive feedback to their work on a guide, whether from peers, parents or teachers, this enhances the opportunities for learning relative to passively sitting in a class listening to a teacher lecture. If, on top of that, students submit work on a digital platform, and receive feedback on that platform, they can respond to the feedback, creating a powerful loop, a conversation, with their teacher, that supports learning more effectively than the delayed loops that feedback provided on written assignments on paper provide. These simple innovations have powerful effects in allowing for more use of formative assessment to guide instruction, thus increasing personalization.

There are, of course, limitations to the potential benefits of the personalization that this approach offers. Students must have adequate reading competencies to be able to draw meaning from text, self-study competencies to be able to learn independently, and appropriate conditions to learn at home, perhaps a quiet place to study, to make independent learning, or listening to a recording, possible and productive. Most obviously, they need to have access to the content, in whatever format is being used to distribute it, and if they have the support of a knowledgeable adult who can check their understanding and guide them, they will likely draw more benefits than if they lack such support. When a greater proportion of instruction shifts to the home, as is the case with these innovations, differences in home conditions and resources have a greater impact on learning, relative to instruction which relies on learning in school.

Examples of low-tech approaches to distributing content include the Har Ghar School in India (Chapter 4), which combined low-tech resources and engagement from community volunteers to support learning in low-income communities. Also in India, the Madhi Happy Learners model (Chapter 4) offered students worksheets, enhanced with a layer of technology, to support learning from home.

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

In Uganda, Pangea Publishing (Chapter 13) distributed culturally relevant reading materials (children's books) on paper, as well as digital media, to provide students with information 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 digital resources and lessons. The Egyptian Knowledge Bank (Chapter 3) offered a variety of digital resources to support learners. WhatsApp was one of the most utilized technologies, given its ubiquity. In India, for instance, the Swadhyay model (Chapter 4) relied on WhatsApp messages to create personalized learning for children. In Indonesia, Sekolah Enuma 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 universal design-for-learning principles that allowed for gamified 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, as well as platforms and resources, to all students and schools.

Some of the innovations enhanced the distribution of content to students with more personalized forms of support, either through technologies that allowed personalized learning, or with tutors. In Bangladesh and Pakistan, ELAN (Chapter 2) provided access to a self-instructional literacy application, supported by tutors, through smartphones. In Mexico, students most at risk of exclusion were provided with access to face-to-face instruction and tutoring (Chapter 8). Tutoring for struggling students was also a strategy adopted in the 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 feedback on student knowledge which could be used to personalize instruction. Often, this doubled also as formative evaluation for students. In Mexico, for example, the Independent Learning Measurement Initiative (Chapter 9) used learning assessments to adapt instructional practices 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 students' 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 on independent study, typically as a complement, rather than a replacement, of learning with the assistance of teachers or parents. For instance, digital learning platforms such as the Egyptian Knowledge Bank, Madrasati in Saudi Arabia and Ceibal Integrado in Uruguay, and the

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

Supporting deeper learning

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

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

Supporting student socio-emotional development and wellbeing

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

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 them 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 awareness, 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 their competencies either to teach more effectively, develop higher-order competencies, support social-emotional learning or use digi-pedagogies. Two-thirds of the innovations examined in the cases address teacher professional development, either as the primary or exclusive focus, or as a component of an innovation including other elements. For instance, the Education Above All Internet-Free Education Resource Bank, while primarily a bank of lessons and activities to support active learning, includes instructions for parents or teachers to work with learners on those lessons, in this way embedding a professional development component in the innovation. A number of the innovative programmes mentioned in the previous section covering learning outcomes for students also included professional development components, 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 national programme for recovery of learning loss; the multipronged approach to continuity in Kenya (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 of competencies that would help their students, in turn, develop a range of competency domains. They included accelerating change in teachers’ in-service training in Brazil (Chapter 22); scaling blended systems of teacher development in Peru (Chapter 29); leveraging human connection in virtual teacher professional development programmes in Guatemala (Chapter 26); accelerating the development of digital competencies in Costa Rica (Chapter 24); fostering entrepreneurship among school leaders in India (Chapter 27), including through support for teachers’ professional development); supporting the professional development of the higher education workforce (including faculty in schools of education) in the People’s Republic of China (Chapter 23); and supporting continuity of learning in São Paulo, Brazil (Chapter 21).

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

In Brazil, efforts to accelerate change in teachers' in-service training involved creating an online peer-to-peer teacher support programme to help students develop digi-pedagogies 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 remote learning to support teachers and school principals in using formative assessment for curriculum management.

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

In Colombia, the Alianza Educativa social and emotional learning initiative relied on communities of practice to develop the pedagogical skills of teachers and support teacher professional development.

Costa Rica's programme of teacher professional development used an assessment of digital competencies to align the support teachers received with their needs.

The Educate Me Foundation in Egypt offered support to schools, using technology and blended learning to help teachers to improve their pedagogical skills.

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

India's Rehnuma programme cultivated the entrepreneurial and innovative competencies of school leaders in low-fee private schools, through a community of practice and mentoring and support.

Kenya's multipronged approach to education continuity emphasized professional development for school leaders to help them support teachers in developing a competency-based curriculum, addressing socio-emotional development, improving pedagogy and supporting home-based literacy.

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

Mexico's national programme to recover learning loss in middle schools offered teachers professional development via a community of practice which enabled teacher collaboration 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 no-tech approaches to support the professional development of teachers by fostering a range of mindsets and competencies to teach twenty-first century skills.

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

Family engagement

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

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

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

India's Rocket Learning (Chapter 30) project used an SMS text-messaging system to support 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. For the youngest learners, they included guidelines and support for family engagement to help students learn.

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

The family, school and community school engagement initiative in the United States (Chapter 32) focused on a systemic and statewide culturally responsive framework, developed across sectors, to build dual capacity and two way communication of both LEAs and SEAs and 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 response to a moment of acute crisis. They all incorporate new ideas about how to make education more responsive, more effective or more relevant, which, while developed amid the constraints created by the crisis, have implications beyond them. The underlying issues they address are significant in their own right, irrespective of the pandemic. In other words, these innovations are not just means of mitigating the educational losses created by the interruption to schooling, or of building resilience to teach remotely, but provide also a roadmap to building back better, addressing some of the pre-existing deficiencies of schools and education systems, and preparing students to develop the competencies necessary to create a better and sustainable future. While these innovations indeed represent practical ways to enhance and support learning with new ideas, they are more than ideation; they involve the creation of value for the purpose of solving pre-existing and enduring problems or meeting unmet needs.

Innovations can vary by degree. They can be incremental, evolutionary or revolutionary. A study in the field of business innovation, characterizes as an incremental innovation one which involves the gradual improvement of a process or product, for example through improving efficiency. Evolutionary innovation involves extending offerings for existing customers as well as finding new customers for existing offerings. Revolutionary innovation creates new offerings for new customers (Matthews and Brueggeman, 2015, pp. 31–33).

We draw on this characterization of innovation to develop a typology of educational innovations. They can occur along three dimensions, concerning: 1) who should be educated, 2) what goals education should pursue, and 3) how people should be educated. The first dimension defines who the learner is. In a formal education system, the learner is typically defined as a student in the age group that is expected to enroll at a particular level, whether ECCE, primary, secondary or upper secondary. The second dimension defines what competencies education aims to help learners develop: basic literacies, socio-emotional competencies, civic competency, entrepreneurship, and so on. The third dimension defines how learners should be educated. This dimension goes from pedagogies that are more teacher-centric to pedagogies that are more learner-centric. Taking two of these dimensions into account – what goals education should pursue and how – we can develop the following 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 getting teachers to adopt more effective pedagogies, for example through more reliance on formative assessment, would be an incremental innovation. The goal remains basic literacy, and the pedagogy remains teacher-centric. Incremental improvements are important because they improve the effectiveness of the instructional process. More students will be able to learn if their teachers improve their skills. In contrast, an improvement in pedagogy to teach basic literacy that provides more agency to the learner, for example through the use of personalized learning guides or through the provision of books from which students can choose, is an evolutionary improvement, because while the goal remains improvement in basic literacy, the innovation provides more agency to the learner over how to learn. Similarly, an innovation that broadens the goals of the curriculum, but remains teacher-centric, such as structured pedagogy to support literacy with support for socio-emotional development, is evolutionary because it represents an innovation in one dimension of the instructional process (goals) while keeping other dimensions constant. Finally, an innovation that broadened the goals of the curriculum, while also providing students more agency over their learning, such as supporting team- and project-based learning with formative assessment to provide personalized pathways to students that gave them opportunities to develop a range of competencies with more agency over their learning, would be revolutionary.

To this two-dimensional characterization of the process of innovation we should add the 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 characterization of either 1X or 2X incremental, evolutionary or revolutionary innovations. The first three rows in the table characterize innovations that do not change the intended population of students, while the next three rows include innovations which expand learning opportunities to new populations of students, previously excluded. The top half of the table is identical to the table presented previously, while the bottom half augments the level of innovation by also expanding 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 competencies/ whole child
How: Student-centric	Evolutionary	Revolutionary
How: Teacher-centric	Incremental	Evolutionary

Who should learn: Expanded definition of students (reaching out to excluded groups)	What goals: Basic literacies	What goals: Breadth of skills/whole child
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 incremental does not make it better or worse than an evolutionary or revolutionary innovation. In a world in which many children fail to read in elementary school, incremental improvements that help them succeed at reading are very valuable, just as much as evolutionary improvements that do the same in ways which give students more agency over their learning, or improvements which expand what they learn or widen access to students previously unserved. All these innovations are valuable. It is the aggregate effect of the diversity of educational innovations in a system that defines how adaptive the system is at meeting the various needs for improvement. A more adaptive system has a balanced portfolio of innovations that cover the 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 reflected in this book offers a balanced portfolio or is unduly skewed in favor of a more limited range of types of innovation. The 31 case studies examined in this book represent a variety of types of innovation, leaning towards the incremental and evolutionary, with a predominance of 1X innovations. In a context in which basic access to school was at risk, the importance of simply maintaining access through incremental improvements, rather than attempting, at the same time, to improve 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 represents an incremental improvement to a pre-existing approach to engage parents in supporting the learning of their children. This innovation augments the effectiveness of the instructional process, even though it does not alter the goals and how of instruction or the population of students.

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

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

Mexico's programme of independent learning measurement, using assessment to personalize instruction, improved the efficiency of the delivery of education.

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

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

The International Institute of Online Education, in China, supported the development of digi-pedagogies among university faculty, thus improving the efficiency of pedagogy at this level. While the case provides no evidence that this use of pedagogies helps university faculty broaden the range of competencies they help their students develop, nor provides students 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 more opportunities to recover lost learning, thus improving the effectiveness of instruction, even if the focus remains on the competencies that guide the curriculum and the control students have over their learning remains unchanged.

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

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

São Paulo's programme of professional development to support the use of learning activities and formative assessment improved teachers' effectiveness in teaching remotely, while 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 that supplemented in-school learning with a volunteer-led, contact intensive at-home learning programme using printed materials. WhatsApp and SMS text messaging were leveraged as support layers while low-skilled volunteers leveraged high-quality content to accelerate student learning.

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

Evolutionary

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

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

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

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

Peru's blended systems of professional development in rural areas provided teachers with support to improve their pedagogical effectiveness in teaching twenty-first 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 more 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-person instruction for at-risk students during the pandemic, representing an improvement in the efficiency of existing remote learning options while focusing on supporting the development 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 augment 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 the 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 way innovating in the dimension of instructional goals.

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

Revolutionary

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

2X Incremental

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

2X Evolutionary

None of the innovations encompassed innovating in at least one dimension (goals or 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 support project-based learning and expand the range of competencies that students can develop, thus supporting deeper learning. Projects are designed to enable students to achieve foundational literacy and numeracy, curricular learning outcomes, and a range of twenty-first century skills and socio-emotional learning skills. In addition, the resources are intentionally designed to include populations generally poorly served, such as students in low-resource communities and students categorized as having special needs. Furthermore, by bringing these methodologies to the homes of students and promoting self-led learning, this solution is also potentially expanding student agency over their learning, becoming a 2X revolutionary innovation.

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

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

India's Rocket Learning programme provided students with more control over their learning and delivered more personalization, while broadening the range of competencies

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

WHAT PROCESSES SUPPORTED THOSE INNOVATIONS?

The crisis created by the pandemic induced a generative perspective on leading innovation: begin with the learner and their needs; see them as multidimensional whole people, with diverse and complex motivations, embedded in particular social contexts. Anchoring the task of forging new approaches to education in students and their needs led to innovations more relevant than those that begin with content, or with other goals extrinsic to the learners. The needs of students were prioritized over other concerns and interests which also govern how education systems operate. While the idea of beginning with the learner and their needs is simple, there is much about the regular functioning of schools which is better explained in terms of the interests of the adults in the system, than in terms of the interests of learners. For example, we group students in grades not because it is the best way to educate them, but because it is administratively and financially efficient. We organize the curriculum in subjects not because this is the best way to help students develop valuable competencies, but because it makes the preparation and management of human resources easier. We rely on summative assessments of low-order cognitive competencies not because this is a superior method to formative assessment of complex ones, but because it is less expensive to administer at scale. While these arrangements, made for practical rather than pedagogical reasons, serve their purposes, there are also cases where these means take precedence over their intended aims, working at cross purposes with them, as when students are made to repeat an entire grade 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 they learn in various subjects.

This focus on learners and their needs has allowed a reimagining, reconfiguration and reengineering of the roles of various stakeholders in the service of the process of learning and teaching. Teachers and students had more agency and voice than is the norm in how schools and education systems are ordinarily managed. For example, faced with the limitations of approaches designed by national governments, many authorities opened up opportunities for innovation in the creation of options to ensure educational continuity to local and state governments, and to civil society. The innovations examined here involved a diversity of stakeholders as co-creators and partners and reflected 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 educated, to what end and how, and then used appropriate technologies in the design of the innovative solution. They are student-centred designs, rather than innovations designed around technology. They do not begin with technology, asking what uses could technology serve, but 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 Internet-Free Education Resource Bank developed by Education Above All requires no technology at all, except as a means of distributing the instructions, which can also be distributed via paper. In fact, these resources were developed as a solution to the limitation of many of the initial responses to teaching during the pandemic which relied on technologies which did not reach a considerable number of children because they started with the question of how to deliver curriculum through technology, rather than with the question of how to help students learn. Furthermore, there is no apparent correlation between the number of innovative dimensions addressed by the innovation and the use of technology, that is, in some of the innovations, technology is merely used to sustain access, without transforming the educational goals, or to provide more agency to learners, or expand access to previously underserved learners. These are the incremental innovations described earlier. In contrast, some of the innovations that address further dimensions rely on low- or no-tech approaches, such as Pangea or the Internet-Free Education Resource Bank.

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

The 31 innovations are all the product of collaboration and partnerships between government, civil society, businesses, and other organizations. However, they vary with respect to whether the initiator is a government or a private entity, and with respect to whether they were designed 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 Bank, Madrasati in Saudi Arabia, or Brazil’s programme to support teacher digi-pedagogies are government initiatives, designed to be of national reach and scale. The same is true of Finland’s project-based science education initiative, Norway’s digital feedback initiative and

England's national tutoring programme. Some of them involve a number of partnerships with civil society organizations and private-sector entities to augment the capacity and reach of 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 were national or regional in scope, such as São Paulo's digital strategy for education continuity, Mexico's schools as community learning centres programme and its programme to recover lost learning and the interactive learning guides in Guanajuato, Mexico.

In contrast, a number of programmes were initiated by civil society organizations, launched on a smaller scale to grow gradually. These required partnerships with the public sector for effective implementation and to go to scale. Examples of this approach include the community and school engagement initiative in the United States, South Africa's programme to support family engagement with scripted resources, the professional development programme for rural teachers in Peru, the enhanced literacy and numeracy programme in Pakistan and the programme of teacher professional development in digi-pedagogies in Costa Rica. The Kide Science programme in Finland was also privately initiated. Sekolah Enuma Indonesia was initiated by a private sector company in collaboration with foundations.

A number of the programmes led by civil society organizations involved transnational foundations or non-governmental organizations (NGOs), for instance, the Education Above All Internet-Free Education Resource Bank, developed by an international education foundation, required partnership between NGOs and school systems for effective implementation. Similarly, ProFuturo, in Guatemala, is a programme supported by an education foundation in Spain, working with local partners and national governments. Pangea Publishing is an international NGO-led programme, which reached scale as a result of partnering with governments. Technology enabled the creation, implementation and scaling of these innovations, regardless of whether the innovation itself involved technology. Even for the innovations which relied on low-tech, the process of generating the innovation 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 of technology that, in some cases, relatively small organizations and groups of people had considerable impact, exceeding the resources they directly controlled. For instance, the 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 on technology and partnership with other organizations allowed the creation of a delivery structure of considerable scope. Furthermore, technology also supported the professional 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 even under adverse and challenging contexts. These innovations contributed to regaining and maintaining trust in the transformational power of education in the lives of students and in communities and societies at large at a most challenging time in which people were concerned for their lives and livelihoods. The following implications for the future of education emerge from a cross-cutting analysis of these cases.

- (1) Most of the cases illustrate either incremental or evolutionary improvements in either the goals of education or providing students with more agency in their learning. Fewer cases tackled simultaneous innovation in goals and student agency, and very few innovations involved reaching populations previously excluded. Perhaps this is to be expected in the context of the emergency created by the pandemic, but this points to an area in need of attention as we think about the future. The failures of the education system before the pandemic lay not only in how they educated the students who had access to school, but also in how they excluded many students from access. Completing the unfinished task of providing genuine access to all is an imperative given the dislocations caused by the pandemic, especially the increases in socio-economic exclusion. Also, given the new demands to participate economically, there is a new urgency around educating the whole student and preparing them for lifelong and lifewide learning, and innovation is essential to build the ecosystem that will create and sustain those opportunities.
- (2) The innovations studied in this volume reflect the power of looking at the strengths of organizations and systems, rather than focusing on losses and deficits. There is no doubt that the pandemic produced considerable educational losses, but an exclusive focus on those losses might be more likely to support efforts to restore the levels of functioning of the education system prior to the pandemic than to rebuild the education systems we need for the future. The case studies of innovative programmes created during the pandemic offer optimism, hope, positivity, determination and evidence around the conviction that reimagining education post-COVID-19 can contribute to laying the foundations for a better, sustainable and inclusive future for learners, teachers, families, communities and society at large. Though the chapters in this book acknowledge the considerable implications of the learning losses and gaps augmented by the pandemic, they also provide clues and pathways to rethink and strengthen schools and education systems in the post-pandemic era to enhance and democratize learning opportunities.

However, these innovations do not have a built-in mechanism for sustainability beyond the pandemic. It was inherent to the disruption created by the pandemic that rules were upended, 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 society 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 of these extraordinary needs. In a context in which little of what had been initially created to sustain education remotely during the immediate phase of lockdown seemed effective in reaching all children, governments were more open to novel ideas and partners. But it is to be expected that as the emergency recedes some of the norms, bureaucratic barriers, and mindsets about the roles of the various stakeholders that form the education system may reassert themselves and push back against some of the innovations that were accepted during the crisis. For instance, many private education companies offered resources at no or very low cost during the crisis, which contributed to the creation of alternative mechanisms of education. But this spirit of contributing to an educational commons may diminish as the shock of the initial crisis wanes.

In order to think about the sustainability of these innovations beyond the crisis, it will be necessary to think about system transformation, about the integration of these innovations within structures, roles and processes of the regular operation of the school system, and possibly also about how to change those structures, roles and processes so they enable innovation. For instance, some of the innovations supported students in gaining agency over their learning, choosing what to learn and when, and accessing rich repositories of lessons and resources. This was easier to do in a context in which schools were placing few demands on students, other than expect them to engage with learning, and where the usual mechanisms of accountability – student examinations, for example – were suspended. If schools return to a mode of functioning that is primarily driven by the goal of delivering content, this will crowd 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 studies we have examined are examples of innovations, a point of departure towards systemic change, but not a destination. They were opportunistic in finding a point of entry into the education system created by the crisis, but they were not designed to produce coherence with the rest of the system and to transform processes that maintain the education system of the past. They are ‘add-ons’ rather than interventions to transform the systems in which they are operating. They have the potential to contribute to systemic change, but systemic change is not the automatic corollary of these innovations. Change at scale requires multi-dimensional attention to the process as a cultural, psychological, professional, institutional and political process (Reimers, 2020a, 2020f).

The conversation about change, however, has been made easier as it becomes possible to examine what these innovations achieved and to then ask which of them should replace pre-existing practices and norms. In order to support that conversation, it is imperative to take stock of the innovation which took place and to learn from it. Without such learning, the 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 world over. In response to this crisis, many stakeholders collaborated to create novel ways of sustaining education at times when this was very challenging. These efforts are important not just because of what they did at a time of great need, but because of what they show about what is possible in reimagining education. There is much to be learned from studying these innovations, particularly when it comes to supporting the necessary transformation of schools and school systems around the world. Such an exercise is important not only to restore what was lost during the crisis, but also to help students learn what they need to learn to build a better, sustainable and fair future.

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INNOVATIONS SUPPORTING
STUDENT-CENTRED LEARNING



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 existing infrastructure, such as the smartphone of a child's parent or sibling, to enable K-5 (Kindergarten to Grade 5) students to learn at home using gamified applications in Bangladesh and Pakistan. The initiative mitigated learning loss during the COVID-19 pandemic and produced positive gains in student learning. Students became more independent learners by using highly engaging and interactive content in the form of games. As schools reopened, the programme adapted to serve as a quality-enhancement tool for students in under-resourced 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, digital skills, independent learning, individualized learning, personalized learning, multimedia platforms, literacy



BIG IDEAS

Using gamified 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-profit 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 flagship K-5 (kindergarten to Grade 5) literacy programme, delivered through digital devices using gamified learning apps, was adapted for Android-based smartphones, through which students could learn at home and follow the same content as in school.

CONTEXT

In Pakistan, where approximately 22.2 million children were already out of school, the COVID-19 pandemic posed a risk to an additional one million children, who were expected to drop out due to the pandemic's socio-economic impact (Azevedo et al, 2020). Additionally, COVID-19 school closures affected 32 million K–5 students (UNESCO, 2020). In Bangladesh, 38 million children have had their education disrupted due to the school 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 concern regarding the quality of education available. In Pakistan, the learning outcomes for in-school children are very poor, as approximately 40 per cent of fifth-graders fail to perform at the second-grade level (ASER, 2019). In Bangladesh, 57 per cent of children were estimated in 2017 not to be able to read or understand a simple text by the end of primary school (World Bank, 2019).

SMARTPHONE PROGRAMME

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

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

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

The key features of the programme are its low cost and its non-reliance on physical location. The students learn at home, in their own time, while most of the management is done remotely, through the implementation partners. There is minimal infrastructure investment, as the devices used are already available in the household, and there is easy access to applications which 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 the applications can work offline or in a low-connectivity setting, requiring an internet connection once a week, for data analytics upload.

The programme is implemented through a network of local partners. In Pakistan, the implementation partners are Junior Jinnah Trust in Islamabad and Rawalpindi, Moawin Foundation in Sheikhpura, and CARE Foundation in Lahore and its surrounding areas. All these organizations run either privately-adopted government schools or low-cost private 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 have been affected by COVID-19 school closures. In Bangladesh, TTWF's network partner in six cities is OBAT Helpers. There are nearly 1,400 students enrolled, from refugee camps or urban slums where education has been disrupted due to COVID-19 school closures. The partner organizations offer the programme to their existing cohorts, as well as identifying additional out-of-school children who could be included. Their existing teachers and staff are trained as facilitators by TTWF, who then monitor and support the students and parents for the programme's duration.

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

RESULTS AND LESSONS LEARNED

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

Twenty-five students from among those enrolled on the programme in Islamabad and Rawalpindi were evaluated at three-month intervals, showing significant learning gains (averaging 50 per cent) and mastery over subjects (English, mathematics and Urdu) at their grade level. Half of these students were promoted to the next grade level within six months of being enrolled on the programme. These results confirmed previous findings as to the efficacy of gamified learning applications in building literacy and numeracy skills.

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

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

One of the most significant findings of the programme was that parental engagement was crucial to children's success. Higher engagement levels were reported among students whose parents ensured access to smartphones and supported their child's learning through higher interest in their children's assessments and increased interaction with the facilitators. Looking

ahead, an avenue to increasing student engagement levels is to offer minimal monetary 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 initiative, using digital innovation to tackle many problems that contribute to the global education crisis. Repurposing available smartphones to provide educational content at home solves 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 of education. These applications provide engaging, fun and interactive content and formative assessment through instant feedback – all of which supports self-learning. The students are actively engaged in education, rather than being passive learners. Through this, the children are equipped with twenty-first century skills, as independent learners taking responsibility for their own learning and education. It is a wholly student-centered and student-driven model, which caters to each student's learning trajectory and abilities, as they navigate their way through the applications. The applications are designed for the students to move ahead at their own pace, depending on their grasp and mastery of the content. They develop essential 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 student. This could be a breakthrough in areas where there are teacher shortages and issues with teacher quality. It also has the potential to aid flipped classrooms in the future, supporting 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 is currently over 45 per cent (Pakistan Telecommunication Authority, 2021) and expected to grow exponentially. Internet and smartphones are becoming more affordable and more readily available. There is great potential for schools across the world to incorporate digital learning, especially given its successful use during COVID-19-mandated school closures. 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 transferable to public or low-cost private schools that may not have the resources for incorporating digital learning in their classrooms, especially in developing countries. Internet service providers could play a vital role in scaling-up this programme, by providing subsidized rates for data usage of specific educational applications. If advocated for at the systemic level, this can bring a digital revolution in education.

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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 the 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). This chapter will explore the intersection between EKB and K–12 (kindergarten to Grade 12) formal education, to and examine the development, implementation, limitations and potential 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**

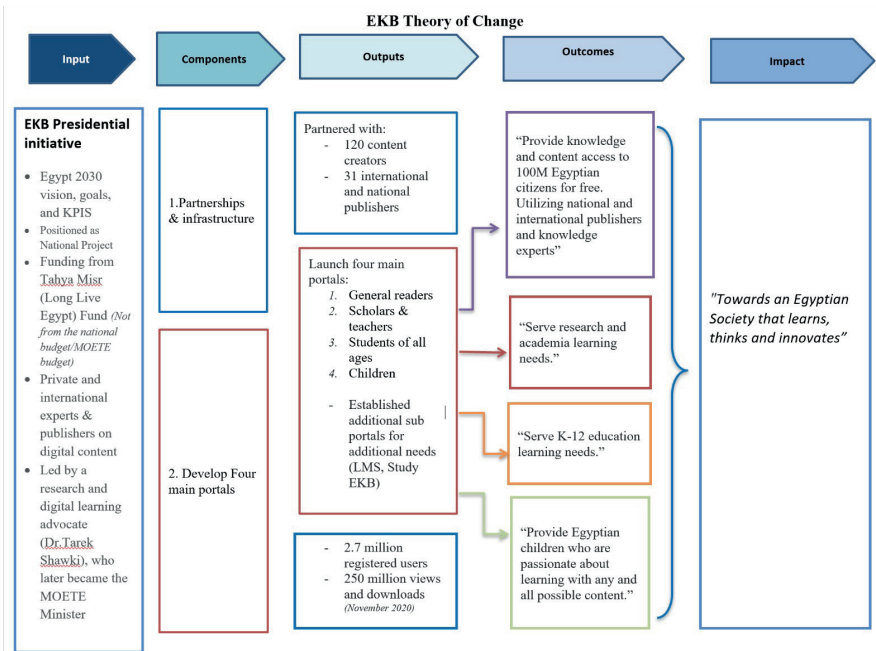
Explore how a national, digital learning platform can be integrated into K–12 formal education, focusing on its development, implementation and limitations, and the potential implications of a large-scale, free of charge private-public partnership.

BACKGROUND

To better understand the Egyptian Knowledge Bank (EKB) and its link to pre-tertiary education, it is essential to consider Egypt's K–12 (kindergarten to Grade 12) education system. It is the oldest and largest in the Middle East and North Africa (MENA) region, yet, for years, it has been ranked in the bottom 5 per cent of international assessments such as TIMSS (Trends in International Mathematics and Science Study) and PIRLS (Progress in International Reading Literacy Study) (TIMSS, 2015), which monitor international trends in student achievement in mathematics, science and reading. It faces persistent pressure from a rapidly increasing student population, deteriorating teaching quality, a rigid curriculum, inequality, and a lack of resources (USAID, 2020). In 2017, the Ministry of Education and Technical Education (MOETE) announced a transformation of the education system, Education 2.0 (EDU 2.0, 2018–2030), with an aspiration to address these challenges through modernizing the country's education system. By focusing on substantial utilization of technology and blended learning models, a process that began before the COVID-19 pandemic (RDP, 2021c), it aimed to increase students' competencies in twenty-first-century skills while moving away from rote memorization and teaching to, and learning for, the test. As a result, when COVID-19 hit and schools shut down in March 2020, the MOETE leveraged the existing infrastructure of the EKB, to meet some of the challenges. The following section explains the EKB theory of change, its implementation, the COVID-19 response for pre-tertiary education, the key results 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 in the MENA region, offered free to all Egyptians. Launched in 2016, the EKB was designed to provide higher education researchers with high-quality free resources and international journal access (RDP, 2020). EKB has been growing and evolving since then, aiming to address a wide variety of needs and accommodate all Egyptian citizens (RDP, 2021a; RDP, 2021b; EKB, 2020a; Elzayat, 2020). EKB's current long-term goal is to develop and serve an Egyptian society that learns, thinks and innovates. It is divided into four key portals: general readers; scholars and teachers; students of all ages; and children (RDP, 2020). Each portal includes encyclopedias in English and Arabic, online journals and periodicals, online dictionaries, interactive lessons, and various books and scientific articles, covering a wide range of needs, from early childhood to graduate-level studies (EKB, 2020b; EKB 2021; RDP, 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 benefit from, to develop scientific 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 global competition in the age of science and information." Official presidential spokesman Alaa Youssef (EKB, 2020a).

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

- Funding EKB as a national project outside the MOETE budget could ensure sustainability in the face of internal challenges.
- Utilizing existing international and national expertise in content development, management and training allows scalability, efficiency 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 official published EKB theory of change; this is a compiled outline based on published data.

IMPLEMENTATION OF EKB

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

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

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 structure for assessment of higher grades (secondary grades). The link between EDU 2.0 and EKB began pre-COVID-19, with the establishment of digital learning and assessment for all students in public secondary schools. In 2018, to provide an equitable learning opportunity and introduction to digital learning, 750,000 Grade 10 secondary school students received a free tablet with the EKB application. Textbooks were updated to include website links to resources and exercises on EKB, connecting the formal curriculum with specialist-subject publishers to replace non-school books (revision for exams) with EKB content (RDP, 2021b; Elzayat, 2020). With the onset of the pandemic in its second year of operations, the structure 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 connection between EKB and K–12 formal education scaled-up further. The launch of Study EKB (Zaker), an offshoot of the original EKB site, ensured curricula spanning K–12 grade levels were

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 with the Center of Curriculum and Instructional Materials Development (CCIMD), the site used existing content from over 31 partners, to mirror Egyptian curriculum standards (EKB, 2020a; 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 of 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 to technology, EKB has been complemented with the new MOETE TV channels, Our School (Madrasetna). These channels are different from older educational TV channels as they offer newly developed, game-based, engaging content, as well as some resources from EKB, and reference back to EKB. Such offline TV channels reported an estimated one million views, while YouTube views reached more than 14 million in the nine months from October 2020 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 guest users on pre-setup computers in libraries, government institutes and schools (EKB, 2021; RDP, 2020; RDP 2021a). Breaking the figures down, the majority of users, 76 per cent, are teachers and students in pre-tertiary education, while general readers account for 5 per cent, scholars 6 per cent, university students 13 per cent, and children less than 1 per cent. Users have access to 46,012 content resources (RDP, 2021b) on the four portals, which have been viewed more than 250 million times. In comparison, the Study EKB (Zaker) alone offers more than 48,942 content resources, attracting more than 462 million views and over 41 million sessions. The majority, over 80 per cent, of those views and sessions are with students, primarily from their secondary school tablets. The remaining 20 per cent are viewed by parents and teachers (EKB, 2021).

This analysis shows how the connections between EKB and MOETE have encouraged higher 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 impact of EKB as a national digital learning platform.

Lessons learned

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

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

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

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

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

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

Limitations

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

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

conferences, at events and in short videos has raised awareness with a limited range 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 MOETE is aware of such limitations (RDP, 2021 c), and is attempting to address it for younger 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 the returns on investment, and analyse gaps and strengths.

Internet infrastructure and access: Despite the significant 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 that could support online learning (World Bank, 2018).

Implications and conclusion

The development of national digital learning platforms has been increasing in the last decade, with examples from Mexico, Uruguay and Brazil, among other countries. Such platforms and 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 country with the ambitious goal of serving all its 100 million citizens.

The case study shows a country attempting to integrate its digital learning platform within the ongoing reform of a complex education system. This has resulted in a set of limitations and lessons learned, such as: how horizontal management structure and building on experts' knowledge through PPP can advance the development of a digital learning platform 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 Futures of Education framework, this experience contributes to the knowledge surrounding blended learning, private-public partnerships, and mass digital learning usage targeting various 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 rather

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

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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 indefinite period. With in-school learning no longer an option, students had to adapt to various home-learning programmes launched by the state governments. Three such programmes, remedial learning through WhatsApp chatbots, activity-based learning through worksheets supplemented by interactive voice response (IVR) and text messaging, and volunteer-led community-based learning, informed the formulation of a framework that tackles the challenges in implementing home learning in India. While the above-mentioned programmes independently fell short in some aspects, they helped us identify five key components of a holistic, 360-degree home-learning programme: access, content, roles, adoption and monitoring.

KEYWORDS

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

**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 an indefinite period. With in-school learning no longer an option, close to 250 million students had to adapt to various home-learning programmes launched by state governments in partnerships with various non-governmental organizations (NGOs). While well-intentioned, most of the home-learning programmes were suboptimal in their design and comprised sharing content that was readily available rather than including content targeted towards building specific competencies.

Based on a study conducted by the Azim Premji Foundation (2021), on average 92 per cent of children across India have lost at least one specific language ability and 82 per cent have lost at least one specific mathematical ability during the previous year, across all grades. For every month of school closures, children have lost twice the amount of learning (UIS, 2021) they would have gained in that period. Moreover, less than 40 per cent of children were able to access any form of home learning. From this, one can assume that learning for children going to government and low-cost private schools in India has been minimal during the COVID-19 school closures. While the disease itself is a visible crisis in terms of impact on health and livelihood, there is an invisible generational crisis unfolding due to the massive learning loss children are experiencing. Unfortunately, the situation is unlikely to improve as, at the time of writing, schools continue to remain closed in India and are not expected to open 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 programmes, implemented in different geographies in India, are discussed in this chapter. They show learning as a function of 'touch' (consistent motivation, guidance and scaffolding) and 'stuff' (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 across India received learning materials or activities from their teachers during the week before the 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 the spectrum from low to high-tech interventions that delivered learning gains at scale. *Figure 1* provides an overview of how each of them fitted this scale and their key findings.

Figure 1. Summary of Findings

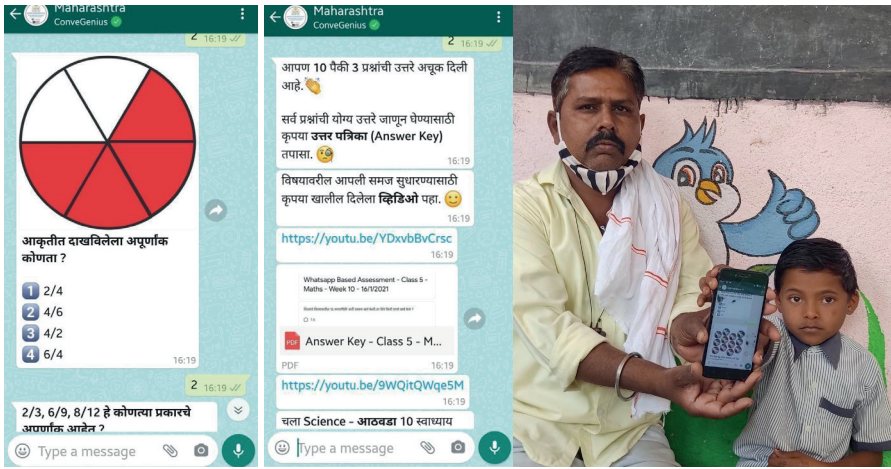
Key features of home-learning interventions			
	Low Tech		High Tech
Program Model	Community-based learning supplemented by SMS & Whatsapp	Activity-based learning through worksheets supplemented by SMS/IVR	Remedial learning through WhatsApp chatbots & nudges
Exemplar	 Language and Learning Foundation Strong Foundations. Stronger Futures Har Ghar School, Haryana (80K learners, G1-3)	 MADHI Happy Learners, Tamil Nadu (20K learners, G2-4)	 CG Lfe SwadhYay, Maharashtra (8M Learners, G1-10)
Access	70% Community classes, physical workbooks and text messages	- Physical workbooks & IVR calls	60% Whatsapp chatbots
Engagement	70% of students attending at least 3 classes per week	20% Student engagement 45% Teacher engagement on digital tracker	More than 90% test completion rate 40-50% student engagement for 5 consecutive weeks
Learning Outcomes	60%, 80% & 55% improvement in text reading, reading comprehension, & writing respectively	12% average improvement across Student learning outcomes	NA

REMEDIAL LEARNING THROUGH WHATSAPP CHATBOTS

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

The programme uses a nudged learning model and has three core components: formative assessments; remedial learning; and adaptive teaching. Each student has a personalized learning journey, drawn up from the formative assessments administered via WhatsApp. Based on the performance in the formative assessments, parents or students receive content nudges through the automated conversational software, the WhatsApp bot, each week focusing on a particular learning outcome, facilitating remedial learning. The teachers receive nudges in the form of summary reports of each cohort, facilitating adaptive teaching (Figure 2).

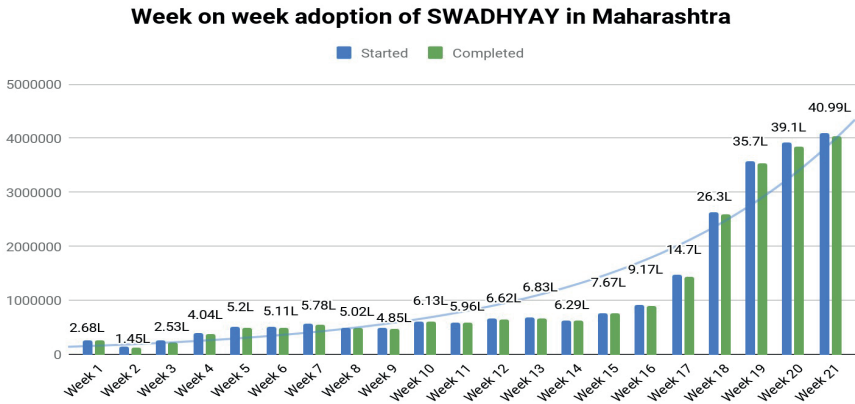
Figure 2. Assessments and content nudges on WhatsApp, Swadhyay programme, Maharashtra



KEY FINDINGS

- Officers at block, district and state levels, as well as teachers, use data from the programme to track the participation and performance of the students ensuring high engagement – completion rates week-on-week were above 90 per cent (ConveGenius, 2021) (see Figure 3).
- The SWADHYAY programme has demonstrated that assessment-informed instruction, offering users very targeted content, increases engagement metrics compared to content and videos delivered to students in a cascaded manner.
- Participation and performance of students can be monitored at a state, district and block level.
 - 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 at the local and central levels.
 - The platform is useful in conducting diagnostics and evaluations to support the state 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 of Madhi Foundation (<https://www.madhifoundation.org/>), implemented the Happy Learners programme focused on strengthening foundational learning in two of its districts, reaching approximately 20,000 students and 850 teachers. The programme leveraged the prevalence of feature phones in children's households, the dominant phone type in rural TN. Learning content was delivered through an interactive voice response system (IVRS) and hardcopy workbooks were made available for children to learn. Each child would call the IVRS learning system, once a day, and complete the associated learning worksheet and check for understanding questions where necessary (see Figure 5), with support from their parents. Teachers used 15-minute voice calls to conduct assessments, based on the teacher guide provided to them, with all the students in their class and uploaded the data inputs into the digital tracker every week. Automated short message service (SMS) nudges were sent to teachers and coaches who did not update their trackers, along with reminders of regular review meetings.

Figure 4. Sample activities from Happy Learners programme


Date **DAY 17**


What do you see?


Input

Sugarcane Watermelon Mango

1. Circle the right picture:

a) Mango 

b) Sugarcane 

c) Watermelon 

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

Think and do

Let us Read

Madhu is a small girl who lived in Chennai. One day, Madhu's family decided to go and meet their aunt. Her aunt lived in Kanchipuram. Madhu and her mother went to the shop to buy fruits and vegetables. They got mangoes, watermelon, and sugarcane for the trip. Madhu got some chips and biscuits. Madhu's mother bought potato, onion, and chilli from the market. They decided to pack potato curry and chapati for the trip. Madhu was very happy.

1. Answer using the help box. Chennai, Onion, Kanchipuram

a) Where did Madhu live? _____

b) Where did Madhu's aunt live? _____

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 greatest improvement in student learning outcomes, which is further corroborated by the fact that 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 for rural households, reflected 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 of rural households in India. Furthermore, according to the ASER 2020 Survey (2020) almost 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 study in government schools (84 per cent) and less than half of their families have a smartphone (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 home visits from teachers, volunteers and LLF staff, to support students learning through face-to-face interaction. Volunteers conducted community classes at least three days a week for 90 minutes with a class size of 3–10 students. Students received daily homework through text messages via SMS or WhatsApp. The responses were tracked, and automated report cards and certificates were sent out to students to keep them motivated. Teachers and coaches conducted regular assessments to track student learning. It is envisaged that once schools reopen, students who are lagging behind in their learning level will continue to get face-to-face support after school hours and on weekends by community volunteers.

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



KEY ACTIVITIES

Volunteer or teacher run community classes



- 3 classes per week for each grade (1 & 2)
- Class size varies from 3 to 10

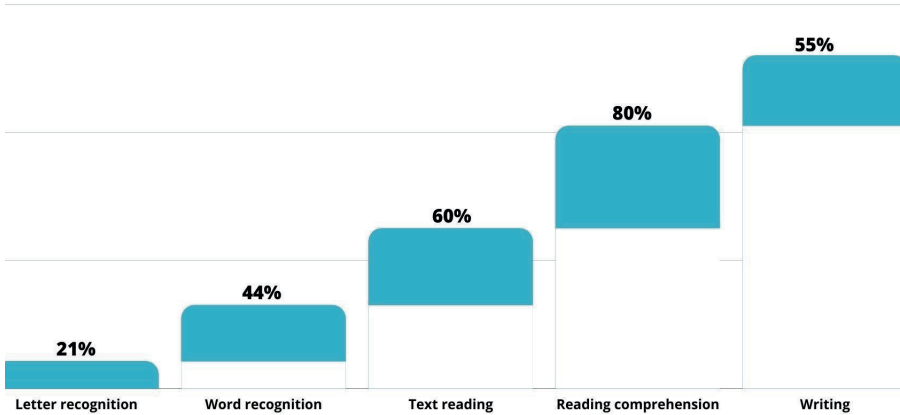



KEY FINDINGS (LLF, 2021)

- **Learning outcomes.** Improved levels of proficiency over baseline in the skills such as letter recognition (by 21 per cent), word reading (by 44 per cent), text reading (by 60 per cent), reading comprehension (by 80 per cent) and writing (by 55 per cent). The programme focused on inclusive learning for the students at the bottom of the pyramid academically. The average scores of the lowest-performing 20th percentile learners more than doubled in eight months, and the gap between 25th percentile score and median reduced.
- **Engagement.** Around 90 per cent of schools conducted community classes with approximately 70 per cent of students attending at least 3 classes per week. Approximately 75 per cent of the parents on WhatsApp groups actively responded to home-based activities.

Figure 6. HGS learning outcomes

Percentage improvement in the progression of literacy skills during Har Ghar School programme



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 designed to be instructor-led and not for self-use by the student or the parent. Moreover, the limited use 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 the dearth of resources in a country like India. This programme shows us that a high-touch model 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 sustained motivation for the learners over time.

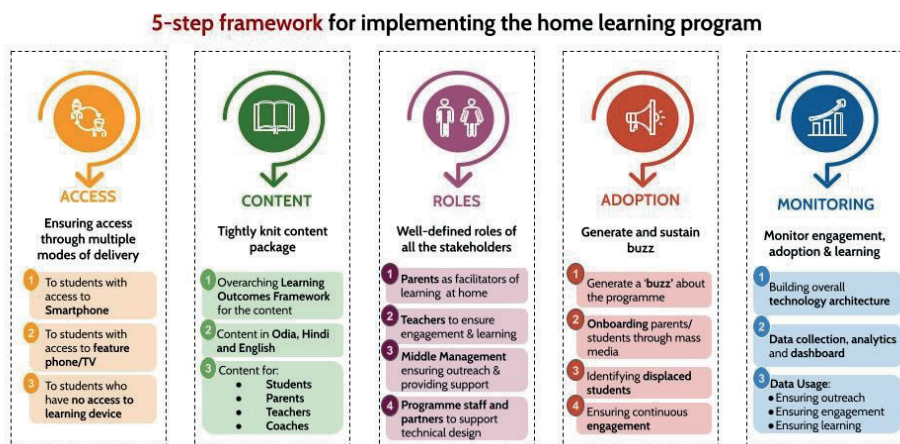
The Happy Learners programme was designed using a good balance of human and technological touch combined with contextual content accessible by all children. However, this programme failed to leverage technology as a multiplier and merely used technology to provide a layer of supplementary content above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

IMPLICATIONS FOR THE FUTURE

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

While the above-mentioned programmes independently fell short on some aspects, they helped us identify five key components of a holistic, 360-degree home-learning programme; 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-tech technology interventions. This 'bundled' approach is in the spirit of the multifaceted poverty-alleviation programme studied by Banerjee et al. (2015). The five-step framework helped us study various interventions and arrive at few successful technology solutions which can be bundled together to improve learning at home:

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

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

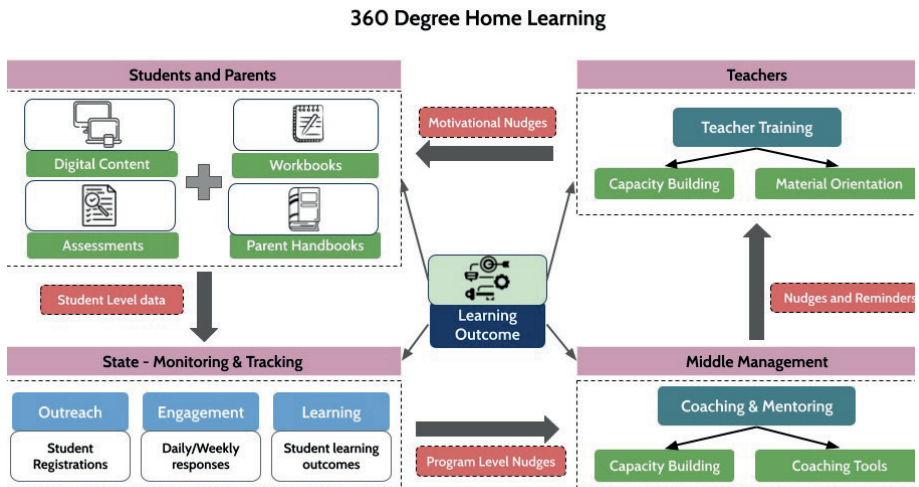
- **Content and assessments:** Printed student workbooks, parent handbooks, and posters need to be designed for self-use without the need for a trained instructor. This can be supplemented by byte-sized, multi-modal content that can be used to deliver instructions as well as dynamic learning. HGS had success with printed material while Swadhyay and Happy Learners programmes have demonstrated high engagement with digital content and high task-completion rates.
- **Roles and responsibilities:** Roles and responsibilities of all the key stakeholders need to be clearly defined and communicated. Cascaded WhatsApp groups ensure content flows from the state department to district level, principals, teachers, volunteers, and finally students. This provides an opportunity to deliver key updates and orientation videos to volunteers, parents and teachers. This facilitates agile decision-making amid continuous disruptions. Physical handbooks with clear instructions for parents and volunteers, as used 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 India have access to newspapers and advertising agencies that can reach remote communities. 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 officials to make informed decisions for the future. Engagement and learning data can themselves act as a motivational nudge for parents and students to sustain learning as seen in both Happy Learners and Swadhyay programmes.

CONCLUSION

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

The key to ensuring an effective home-learning experience lies in a tight-knit programme that 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 which is packaged for self-use by parents and students.
- Training and on-the-job support for teachers and volunteers on how to deliver content, as well as sustaining the engagement and motivation of the users.
- Consistent ‘touch’ through human and technological nudges at each level to sustain engagement and learning over time.
- Data tracking and monitoring to identify gaps in implementation and inform next steps.
- A well-defined linkage between what each stakeholder is learning, when they are learning and how they are learning.

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

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Chapter 5. INDONESIA**Sekolah Enuma, A digital application for young learners**

Pam Vachattimanont

ABSTRACT

Enuma School is a digital application that aims to support young children's learning of basic literacies: reading, writing and mathematics, as well as additional language learning. It functions without internet access, promotes individualized learning, and is designed for self-directed learning too. Enuma School was first created for use in Indonesia as Sekolah 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 back better. This case study describes Sekolah Enuma Indonesia and reviews the experience of its 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 beneficial 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, books

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

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

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

SEKOLAH ENUMA INDONESIA

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

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

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

As the grant was being finalized, the COVID-19 pandemic made the development of a tool to support young children's ability to learn continuously more urgent, as communities 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. An independent tool for young children would be particularly helpful.

With support from The HEAD Foundation, GMP and PSMI, and leveraging its experience in developing applications to help children learn in more than 20 countries, including through Kitkit School, Enuma completed development of Sekolah Enuma Indonesia in December 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 seven and 16 children would gather at community sites for 60–90 minutes five days a week to play with Sekolah Enuma. Children had been out of school for over nine months at the time of implementation and had little access to other learning opportunities. Each child played, on 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 during school hours in three schools, COVID-19 related school closures meant that the programme was implemented in hour-long sessions in community halls and as an at-home programme during a more severe community shutdown. Each child in Lampung played an average of 38 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. Facilitators and teachers helped support children when they gathered at community sites to play with Sekolah Enuma, or to distribute devices for the at-home programme, for which children took a device home and could access the application anytime their families allowed.

OBSERVATIONS

Exhibiting learning efficacy

Students took pre- and post-tests during the three-month beta-testing period. The tests, part of Sekolah Enuma, were administered digitally through the application. The Indonesian and mathematics tests were developed based on the Early Grade Reading Assessment (EGRA) and Early Grade Math Assessment (EGMA), while the English test was developed based on Sekolah Enuma's English curriculum. In both Lampung and Medan, average post-test scores increased from pre-test scores. The average percentage of correct answers for Lampung students increased from 73 per cent to 78 per cent in literacy, 53 per cent to 59 per cent in mathematics, and 44 per cent to 55 per cent in English. In Medan, the average increased from 47 per cent to 53 per cent in literacy, 41 per cent to 53 per cent in mathematics, and 25 per cent to 29 per cent in English². While future opportunities for more rigorous evaluation of learning results, such as through a randomized controlled trial (RCT), would be beneficial, these initial results are an encouraging testimony to the programme's learning efficacy.

Raising empowered learners

Thoughtful design considerations created a child-directed application, which learners are able to use without much, if any, intervention from facilitators during play. By applying Universal Design for Learning principles to its design, children are given multiple ways of approaching or understanding the learning content; for example, through auditory and visual cues, as well as through a tightly scaffolded curriculum that allows children to move along an appropriate learning pathway at a pace that suits them³. When interviewed about the project, Nanik Ernawati, the head teacher of three GMP schools involved in the programme noted, 'The Sekolah Enuma programme has succeeded in helping reduce children's boredom ... The children can be independent and identify problems without guidance' (Enuma, 2021 a). The application provides little direct instruction, and instead relies on quality game design to craft a learning experience that children explore independently. Through positive feedback and ongoing encouragement from the games and the learning system, Enuma School aims to empower children to be confident 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 Framework*: Available here

Supporting innovative learning models

Stakeholders note the flexibility 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 implemented at community centres (akin to school settings), extra-curricular environments, and in homes. 'Enuma's model is suitable for various learning environments. Therefore, we believe that this 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 Plantation (Enuma, 2021a). Future visions of education may require such flexibility, whether instigated by natural or human-made circumstances, but ultimately needing expanded ways of thinking 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 internet connection. So, the children can still learn, even in areas where it is hard to obtain an internet connection. That is why we firmly 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 increasing 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. The Sekolah Enuma programme so far has benefited 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 remotes areas and isolated regions can benefit from the new technology of learning without being burdened by, among other things, the internet connection,' said Professor Hilman Latief, Chair of Lazismu (Vachatimanont, 2021).

Digital skills for young children

In addition to its offline capabilities, Professor Hilman Latief also highlighted the application's potential for supporting digital skills. 'We do hope that our collaborative programme, called EduTabMu and Sekolah Enuma, can enrich teachers' learning perspectives and methods, as well as accelerate students' engagement in new technology and interactive learning processes in such subjects as mathematics, English, and the cultural diversity of Indonesia. This collaboration is a strategic step to familiarize digital technology for our generation and promote what I would call an "inclusive learning acceleration project,"' (Vachatimanont, 2021).

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

LOOKING TO THE FUTURE

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

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

A child-directed application can support basic education and digital literacy and help build confident and empowered learners to engage further in twenty-first century learning. An offline and application-based programme such as Sekolah Enuma can also integrate flexibly

into new learning environments or models, as schools of the future continue to evolve to improve or as they face various challenges to educational delivery. As Dr Ella Yulaelawati, Curriculum Developer and Advisor to Sekolah Enuma Indonesia and former Director, Ministry 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-first century lifelong 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 internet 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 for multiple mediums of technology, to reach children in low-resource settings and support foundational literacy and numeracy skills without in-person teaching. In addition, the next 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, rural 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 the mission to create schools that open doors and change lives. Founded in Sierra Leone in 2014, Rising provided emergency education to children kept out of school by the Ebola epidemic before opening its first school in April 2015. In Sierra Leone, Rising innovates through schools it owns and operates on a low-cost private school model. It then shares the lessons and work

with the government and other partners. In Liberia, Rising is in a public-private partnership with the government, providing high-quality structured curriculum content, intensive teacher coaching and rapid feedback loops to their partner schools. Before the coronavirus epidemic, 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 intervention during a pandemic and work with partners around the world to ensure its lasting impact. What was originally designed as a short-term solution for Rising's own students in Sierra Leone and Liberia went on to reach over 12 million children in 26 countries during the pandemic, and was named by Finland's HundrED, a not-for-profit organization that shares examples of innovative practice in education, as one of the top 100 education innovations 'changing the face of global education in 2021'. ROA also received the 2021 literacy award from the Education Alliance.

Rising responded to the closure of schools in March 2020 by adapting their curriculum content to create a radio programme to strengthen students' foundational skills, even when they were out of school. The theory of change was that students who participated in the Rising on Air programme would stay connected to school, practise foundational numeracy and 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 text-messaging content made available to partner organizations around the world. The programme leverages Rising's high-quality structured curriculum content, re-designed for delivery via existing, widely available technologies: radio, phone and SMS. The Rising on Air content covers literacy, language, arts and numeracy at five different levels across K–12, from early childhood education to senior secondary school, with complementary content supporting teachers' professional development and safeguarding and health messages.

The solution also builds on key lessons learned from the Ebola epidemic: the importance of deploying a solution quickly to keep children anchored in the education system; the value of being able to access high-quality, engaging content rather than trying to start from scratch; and the need to weave health and safeguarding messages into the approach. Interwoven throughout the content are messages designed to help keep children safe from COVID-19 and also from the broader array of heightened safeguarding risks they will be exposed to while out of school.

Because the ministries of education in both countries had been through school closures once 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 first radio lesson within one week 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 first and most urgent problem. For most children in Sierra Leone and Liberia, low internet penetration and weak infrastructure make online learning neither a realistic nor an equitable solution. In Sierra Leone, for example, 81 percent of internet 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 not 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 a 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 who 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 radio 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 built 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 the onset that their intention was to share these radio scripts widely so other organizations could adapt and use them locally. This required the Rising curriculum team to create 'standardized' lesson scripts – keeping the lessons as generic as possible while highlighting what might 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 could download and use them. In addition, Rising created a Slack⁴ platform for all of their partner organizations to collaborate and share tips, recordings and feedback about the radio lessons.

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

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

The use of the lessons has been extremely diverse. Some partner organizations have used the lessons as-is and directly translated them (particularly for numeracy lessons). Other partner organizations used the content of the lessons but changed the medium of instruction from radio to WhatsApp voice messages or interactive voice response messages. Organizations in other sectors used the structure and approach to develop their own content, such as myAgro, which provided radio lessons aimed at 400,000 farmers in Senegal and Mali. Rising worked with the EdTech Hub to create a how-to guide for partner organizations that suggests best 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 over 12 million children during the pandemic. It is important to note that this is not just a pandemic-specific intervention, but a lasting solution that can be used to reach the most marginalized children around the globe. In March 2020, the Rising on Air student radio lessons were aired in English and by May 2020 they were also available in French and Arabic. The summer of 2020 focused on developing professional development sessions for teachers via radio. As mentioned above, teachers needed a connection to their school and development 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 been 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 be 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 partnered with organizations such as the Norwegian Refugee Council in the Kakuma camp to support refugee students in Kenya. This was also the driving force behind the Arabic translation of the lessons. They could then be used with students in the Middle East who had missed years of school due to conflict 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 chatbot tutor that is powered by artificial intelligence (AI) and delivered via SMS and WhatsApp. Rising won R&D Funding as part of the Schmidt Futures/Citadel Tools Competition and most 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 create a machine learning-powered recommendation engine to provide students with the content most relevant to their learning needs. Because it is delivered through highly accessible technologies, such as SMS and WhatsApp, Rori has an incredible potential to reach millions 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. Initially, Rori will deliver maths content for upper-primary and lower-secondary students in English. 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 will enable learning to continue in a personalized way, significantly 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) and the Centre for Global Development (Liberia) showed that students in Rising schools typically 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 basic 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 automatically adapt its questions to find the right level of difficulty for the learner. By using unique IDs, the chatbot can recognize the student every time they engage with the bot, supporting them through the learning content over time.

Rori can help millions of students reach their potential. Rori will launch starting with the 32 schools that Rising owns and operates in Ghana. Next, it plans to expand to its schools in Sierra Leone and Liberia and other school networks in Ghana. Finally, it aims to open Rori up as a global, multilingual product for others to utilize.

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MORE READING

- Rising on Air’s website (up to date)
- One year later report (Mar 2021)
- Report by the OECD, the World Bank, HundrED, and the Harvard Graduate School of 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 Guanajuato⁵

ABSTRACT

With the advent of the COVID-19 pandemic, cities, states and countries around the world were forced to close schools. Guanajuato, a state in central Mexico, was no exception. On March 17, 2020 classes were suspended in the state. Education provision moved quickly towards a distance teaching-learning model. One of the initiatives undertaken by the Secretaría de Educación de Guanajuato (SEG), the Educational Adaptation Study (EAS), that involved the production of guidelines for decision-making and implementation, aimed at helping to ensure continuity of education during the pandemic. This chapter describes one of the innovations that SEG implemented: the design of a set of instructional guides for home study, both in print and interactive, aimed at all students with internet access and a mobile 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) encouraged leaders of educational systems and organizations to ‘develop plans to continue with the educational services through alternative or modalities during the necessary period of social isolation’. On this basis, the state of Guanajuato implemented its School at Home strategy,

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developing comprehensive guides for home study, a selection of educational programmes through the local television channel (TV4), and a platform with educational content for all 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 those without internet access and, subsequently, as an interactive option, available electronically, so that students could learn virtually through an online educational platform.

The decision to develop comprehensive guides in digital format with interactive content arose partly from the results of the Educational Adaptation Study (EAS)⁶. The study was carried out using mixed methodology (quantitative and qualitative), with information-gathering instruments, such as questionnaires, deployed alongside conversations with teachers, 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, the pandemic has accelerated these changes. In recent decades, information and communication technologies have advanced rapidly. There have also been efforts – some more successful than others – to integrate them into pedagogical thinking and to generate an initial theoretical framework.

Víctor Amar argues that education through digital media should not only focus on understanding and proficiency, 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 relevant 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 situated 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 to attend to it epistemologically and affirm again in the reality of applied knowledge’.

The use of information and communication technologies (TIC) in teaching must, however, contribute to the knowledge of students for this to happen. It must be understood that learning is not an isolated process but ‘occurs within diffuse environments of changing central elements, which they are not necessarily under the control of the individual’ (Keller, at Cueva et al, 2019, p. 208). This implies that learning is influenced by the environment in which it takes place. In this sense, the situation of the pandemic created a complex and challenging environment for 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 in the model, Curricular Specification of Elementary and Junior High (CONCUPRISE, as it is called in Spanish), and organized into weekly projects, the daily activities of which integrated, in a transversal way, the contents and learning purposes of various subjects or areas around an 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, depending on the maturity level of the child or adolescent, be developed by students with a certain degree of autonomy and, in the case of the youngest, with the support of their families. The material incorporated content on topics relevant to the student's immediate or everyday environment, with a view to creating simple, creative and playful activities.

CONCUPRISE specifies the essential basic contents in each academic subject in elementary and junior high education. It supports the acquisition of knowledge, skills, values and attitudes, based on the current study plan and programmes of the Secretaría de Educación Pública (SEP). The model includes the main areas of: language and communication, mathematical reasoning, life in society, and the natural sciences. These areas comprise the following 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 Guanajuato suggest that, at the basic levels of education, 29% of students have computer equipment for the development of their school activities, while 39% have internet access at home (based on estimates by teachers). For its part, the National Institute of Statistics and Geography (INEGI, 2020) reports that 48.2% of households in Guanajuato have internet access.

Furthermore, teachers in conversation said that the use of digital platforms was more efficient since it enabled them to administer and manage their own content according to their progress and that of their students, creating an opportunity for a successful interface that supports 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 not overwhelmed with activities.
- The guides are designed by technical-pedagogical advisers, reflecting 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 confinement period were identified. Some of them subsequently participated in a focus group for the design, piloting and implementation of the interactive version of the comprehensive guides 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 prototype and identified areas for improvement. The discussion with teachers identified a number of key 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 were designed and the initiative was launched through the SEG FormaT (Moodle) educational platform. The aim was to provide a tool for students, teachers, administrators and parents with the basic elements of interaction necessary to facilitate the coordination of the at-home 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 well as the process of making use of this tool, helping ensure wide acceptance within the education 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 school.

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

To access this technological resource, initially an interested teacher makes a request through a form, supplying information such as the regional delegation⁸, school password, and the educational level and subject. At the end of registration, teachers automatically receive an email with the registration key for the requested group, which they share with students selected by the teacher to use the platform.

RESULTS OF THE INITIATIVE

As mentioned above, the interactive home study guides were based on the printed guides, 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 copies between April and December 2020, while the electronic version had a total of 330,000 downloads over the same period.

The interactive guides uploaded on the FormAT platform have had the following use since its launch, up to June 4, 2021. There are 45,821 registered students of the different educational 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 resources and 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
	1 & 2	3,265
Elementary school	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 introduced in response to it are here to stay. One of them is the greater use and appreciation of technologies in education systems. The comprehensive home study guides seek to exploit and support this appreciation and use of technology in education; however, there are still borders to institutionalizing its application, one of them being access to the internet and mobile devices for educational purposes.

A brief survey was conducted with the teachers who used the interactive guide with their 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 and 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 cent disagreed.

Locally, the use of these comprehensive guides for home study represented an innovation in terms of curriculum model and the prioritization of student learning. A further leap in innovation 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 continuity strategies for teaching and learning and ensuring that, in the long term, the adoption of the 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 countries, leading to what UNESCO considers a generational catastrophe. Prolonged school closures have widened the learning gap that already affected regions such as Latin America before 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. This chapter explains why and how the use of community learning centres (CLCs) as part of a low-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 student support, and providing increased space for teachers and families to participate in school 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.

**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 closed 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 significant structural inequities, present in Mexico, as well as in other Latin American countries, (UNESCO, 2021) many learners have not been able to access any form of remote education.

The negative consequences of prolonged school closure are worrying. According to data from a recent field study conducted by Mexicanos Primero and the MIA project nine out of 10 students in Mexico believe something bad will happen to their families; seven out of 10 indicate that they feel afraid; and nine out of 10 households say they have lost a family member due to COVID-19 (Mexicanos Primero, 2021). Moreover, in terms of academic learning, the study showed that 61.6 per cent of students aged between 10 and 15 do not understand a fourth-grade text, and 88.2 per cent of students in that same group cannot solve a third-grade maths problem. Finally, although the Ministry of Education (Secretaría de Educación Pública, SEP) has not provided official information, Mexico's National Institute of Statistics and Geography (Instituto Nacional de Estadística y Geografía, INEGI) estimates 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 financial circumstances (INEGI, 2021). This corresponds to 17 per cent of Mexico's K–12 (kindergarten to Grade 12) public and private school enrollment.

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

SCHOOLS AS COMMUNITY LEARNING CENTRES

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

SEPyC) of the state of Sinaloa was among the first, and one of the few, local authorities to decide to implement this strategy. Its goal was to support students who had had little to no contact with their teachers during the remote education phase. During February and March 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 26 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 almost 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 decision for each community. But there was no guidance as to how school communities should approach the decision-making process. In response, SEPyC asked all school principals to discuss the options during the School Technical Council (Consejo Técnico Escolar, CTE), a recurrent meeting teachers and principals hold on the last Friday of each month. To orient this discussion, SEPyC sent all principals a report (APA Report) containing data about the school's virtual attendance and personalized information about students with whom there had been little to no communication. While some schools arrived at the final decision solely based on the school principal's choice, others allowed teachers to vote and offer their opinions, while some schools included families and caregivers in the decision-making process.

Giving school communities the responsibility to decide was an effective way to neutralize the resistance of teachers' to resuming face-to-face instruction. But this transfer of responsibility also limited SEPyC's capacity to secure the availability of more CLCs; this is relevant since the 26,000 learners attending CLCs represent a low percentage of the state's student population 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 CLCs, the main factor behind the decision to re-open the school was the awareness that principals and teachers had about their student's need for face-to-face instruction, which in all cases, was communicated directly to families by teachers and principals. This success might offer interesting implications when thinking about how to persuade more schools to start operating as CLCs.

ACADEMIC AND SOCIO-EMOTIONAL PROVISION

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

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

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

DISCUSSION

CLCs in Sinaloa offer valuable experiences for countries striving to find ways to resume face-to-face instruction. Operating with a set of precise and clear guidelines and limitations, only 16 out of almost 900 CLCs have had to close temporarily due to COVID-19 cases (Trejo, 2021). But the most valuable lessons do not come from the health and safety protocols observed by CLCs. Instead, they emerge from the organizational and pedagogical implications of resuming face-to-face instruction after almost one and a half years of remote education.

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

the educational quality in schools. Shared decision-making (SDM), namely 'a formal system 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 engagement practices that offer several benefits 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. Personalization refers to teachers, students and families interacting in ways that 'scaffold each student's learning and enhance the student's personal competencies'. (Twyman & Redding, as cited by Murphy et al., 2016). Some of the essential traits of personalized education strategies are: to focus on understanding the learner's preferences, interests, and aspirations; developing quality relationships that increase student engagement; and enhancing personal competencies (p. 4). As evidenced by the lack of rigor in the learning assessment methods used by teachers, 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 partner with Mexico's National Council for Educational Promotion (Consejo Nacional de Fomento Educativo, CONAFE) which has had pioneering experiences with the Learning Community Project (LCP), an educational change initiative focused on empowering students to master new knowledge that they can then teach others through becoming tutors (Rincón-Gallardo & Elmore, 2012).

Personalization and innovative approaches, such as student-centred tutoring, can be a 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 that 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 into a fundamental building block of face-to-face instruction.

Embracing this crisis as a renewal opportunity for school systems is essential for all countries that want to help learners to recover from the effects of prolonged school closures. According 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 collaboration and innovation (OECD, 2020). Similarly, nine out of 10 Mexican students believe that they

can get through hard times, while three out of four feel that their goal in school is to learn as much as possible. Considering these underlying conditions, CLCs in Sinaloa have the unique opportunity to outgrow their role as an emergency response strategy to mitigate the immediate consequences of the pandemic and become a source of ideas for the renewal of face-to-face instruction required for schools to build back better.

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Chapter 9. MEXICO**Independent Learning Measurement initiative**

Sergio Cardenas and Felipe Hevia

ABSTRACT

Independent Learning Measurement (Medición Independiente de Aprendizajes, MIA) is an action-research project conducted jointly by scholars from El Centro de Investigaciones y Estudios Superiores en Antropología Social (CIESAS) and Universidad Veracruzana. As a collaborative research project, begun in 2014, MIA has adopted Pratham's Teaching at the Right Level approach to support rural and multi-grade school communities. During the COVID-19 pandemic, thanks to their experience of working with local education systems, MIA adapted and implemented professional development programmes to support schools affected by mandatory school lockdowns. These professional development programmes helped teachers to use diagnostic assessments and implement a Combined Activities for Maximized Learning model to support primary school students during the pandemic. Preliminary impacts on learning and potential lessons for replicating this model during the reconstruction period are described.

KEYWORDS

Assessment, professional development, innovation, policy learning, networks.

**BIG IDEAS**

This chapter describes how the rapid adaptation of a programme based on professional development activities helped support school communities during the pandemic. It also highlights the importance of constantly building support networks for school communities.

INTRODUCTION

The COVID-19 pandemic posed significant challenges to education systems worldwide. School lockdowns made traditional teaching tools, such as face-to-face instruction practices, unworkable for school communities. Numerous national school systems could not adapt to distance education modalities, thus increasing the learning gaps that existed before the pandemic.

The Mexican Government responded to the COVID-19 educational crisis by adopting two central policies. First, it implemented school lockdowns to reduce infection rates among students, teachers and their families. Second, it implemented a distance education initiative called Learning at Home, based on educational television programmes broadcast on dedicated channels operated by the federal government, while opening a web platform to support school principals and teachers.

The rapid transition to a generalized distance education model resulted in increased learning gaps and drop-out rates. Although no official data on learning loss and drop-out rates have been made public, some studies suggest that a significant proportion of Mexican students faced significant challenges while participating in distance education programmes (Baptista Lucio, Almazán Zimerman & Loeza Altamirano, 2020; INEGI, 2021; Juntos por el Aprendizaje, 2020; Pozas, Letzel & Schneider, 2021). These limitations may result in a significant loss in educational achievement in the country, compared to previous decades.

The documented challenges in implementing distance education policies during the pandemic in Mexico may have different explanations. First, the context is complex due to the size and diversity of the Mexican education system, with more than 30 million students enrolled in compulsory education before the pandemic (primary and upper secondary). Second, emergency education policies were designed and implemented in a highly centralized way, even though local governments are responsible for nearly eight out of 10 schools (SEP, 2020). Third, policy-makers have limited experience in designing universal distance education programmes, resulting in significant variations in the effectiveness of local initiatives to support school communities.

The Independent Learning Measurement (*Medición Independiente de Aprendizajes*, MIA) initiative was developed over several years in close collaboration with local governments and school communities. Its characteristics were essential in responding quickly to the demands of school communities during the pandemic. This is because the initiative aims to promote appropriate use of information from learning assessments to adapt instructional practices and align them with specific students' circumstances.

THE INTERVENTION

Before the pandemic, MIA acquired experience adapting the Teaching at the Right Level model developed by Pratham in India (Banerji, 2017). This model was usually implemented through a three-step iterative process with school communities: first, MIA administered a diagnostic and formative evaluation tool, to identify appropriate learning levels for each student regardless of their age or school grade. Once this information was collected, MIA

would design remedial courses, including suitable instructional activities for each student. Finally, they administered a test to collect additional information to guide future adaptations of instructional practices. Under this model, these assessments guided teachers' decisions to support specific groups of students, facilitating the adaptation of instructional practices to different contexts such as those presented during the school lockdowns.

The close connection the MIA team built with school communities before the pandemic helped it rapidly assess the different issues teachers and school principals were facing, including the learning loss resulting from school lockdowns. Based on these observations, MIA developed its emergency model, drawing on the three principles that guided previous interventions:

1. Alignment of instruction with students' learning levels, based on the Teaching at the Right Level approach (TARL).
2. Use of diagnostic tools to teach students at the right learning level, particularly during the pandemic, when timely feedback on academic performance was limited.
3. Conceptualization of simple and helpful assessment tools which can be used by teachers, children and parents without sacrificing validity and reliability.

One of the main challenges teachers faced during the pandemic was limited access to reliable information about student academic progress due to the limited capacity to collect information. This problem increased the difficulty of designing and implementing remedial instructional activities for different groups of students, a critical task since the strategy adopted by central government depended heavily on the support and continuous commitment of parents while students remained at home. However, the characteristics of the intervention tools developed by MIA were essential for a rapid adaptation to a complex distance education working environment. Diagnostic instruments were revised to measure the achievement of *essential learning* rather than the *expected learning goals* included in the national curriculum, facilitating adequate support during a process in which it was necessary to adapt the curriculum to a restricted learning environment. Based on this orientation, MIA adapted its tests to measure reading (fluency and reading comprehension) and basic mathematics (arithmetic operations and problem-solving). Assessments were easily implemented since tests could be administered orally, person to person, quickly, and without complex training.

These conditions helped to provide timely feedback on students' performance to school communities. Furthermore, these tests could be potentially administered over the phone, which would increase their usefulness in case of future school lockdowns. Once the information had been collected, MIA designed remedial courses according to students' learning levels during the pandemic and organized group activities to maximize student learning (usually 20 sessions of 90 minutes each), defined as 'learning boot camps'. Finally, the intervention undertook a formative evaluation to identify potential impacts on learning and measure

change in order to evaluate the course's effectiveness. This process helps generate evidence to support the alignment of instructional activities with students' specific needs in future activities.

IMPLEMENTATION

The implementation of the MIA intervention during the pandemic aimed to support teachers in two fundamental processes: a) the use of diagnostic tools; and b) the design and implementation of remedial courses. This project was implemented with the financial support of the Tinker and Hewlett foundations, as part of a project to create a scalable and sustainable professional development model. It was based on two courses, with a total duration of 45 hours. The first course was designed to inform teachers about assessing students' performance, including the administration of MIA-adapted tests. During the second course, teachers learned to implement the TARL model and to adopt instructional innovations to teach mathematics and language in a way that took account of conditions during the pandemic. Among these innovations were lessons recorded by teachers, the selection of YouTube materials, the use of board games, and the use of apps on cell phones. These materials were used in the context of four general pedagogic strategies: problem based-learning, socio-emotional learning, collaborative learning and independent learning.

MIA staff implemented these courses through an asynchronous delivery model, using a learning management system on a virtual education platform developed by the Universidad Veracruzana, known as EMINUS. This process required the assessment of contexts and professional development needs, the design of an effective learning environment, instructional materials, and the conducting of instructional planning and formative assessment design in online and offline modalities. It is important to point out that MIA aims to foster learning communities composed of public officials, superintendents, supervisors, principals and teachers. This orientation is a crucial characteristic of the model since it recognizes and includes different actors in programmes developed to support school communities.

This process enabled the design of specific courses for teachers working in multigrade schools, as well as the implementation of a recruitment and training process on digital skills for school facilitators. This stage resulted in four courses organized by the Universidad Veracruzana, all valid for internal certification for promotional purposes.

In addition, MIA worked with other local education authorities outside Veracruz. Once the initial training process concluded, local education authorities requested the expansion of the MIA project to include more teachers in two states. Similarly, in a collaborative effort with NGOs and international organizations, the two courses designed by MIA were

implemented in Guerrero, Chiapas, and Yucatán, in the Mexican southeast. At the beginning of the project, in September 2020, MIA expected to train 400 teachers from multigrade schools in Tabasco and 200 in Veracruz. By June 2021, MIA surpassed these goals since the project trained nearly 2,500 teachers in all the participating states, including every teacher working in multigrade schools in Tabasco.

The percentage of teachers satisfied with the implementation of these courses was very high: 94 per cent indicated that they would be able to apply diagnostic tools for their students in their contexts; and 93 per cent considered the methodology adequate. Furthermore, 93 per cent stated that topics and contents corresponded to their professional development needs. In addition, internal preliminary evaluations suggest a positive effect on language and mathematics: 54 per cent of students reached a higher performance level, while 43 per cent of students reported the same positive effects on mathematics.

There were some problems and limitations in the implementation of this initiative, however. The most obvious was the lack of connectivity and digital skills among teachers, which is likely to have contributed to the 20 per cent drop-out rate during professional development activities. A second limitation was the excessive administrative burden to distribute information within the local ministries of education, represented by superintendents, supervisors, school principals, and teachers. Last, the excessive amount of 'online' activities programmed for teachers resulted in fatigue and stress among teachers, affecting their motivation to implement educational innovations.

LESSONS

The adaptation of the MIA model to support schools during the pandemic allowed efficient and rapid interventions to help teachers and students under emergency conditions. Beyond creating new tools to be used during the pandemic, adapting the MIA model provided a timely and efficient intervention for school communities. This adaptation provided some lessons, which should be considered in the reopening of education systems.

The first lesson to highlight is the need to ensure that basic learning goals are sufficiently emphasized and taught during the recovery process. Beyond reaffirming the numerous learning goals included in the national curriculum under pre-pandemic conditions, it is necessary to reflect on the need to guarantee that every student achieves essential learning goals. The inclusion of excessive learning goals may affect populations with a greater dependence on public schools since fundamental learning can be ignored if a focus on quantity prevails over relevance. This is a crucial aspect to be considered in the design of post-pandemic remedial interventions.

Second, it is necessary to remember that schools are not black boxes isolated from other institutions and communities. A vital lesson from the MIA experience is the need to continuously create and maintain support networks for school communities before, during and after any similar crisis. During the pandemic, the adaptation and implementation of MIA relied on the numerous collaboration projects designed and implemented before the pandemic. These projects were implemented through intense collaboration with school communities.

A third important lesson concerns how the collaboration between public education systems and higher education institutions helped to scale up the MIA intervention. This collaboration suggests that adopting different approaches to enrich students' learning process inside and outside schools is fundamental. Furthermore, in a post-pandemic stage, it will be necessary to adopt a lifelong learning approach since there is an explicit expectation that multiple actors should be included in guaranteeing the availability of relevant learning for all.

Finally, external evaluation and assessments are helpful when used by teachers and administrators to inform their decisions, and these should not be considered exclusively as accountability mechanisms. Similarly, professional development activities aligned with students' specific needs guarantee better educational opportunities for all. It seems necessary to abandon rote practices guiding important decisions regarding assessment and training policies.

FINAL COMMENTS

The MIA experience during the pandemic is an example of a rapid policy adaptation to respond to a complex and changing environment. Beyond the availability of diagnostic and instructional tools, it helped to identify how traditional activities and resources already available in any educational system may still be helpful in improving the operation of education systems. The experience of the pandemic showed how including and creating sustainable collaboration mechanisms across school communities is a necessary step in guaranteeing improved teaching practice and a response to the specific needs of students under critical conditions. In the same way, it highlighted the advantages of policy learning, effective collaboration with decision-makers and, above all, making explicit the shared goal of consistently meeting the specific needs of students. Although some of these factors could be considered standard components in any education reform, the effective operation of traditional interventions in the middle of a pandemic environment remind us of some of the resources we have for redesigning school systems during the recovery period.

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Chapter 10. MEXICO**National programme for recovering learning loss**

Erik Ramírez and Patricia Vazquez; with Rita Sánchez and Harvey Sánchez

ABSTRACT

Like many other countries, Mexico faced enormous challenges in supporting learners during the pandemic. Mexico has experienced an extended shutdown with schools still in full or partial distance learning mode. It is projected that more than 1.8 million students have abandoned the school year because of the economic hardship of their families (INEGI, 2021). This number represents almost 5 per cent of the total population enrolled in the formal education system. In this context, the chapter presents the first results of a national intervention from October 2020 to July 2021, named Recovery and levelling during the pandemic: Improving learning outcomes in middle schools in Mexico. This strategy was a partnership between the Federal Secretariat of Public Education (SEP), along with the Organization of American States (OAS), the National Polytechnic Institute (IPN) and Radix Education (a private organization). The programme reached 14 out of 32 states in Mexico, targeting the ninth grade in public and middle schools in the most marginalized areas.

KEYWORDS

Teacher professional development, learning outcomes, middle schools, secondary schools, learning pulses.

**BIG IDEAS**

A national academic intervention in schools during times of pandemic needs to focus on recovery and levelling as a priority. Learning losses are visible and can deepen more as time goes by. A strategy should have three core objectives. First, collect evidence about students' socio-emotional situations that might allow teachers to understand their learning challenges better. Second, support teachers with accessible learning strategies for remote teaching to reach students from the lowest-performing schools. Last but not least, create and develop a collaborative culture through a teacher training programme as a bridge that allows schools to connect data and evidence to improve student learning (Love, 2009).

INTRODUCTION

The pandemic has demonstrated that there is no one-size-fits-all intervention to support learners during prolonged school closure. Such is the case of Mexico, where the national government deployed strategies to promote educational continuity during the public health crisis. Remote instruction through television and radio were the most common instruments used in ensuring continuity of learning. However, in many cases, other local strategies were implemented to support academic learning and meet socio-emotional needs.

In this context, the Federal Secretariat of Public Education (SEP), along with international and national organizations, built a concrete intervention that was primarily designed to help middle schools to improve learning outcomes against international standards. The pandemic, however, forced decision-makers to adjust the original programme to develop an intervention called Recovery and levelling during the pandemic: Improving learning outcomes in middle schools in Mexico (RELEP) to address the needs of the most vulnerable schools in the country with lowest academic achievement. The programme promoted collaboration between school community members and other schools and stakeholders to recover and level learning outcomes.

RELEP built on the sustained improvement and recognized experience of the state of Puebla, Mexico. Between 20012 and 2018, Puebla went from last place on the national academic assessment in secondary education to first place in maths and language and communication (De Hoyos, 2019). These results were a consequence of implementing the APA (attendance, permanence, learning) education model with the following objectives:

1. Focus education goals on the essential and fundamental learning outcomes of the education system, incorporating teachers, school directors and supervisory personnel in the construction and monitoring of actions.
2. Adapt all possible resources to address the learning challenges, understanding local conditions and promoting learning outcomes above all circumstances and risks.
3. Focus strategies and resources on the most disadvantaged schools (mainly serving the most vulnerable populations).
4. Monitor the implementation of local actions to identify best practice and give follow-up and continuity to those strategies that had the most positive results.

Regarding the third objective, a teacher professional development (PD) strategy was implemented based on the principles of recovery and levelling. Furthermore, peer coaching and peer tutoring were recognized as the best strategies for primary, middle and high schools, and this became a transversal element in the PD programme. All schools with outstanding results supported and advised the lowest-achieving schools in the same geographical area.

In the case of RELEP, the focus was on middle schools only, specifically ninth graders, and on adapting and reconnecting with the national curriculum in order to detect learning circumstances during the crisis. Both SEP and Radix Education agreed to develop the programme just a few months before the pandemic began and schools closed. PISA 2018 results (OECD, 2020) were released at the beginning of 2020, confirming that students in middle schools continued to need an enormous support to improve their basic competencies, even after national reforms had been implemented. With the advent of COVID-19, RELEP adjusted to distance education.

Results from a survey conducted by MEJOREDU¹⁰ in June 2020 provided insights about obstacles to accessing distance education. It found that 57.3 per cent of students did not have a computer, television, radio, or cell phone during the emergency while 52.8 per cent of strategies required materials that students did not have in their home (Hinckley et al., 2021).

THEORY OF ACTION

The theory of action of the programme focused on guiding teachers, principals, and superintendents through a process of deep analysis and understanding of the local education context (Love, 2009) and the learning bias in maths, language and communication, health and socio-emotional skills, through a professional development programme promoting co-sharing solutions. In order to promote better learning outcomes for middle-school students, teachers need to create a cycle of testing and reflection on their own practice. Furthermore, in building this peer virtual community, ‘learning pulses’ should be seen as an instrument to collect data from students and teachers to better understand their academic and social challenges during the pandemic.

ASSUMPTIONS AND GUIDING PRINCIPLES

The main assumption in adjusting RELEP to a context of emergency was to reinforce all efforts to reduce existing inequalities and inequities of the education system, focusing on communities living under challenged and adverse conditions. Teachers in public middle schools knew about the low academic results in PISA, but the need to work differently during COVID-19 on maths and language and communication strategies was urgent. Teacher training programmes may promote and raise awareness of the need to improve learning outcomes. But it was also important for teachers to recognize that distance learning processes were affecting the most vulnerable and least resourced learners and that it was going to be harder to teach in virtual and sporadic conditions. RELEP brought a sense of urgency to the educational agenda but

¹⁰ MEJOREDU is the new institution in charge of developing and assessing education policies in Mexico. It replaced INEE (Instituto Nacional para la Evaluación de la Educación) in 2019.

at the same time, the program helped to build a community in which best practices could be shared. The lessons learned from the guiding principles of RELEP are the following:

- **Consider a programme that prioritises socio-emotional learning through academic content:** Improving academic performance requires the planning and execution of interventions focused on learning beyond teacher professional development. Interventions should also include and foster the growth of mindset to improve and support student success. Additionally, to innovate means changing the culture of classrooms, schools, districts and society (Fullan, 2007), for which several strategies must be included. The most important of these strategies is for peer reflection.
- **Design thinking about a unique context:** The National Council for the Evaluation of Social Development Policy (CONEVAL) estimated an increase of between 8.9 million and 9.8 million Mexicans with an income below the poverty line due to the COVID-19 crisis. These economic challenges increased student drop-out. Even though RELEP based its principles on the Puebla APA model, the pandemic forced the project to design a new strategy based even more closely on schools experience.
- **Give schools the confidence to lead their own PD process.** RELEP promoted the idea that any intervention must ensure learning outcomes for all, even in moments of emergency. Fostering a high-quality peer learning culture through a training programme enabled teachers to raise the quality of their teaching process and, consequently, to improve learning outcomes. The most important idea is that teachers become the academic leaders of the institutions (Lindsey, Nuri Robins, Terrell & Lindsey, 2003).
- **Lead for development:** Teachers are agents of change in their communities, and, in most cases, understand their students' family circumstances. When a distance strategy is implemented, they can oversee the challenges of their own schools and classrooms. Acknowledging this is even more important during a pandemic or other crisis. A professional development programme should recognize teachers as communities of practice. For this to happen, ongoing support for teachers must guarantee a vision in which all students can have access to any type of instruction and teachers place high expectations on each other.

These assumptions helped RELEP to understand the very complex context in which teachers work and to address their needs as a priority. Five main guiding principles emerged from the application of the assumptions to the programme:

1. **Solidarity learning:** This element is understood as a toolkit of peer strategies to promote recovery and levelling. Solidarity learning, in this program was acknowledged by the

strengthened the teaching and the way to support the teaching practice by exposing teachers to innovative methodologies. Additionally, a personalized education system was needed so the Radix Education model could adapt best practice from Learning One-to-One in Colombia through learning guides and transversal projects, all of them developed under the design thinking methodology (Portnoy, 2019).

2. **Targeting implementation:** The middle schools selected from the 14 states had students with the lowest-performing scores in past national tests: 85.8 per cent for language and communication and 91.5 per cent for mathematics. These schools represented different modalities, including general middle schools (43.8%), vocational middle schools (28.4%) and TV Middle schools (27.8%).¹¹
3. **School inclusion:** This framework for teacher professional development is aligned with previous and current educational needs. School inclusion has been a priority in many education systems globally. This principle encouraged decision-makers to think carefully about which schools and students needed most attention and to understand the scale and type of challenges that teachers were confronting. These inputs led to recognition of the importance of reducing inequality and to a review the causes of school drop-out and learning loss.
4. **Monitoring:** Any strategy in education requires data to guide an academic intervention, especially when targeting schools. In this case, experts in assessment and evaluation processes from the Latin American Agency for Evaluation and Public Policy (ALEPH) designed tools that could orient local decision-makers to understand more about the pandemic challenges. 'Learning pulses' were implemented as exercises and surveys to monitor the programme, to support self-reflection on the learning process and to provide continuous feedback to teachers.
5. **Coordination and communication strategy:** This core element of the programme involved concrete pedagogical learning guides for different school decision-makers to make visible teachers' work within the training programme and to monitor the schools' and students' results. This strategy brought all the above components together in a website. It framed the reflective practice of 5,000 teachers, principals and education authorities from the 14 states.

11. In Mexico there is a very special school in which all content for more than 30 years has been released to the most marginalized schools through television content and special textbooks.

EVIDENCE AND LESSONS LEARNED

RELEP was designed and implemented in Mexico with the support of the national authority in accordance with the 14 state education authorities. The programme would, in other circumstances, have been implemented mainly face to face. However, the pandemic resulted in a rethink of how best to provide support to teachers, given evidence of online training programmes with low graduation rates. More than 6,000 teachers demonstrated that the most important strategy in any PD is one that emerges from sharing best practices through a digital platform.

Downloadable student guides, a one-way communication strategy with teachers through the platform, local support from governments and education authorities, and data collection on the current situations of teachers and students were important guiding principles. RELEP is an example of an important articulation between national and local governments.

Notwithstanding the huge challenge Mexico faces in revising its national assessment policy, the need to have data to support RELEP's PD programme was recognized by teachers during the professional development program. In terms of governance, there is no way to nurture conversations with local decision-makers if evidence is a blank sheet. Many concerns were raised in conversations with the 14 states and their teams, from keeping students enrolled in the system to engaging them in their learning processes in all circumstances. The first results from the learning pulses¹² were collected and shared with all the participants at the end of each of the five modules of the PD programme. Some data can also be provided about students' learning conditions and practices, variations in their lifestyle and their physical and emotional health, as well as evidence on what they learned during their time away from traditional classrooms.

The variety of contexts in Mexico is broad, but, for some states, the results reinforced what teachers in other platforms have acknowledged: that the most important element is not only to consider the way in which future scholar cycles should be designed with but also to take a more equitable perspective on current learning situations. The results¹³ synthesize the responses of more than 26,000 third-grade middle school students and reinforce the need to improve educational experiences and understand the magnitude of the challenges to level and recover learning losses.

12. *Pulsos de Aprendizaje* is an initiative of the Latin American Agency for Evaluation and Public Policy (ALEPH), which promotes continuous and timely feedback both for educational authorities and for teachers and students. Such feedback is generated on the basis of diagnoses, formative and achievement evaluations on various areas of relevance to integral human development, such as the essential skills to learn throughout the life, and factors associated with learning, socio-emotional well-being and the health of the educational community. The information supports the generation and adaptation of public policies, educational improvement projects in schools and the design of educational paths personalized for students, in order to guarantee a quality education that responds to local needs.

13. *The learning pulses results will be published shortly. The data is presented here for the first time.*

The first students' results indicated that 99.6 per cent of students have a chair and table, 98.8 per cent have an electronic device, 96.8 per cent have a computer, 70.6 per cent have a tablet, 52.3 per cent have internet service, and 92.2 per cent have a physical space to study. Thirty-eight per cent of students said they learn with educational platforms such as Learn at Home (Aprendo en Casa, created by the national authority) or Google Classroom, 36 per cent with activities on the internet; and 31 per cent with textbooks and paper activities. Ninety-two per cent of students said they do not learn with radio programmes, while 84 per cent said they do not learn through television, and 81 per cent through online classes.

Regarding their learning expectations, one in three students said that their learning was low or very low. However, it is notable that one in two students said that their learning was low or very low during the pandemic. Most students who have learned little or nothing in the past year say they will continue to learn little or nothing after the pandemic.

Concerning the level of studies students aim to complete, 24 per cent of general middle school students said they would complete high school and 14 per cent will complete high school, 24 per cent of technical middle school students will complete high school and 12 per cent will complete high school, and 28 per cent of TV middle school students will complete middle school and 24 per cent will complete high school. To add, one in four students plans to drop out at the end of middle school, six out of 10 students say they will finish higher education, and four out of 10 students say they will complete a postgraduate degree.

Regarding middle school teachers in Mexico, the results captured the opinion of more than 20,000 RELEP participants from the education community surveyed between March and June 2021, who gave an account of changes in lifestyle and educational experience. The following represents the opinion of 1,900 third-grade language and communication and mathematics teachers about their health and social and emotional well-being.

Negative emotions have increased during the pandemic for a higher proportion of teachers, while positive feelings have increased to a lesser extent. Women were more likely to report experiencing negative emotions during the pandemic than men. Furthermore, 68 per cent of women men report feeling more tired during the pandemic, compared to 50 per cent of men. More than 65 per cent of teachers indicated that during the pandemic they had learned more things, that they do more school activities and that they use social networks more. Fifty-four per cent said they had been able to read more while 51 per cent spend more time with their family.

MAIN CONCLUSIONS

In Mexico, students are far from possessing the minimum academic skills necessary for their present and future personal and professional lives. A timely intervention for the most vulnerable educational communities can significantly reduce the inequalities generated by the pandemic. The core element in making this happen is to build and promote professional development programmes in which teachers are the main learners. COVID-19 has reinforced the idea that, in connecting with students, teachers are the first and most important human resources. RELEP offers a clear example of the need to build teacher professional programmes that are adjusted to the current challenges and not to the interests of a few. Improving basic academic skills such as understanding a text and solving simple mathematical operations continues to be an urgent issue for more than 80 per cent of middle school students in Mexico.

Mexico has today an excessive and loaded curriculum. RELEP has demonstrated that the main challenge is to build on those practices that have had positive results during the pandemic and to prioritize marginalized schools and students to avoid a bigger educational catastrophe. With the advent of the global pandemic, local decision-makers have become increasingly concerned about significant differences within the education system. The educational system demands decision-makers to commit on specific strategies and programs to remedy and level learning losses.

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STUDYING
AT HOME

Chapter 11. NORWAY**Assessing students' competences through digital technologies**

Marte Blikstad-Balas

ABSTRACT

Providing high-quality, formative feedback is a crucial aspect of teaching. The key idea in this chapter is that digital, real-time collaborative feedback on students' work through platforms such as Teams and Google Classroom is an important educational innovation. The approach can provide teachers with new insight into each student's working process and allow them to give formative feedback while the student is still actively engaged in the task. Drawing on data from Norway, a country with an extensive digital infrastructure, the chapter discusses how teachers and school leaders used the shift to remote and blended learning situation caused by the COVID-19 pandemic to increase and expand the use of digital formative feedback and to find new ways of collaborating between teachers and students. Focusing on the potential of real-time digital feedback, this chapter explores the lessons learned and the possibility of upscaling this particularly promising way of providing feedback.

KEYWORDS

Formative assessment, digital learning platforms, teacher professional development, blended learning.

**BIG IDEAS**

The key idea of this chapter is that digital, real-time collaborative feedback on students' work through platforms such as Teams and Google Classroom can provide teachers with new insight into each student's working process and offer a possibility to provide formative feedback while the student is still actively engaged in the task. Fundamentally, it shows how digital technology can be used as a way to support student learning and promote twenty-first century skills.

INTRODUCTION

The COVID-19 pandemic placed teachers worldwide in challenging situations involving remote and blended learning. Teachers did not have access to students, which we have taken for granted in normal schooling with a shared physical space. Without this shared physical space, teachers struggled to evaluate students' work in class and offer formative feedback.

This chapter will address how this new situation, combined with an extensive technological infrastructure, enabled innovative digital assessment practices through platforms such as Teams and Google Classroom. On these platforms, students demonstrated their competences through digital videos, audio files and other multimodal formats, while teachers followed the students' real-time learning trajectories in collaborative shared documents. While technologies enabling such formative feedback practices have long been available, extended periods of school closures created a need for teachers to expand their feedback practices systematically. Teachers and school leaders across Norway highlighted new and emerging digital assessment practices when challenged to talk about the potential innovations of remote and blended learning. This innovation supports the development of twenty-first century skills, aligns with research on effective formative feedback and can be scaled up.

THEORY OF ACTION AND DATA PROVIDING EVIDENCE OF THE INNOVATION

The theory of action in this innovation is that real-time collaborative digital feedback from teachers through collaborative platforms can be formative and reach students while they are still engaged in the task. In contrast, previous studies have shown that feedback in ordinary classrooms is often vague and comes too late. The evidence that teacher feedback can impact student learning is significant, especially if the feedback is specific, timely, substantial, and delivered in a meaningful format (e.g. Black & Wiliam, 1998; Brandmo, Panadero & Hopfenbeck, 2020; Hattie & Timperley, 2007; Shute, 2008). Experiencing feedback in real time allows for more communication and shared problem-solving, providing students with new opportunities to communicate and collaborate with their teachers and their peers about their own learning – key aspects of twenty-first century skills. Real-time collaborative feedback through digital platforms will also strengthen students' digital literacy practices for the purpose of increasing and managing their own learning processes while communicating with others. In a recent scoping review on digital assessment practices, Blundell (2021) underscored how gathering and assessing a range of student work digitally (e.g. through digital portfolios) can contribute to assessment as learning and that digital portfolios of student work 'support assessment of a greater diversity of evidence and are reported to provide more overt student authorship' (p. 14).

This chapter discusses how some teachers adjusted the way in which they communicated with their students and supported their work during the pandemic. The case data stem from a targeted focus group conducted with five school leaders from the largest municipalities in Norway (grades 1–13) and a teacher survey with 726 teachers in grades 1–10 from different Norwegian municipalities.

Prior research has found that not all teachers used digital possibilities to innovate their feedback practices, as this case describes. In fact, research on homeschooling in Norway has suggested that many students were left doing individual work *without* good feedback (Blikstad-Balas, Roe, Dalland & Klette, in press; Mælan, Gustavsen, Stranger-Johannessen & Nordahl, 2021). Further, the aforementioned scoping review revealed that digital assessment is not a regular practice internationally (Blundell, 2021). Thus, this chapter focuses on the teachers who innovated their feedback practices during the pandemic, the benefits of that choice and how digital formative feedback practices can be scaled up across schools and countries.

IMPLEMENTATION AND IMPACT

In theory, all schools with the necessary digital infrastructure have the possibility to implement such innovation. The digital infrastructure in Norwegian schools is good, and 94 per cent of survey respondents reported that the digital equipment of students was satisfactory. The teacher survey also revealed that all schools were using platforms such as Teams, Showbie and Google Classroom. While these platforms have been available for some time, they saw increased and innovative use during the period of remote and blended learning.

In the focus group, school leaders considered innovative communication and feedback practices to be a silver lining of remote and blended learning. The need for remote teaching sparked a discussion across schools about how existing tools could be used to support learning and what kinds of tasks students should be working on to support what kinds of competence development.

The question of what to measure in terms of student competences is relevant to twenty-first century skills, and the school leaders observed that homeschool gave teachers more opportunities to give feedback on both what the students had done and how they were working. One school leader described a shift from students as consumers to students as producers of knowledge, and another explained how recordings of students' conversations were used as a new way to assess what competences students were really showing through their work. The school leaders offered several concrete examples of changes:

We were constantly communicating with students through the chat function. It was very low-stakes for them to get in touch, and all of them could participate. We could also go into their documents while they were writing, and we did this particularly for those who needed extra support and gave feedback during the process. (School leader 1)

We used a joint classroom notebook (OneNote) to continuously monitor the students' learning, and we could respond quickly. In mathematics, the students made videos where they explained their mathematical reasoning and sent them back to the teacher. In that way, the teacher got insight into their learning processes, not just their answers. (School leader 4)

The teacher survey responses supported the notion that teachers were communicating actively through digital channels with their students: 76.7 per cent of teachers across grades reported that students could chat with them (and with other students) daily or several times a day, while 82 per cent reported that they communicated with students every day or several times a day. In an open-ended question, we asked teachers to identify possible benefits of homeschooling. Among the teachers who chose to answer this question, 30.4 per cent highlighted continuous and improved contact with students and/or the possibility of getting real-time insight into students' work. Such responses included the following:

The students have been much more active in their own learning process – less teacher talk! (Teacher, Grade 3)

As a teacher, I am up to speed with all feedback on work that [students] are doing every single day. I experience that I have better one-to-one contact with the students than before. I also note that I have a better overview of all the students' capacity for schoolwork, because I see every day what they are doing. (Teacher, Grade 8)

I have had more time and more opportunity to really see the students that struggle and see those who do well. It is easier than usual to focus on the work that is being done while still in progress. (Teacher, Grade 10)

While it is difficult to assess the impact of digital real-time collaboration with formative feedback on each student's work, teachers across grades explained how they had seen different sides of the students. Many students were able to 'show more of their competences', and teachers felt they had closer contact with students, who invited teachers into their ongoing work and asked for help. For example, several teachers noted how 'quiet students' who did not usually speak up became more visible participants in the digital format and showed more of their knowledge and reflection than they normally would. The digital platforms may have benefited these students. School leaders also explained that students and teachers began using the platforms actively as a joint working tool rather than a passive information source:

Before, the teachers were on the platform, but the students were somewhere else. But now ... if an important message has been forgotten, I just post the message, tag the group of students, perhaps at 11 pm and then 'heart,' 'heart,' 'heart' – they respond, at 11 pm, on the platform to their teacher! I mean, it is incredible, and it shows that we are in dialogue. We are in a faster dialogue than we have ever been. (School leader 1)

EDUCATIONAL IMPACT: LOOKING FORWARD

We know that remote learning has affected students in different ways. For some, it has been better than normal schooling, but it has been challenging for most. While this chapter does not contend that this innovation has occurred uniformly across schools, digital communication with students about their work has shown teachers the potential of real-time digital assessment. The school leaders and some of the teachers in the survey explicitly stated they would continue to use this positive development and even scale it up.

In terms of developing twenty-first century skills, the potential of providing digital feedback is evident: When students communicate with others to improve their work, they emphasize process over product, experience the value of collaboration, and learn ways to use digital tools that will also be relevant to their future education and work life. The potential of digital, real-time feedback is high, both in regular school and in blended learning. Previous research has demonstrated that access to technology is not enough to change teachers' practice (Blikstad-Balas & Klette, 2020; Gil-Flores, Rodríguez-Santero & Torres-Gordillo, 2017), raising the question of what can be done to promote more use of formative digital assessment in appropriate situations.

Given that schools have the necessary digital infrastructure, a starting point in increasing digital formative feedback could be encouraging teachers – and systematically allowing teachers the time – to learn the functions of software with shared real-time comments and to access tutorials (e.g. on YouTube). Teachers should also be encouraged to share their experiences with formative digital feedback within their local context, as we know a focus on content, , and the opportunity for collaborative learning and reflection over time between teachers encourage teachers' professional development (Darling-Hammond, Hyler & Gardner, 2017). As this chapter suggests, teachers will adapt to new scenarios when they must. The pandemic situation revealed that some teachers tried new ways of providing feedback and experienced associated benefits, such as insight into students' work processes, the potential for real collaboration, and the opportunity for some students to show sides of themselves hidden in a more traditional setting.

High-quality feedback is a crucial aspect of effective teaching, and the pandemic has highlighted how digital tools can be used in innovative ways to reach students in the timeframe within which feedback is known to be most effective: when they are still actively engaged in the task.

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Chapter 12. SAUDI ARABIA

Madrasati e-learning platform

Sandra Ospina, Yasser Alshehri, Badi Aldossry and Najwa Mordhah

ABSTRACT

The COVID-19 pandemic forced national education systems around the globe to respond and reimagine education in order to ensure continuity of learning throughout the resulting lockdown and rebuild after. Innovations made during the pandemic have helped leaders to imagine possible futures for education. This case study considers Saudi Arabia's nationally developed e-learning platform, Madrasati (My School), rolled out in 2020/21 to support continuity of education for students between grades 1 and 12 in public schools and some private schools. It summarizes the lessons learned from the initiative, reflecting on what went well and what did not. Finally, it considers how the Madrasati innovation can help drive the future of digital education in the country.

KEYWORDS

National developed e-learning platforms, hybrid learning, Madrasati.



BIG IDEAS

Creating a unified national e-learning platform and providing various types of support for teachers, students and parents can minimize interruption to the education process during crises such as the COVID-19 pandemic.

THE EDUCATION CONTEXT AT THE ONSET OF THE PANDEMIC

Saudi Arabia's quick response to the school closures caused by the COVID-19 pandemic ensured the continuation of learning with little interruption of the educational process for all learners, as noted in a statement from Nathalie Fustier, the United Nations' Resident Coordinator in Saudi Arabia, the country achieved great success in moving to distance learning and continuing the education process of more than six million students without interruption (Saudi Gazette, 2021).

Following the decision to close schools in Saudi Arabia, there were different modes through which education was to be continued. These included live TV lessons, as well as YouTube channel lessons, virtual meetings, the government-commissioned National education enrichment platform (iEN) and other asynchronous options.

During this time, there were several directives from the Ministry of Education indicating that all students would be promoted to the next academic school year and that the school year was to finish earlier than planned (Current affairs, 2020)

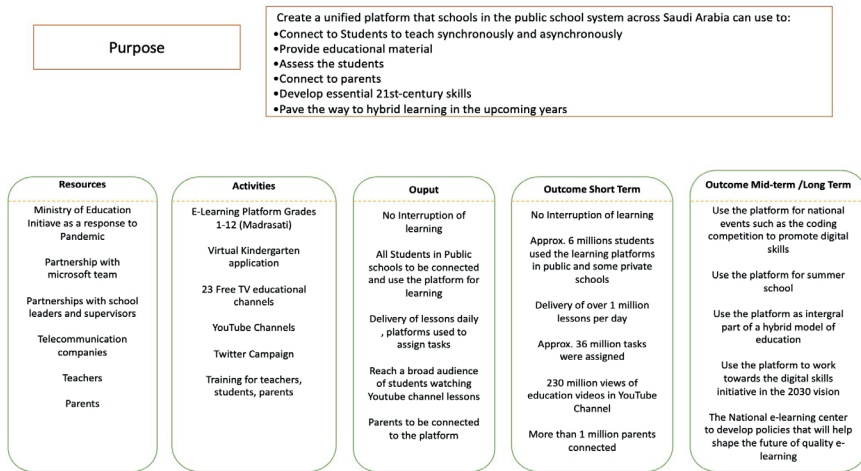
Furthermore, as part of the initial response to the pandemic, the National e-Learning Center of the Kingdom of Saudi Arabia, at the close of the 2019/20 school year, commissioned the Online Learning Consortium to conduct a study to 'understand the state of online K-12 education during the autumn 2020 semester and begin visioning the post-COVID environment'. The aim of the study was 'to determine opportunities for improvement while identifying areas of excellence that could be highlighted against an evaluation framework for quality K-12 online learning' (Online Learning Consortium, 2021).

SCHOOL YEAR 2020/21: INTRODUCTION TO THE MADRASATI PLATFORM

The ministry introduced its learning platforms and expanded other tools used at the onset of the pandemic. The main innovation that has made e-learning possible across the public school system in the country is the Madrasati (My School) platform. The platform was rolled out to be integral to online teaching and learning during the 2020/21 school year. It was used by all public schools in the country and some private schools from grades 1-12. In addition, for learners in kindergarten, the ministry introduced its virtual kindergarten application. The ministry described the Madrasati platform and its purpose as follows;

Madrasati is an e-learning management system, which includes many electronic educational tools that support teaching and learning processes, and contributes to achieving the educational objectives of the curricula. It also supports the achievement of skills, values and knowledge for male and female students to be compatible with the present and future digital requirements. (About my school, 2020).

Figure 1. Logic model: E-learning response in Saudi Arabia, K–12



The logic model in Figure 1 summarizes the short-term, mid-term and long-term outcomes of the first year of implementing various modalities that incorporate e-learning, including the Madrasati platform, in all public schools in Saudi Arabia. The metrics point to a successful initial roll-out and implementation of the e-learning strategy. The data made public by the ministry show, for example, that virtually all learners in the country were connected, and teachers successfully delivered over 1 million lessons per day across the system (Ministry of Education, 2021).

Moreover, at a global level, as reported in the Online Learning Consortium’s study, the ‘Madrasati LMS (learning management system) stands out in the domain of global education, both in terms of its robust capabilities for delivering online learning, as well as its proliferation across the entirety of the K-12 education spectrum in KSA [the Kingdom of Saudi Arabia]’. Furthermore, the same report, in comparing Madrasati to 174 countries solution’s developed during the pandemic, notes: Madrasati has few peers related to other nations’ efforts to implement a countrywide LMS for e-learning in the K-12 education sector (Online Learning Consortium, 2021).

For this case study, to understand what aspects of the Madrasati innovation worked and which did not, various focus groups discussions (transcripts of which are included in the appendix) were conducted to compare publicly available data to the experiences of multiple stakeholders, including an educational leader, teachers and students. In the next section, there will be a discussion of some of the lessons learned during implementation, highlighting the insights of what worked and what needs further attention as the country moves forward and attempts to build back stronger.

LESSONS LEARNED

Teachers

In Saudi Arabia, teachers' ICT competence before the pandemic was higher than the average for Organisation for Economic Co-operation and Development (OECD) countries. According to data from TALIS (the OECD's Teaching and Learning International Survey), many teachers and leaders in Saudi Arabia are open to change and adopt innovative practices; additionally, more than 70 per cent of teachers reported that ICT use for teaching was included in their formal education or training, which is much higher than the average (Mann et al., 2020). Possessing ICT skills and continuous training on using the platform probably helped teachers move swiftly into using the Madrasati platform. As the ministry rolled out Madrasati, it developed a training series; according to the Online Learning Consortium report, school administrators, staff and teachers surveyed were satisfied with the training and support in using the platforms (Online Learning Consortium, 2021). The ministry provided more than 5 million hours of distant parallel training and sessions for more than 500,000 users.

Furthermore, the forum for training opened up opportunities for teachers to post videos on how to use the platform, which, in turn, allowed teachers across the country to learn from one another. That type of collaboration would have been logistically challenging if it were not taking place online. One teacher said: 'The cooperation and the interaction among teachers had a great impact in facing and overcoming the challenges we have faced' (personal communication, July 2021).

The support teachers gave to each other seems to have helped dispel the distrust of digital learning that some teachers had expressed at the onset of the pandemic. According to the Online Learning Consortium report, both teachers and administrators 'found that moving to an online environment improved the institutional culture related to digital learning ... which indicates that educators in Saudi Arabia persevered and innovated through the difficult challenges Covid-19 presented' (Online Learning Consortium, 2021).

Teachers interviewed for the case study agreed that they had received enough training on how to use the platform. However, there is still a need for effective e-learning pedagogical professional development. As they noted, using the platform operationally does not automatically lead to teachers being able to instruct for deep learning using the digital tools, especially if they were not used to doing that before the pandemic. One of the interviewees noted that 'With regard to educational training on distance learning pedagogy, teachers have not received any training in this regard, as it was left to the teachers' experience in

teaching in general or through previous courses in e-learning,’ while another remarked that ‘teachers did not receive enough training on how to use the platform in a pedagogical way, and that it is more important to the success of distance education.’ (Personal communication, July 2021)

Moving forward, there needs to be more training on the pedagogies of e-learning. As noted by Alshehri et al (2020), ‘Teachers need to be more trained on how to use active learning on online teaching, and how to conduct proper assessments.’ The Online Learning Consortium report also recommends that there should be online teacher professional development, particularly in the area of teachers using time more effectively in ‘classes with a variety of synchronous and asynchronous teaching strategies’ (Online Learning Consortium, 2021).

Parents

The pandemic gave parents the opportunity to take a leading role in their children’s education. Through the Madrasati platform, parents can connect to their child’s account and follow their progress, something that was not possible before. The ministry had students in elementary school attend online classes after 3 pm to ensure that parents would be home to help them with online learning. There was training available for parents on how to use the platform; however, the parent training was more sporadic as it relied heavily on individual schools to provide the training. The consortium report indicated that, generally, parents were satisfied with the quality of online learning, the platform’s design, the learning resources, and teachers’ communication with their children (Online Learning Consortium, 2021).

However, there was less satisfaction among parents when it came to teacher-parent communication. Parents seemed to need more support and there appeared to be a gap in terms of what parents needed to support their children and what the school offered (Online Learning Consortium). A teacher in the focus group said that blended/hybrid learning could be successful by ‘Increasing the responsibility of parents and follow-up of their children’ (personal communication, July 2021).

Another challenge was that although families in need of devices were provided with some, larger families did not have enough devices. When they had multiple students attending online classes simultaneously, that meant some students would be absent from class (5 solutions to Madrasati technical problems, 2020).

Overall, parents welcomed the idea of continuing with digital learning as students in the future and wish to have more opportunity and training on how to use digital technologies. One caveat, however, is that they would like internet packages to be more affordable.

Students

There are various accounts of the level of engagement reported. In interviews we did for this case study, students noted that they engaged in their classes and that they appreciated learning the skills associated with completing assignments online using digital tools. Still, one study indicates that they did not interact much with peers (Aldossry, 2021), while another suggests a lack of student engagement (interactions) with other colleagues (Khanfar, 2020).

It is interesting to note the discrepancies among different accounts of engagement. Across the country, students reported that they were actively engaged in their classes, felt connected in their classes, and frequently interacted with other students (Online Learning Consortium, 2021). Perhaps, as in the case of training, the locality of the school and expectations at school level played a role in perceptions of engagement.

To ensure equitable access, developers working on the Madrasati platform need to continuously carry out needs assessments for future updates and improvements that consider student-users' suggestions. Based on the focus group, some students feel the platform could make the interface easier to use; while other studies suggest that the platform needs to be better designed for accessibility, particularly for students with special needs (Aldossry, 2021; Alamri & Almoaiqel, 2021).

In the focus group, students seemed optimistic about using the platform in future when they returned to face-to-face teaching. They felt they were gaining digital skills that were not necessarily common across all schools before the pandemic. Possible uses, they foresaw, were in undertaking homework or extension activities (personal communication, July 2021).

IT support and design of platform

One area that needs to be addressed concerns the technical support available for all users. All reports cited here (Aldossry, 2021; Online Learning Consortium, 2021, Khanfar, 2020) state that both teachers and students face difficulties in getting live support when facing technical issues using the platform. The recommendation from teachers and students is the same, to have live technical support to facilitate the continued use of the platform.

Key partnerships

The ministry worked with private and other governmental agencies to make e-learning in Saudi Arabia happen. It partnered with Microsoft to include Microsoft tools into the Madrasati platform. It is also utilizing cloud services to host the Unified Education System.

In doing so, the quality of the performance of its services is increased, and infrastructure and network loads are absorbed with high quality to serve the significant number of new users.

The ministry partnered with the Takaful Foundation to provide devices to families with no computers or tablets. Takaful Foundation provided more than 20,000 students with new desktop computers, tablets and laptops to facilitate their online learning.

Another critical partnership was made with the Ministry of Communications to deal with internet difficulties by providing enhanced internet and free access to educational sites to ensure the uninterrupted continuation of education for all students across Saudi Arabia.

Partnerships that will be key for the future of e-learning include those with the National e-Learning Center, the Ministry of Communication, and the Education and Training Evaluation Commission (the governmental body responsible for teacher standards and teacher professional development) so the ministries' digital skills framework and the national e-learning framework are aligned and incorporated into the K–12 curriculum.

THE FUTURE: TOWARDS HYBRID MODELS OF LEARNING

The Ministry of Education initially used the Madrasati platform for non-traditional purposes; for example, the platform was used for a national coding competition in which more than 4.7 million users, including teachers and administrators, took part. According to the Ministry of Education, the competition was created with the 'aim of achieving one of the main pillars of the Kingdom's Vision 2030 in promoting a culture of digital skills for students, spreading the culture of programming and innovation in society and among education employees' (Ministry of Education, 2021).

In the interview for the case study, a leader in the Ministry of Education in Jeddah discussed plans for the future use of Madrasati, which include a summer school 'to boost students' skills and cover the educational loss during the academic year'. As for the longer-term, the platform will be used 'to support regular teaching through asynchronous teaching and offer some courses that are not listed in the study plan', and to 'carry on offering online competitions, seminars, etc.' (Alshehri, personal communication, 28 June 2021)

The success of hybrid learning will rest heavily on the preparation of teachers, students and parents. Teachers, for example, would like to see 'more technology integrated into the schools' to continue to develop digital skills and 'more clarity of what the future model of e-learning could look like' in the kingdom (personal communication, July 2021).

Saudi Arabia should continue to build on the improved attitudes towards digital learning. If the platform could provide a space for teachers to collaborate, it could help create communities of practice that allow sharing of innovations and best practices across the nation.

The Madrasati platform could serve students better in the future by providing tools that they can use to create things and collaborate in real-time, making the platform more suited to active learning and not just a repository of resources.

The pandemic has served as a propelling factor for positive change in the education system in Saudi Arabia. The upcoming year will be a year of change, with a revised programme of study, the first in 28 years, including new subjects such as critical thinking, digital skills, and life and family. Additionally, the calendar has been changed from 153 instructional days to 183.

In conclusion, the uninterrupted continuation of the educational process has been at the center of the Madrasati innovation. The nation's ambitious goal of a knowledge-based economy can only be realized with the preparation of all its citizens. The Madrasati platform will be one of the essential tools to pave the way for hybrid models of education now and in the future of the Saudi Arabian education system.

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Chapter 13. UGANDA**Pangea Publishing: Making real-time, culturally relevant content**Drew Edwards, Kavita Kar and Brenda Apeta¹⁴**ABSTRACT**

Pangea, a publisher based in Uganda, quickly developed culturally and linguistically relevant reading materials for children concerning the pandemic around them. Shared across various mediums, the content was read widely in both high- and low-income communities. Learners displayed higher levels of engagement and comprehension and tangibly solved problems they and their families faced, protecting them from the virus. This chapter describes the project's development and considers what relevant pedagogy and widely shared mediums can teach us about accelerating learning post-pandemic.

KEYWORDS

Literacy, multimedia platforms, at-home learning.

**BIG IDEAS**

Making content relevant to help learners solve problems shows potential for increased learner engagement while its use on different technology platforms shows how content can be disseminated more efficiently in or outside the classroom.

BACKGROUND

Pangea Educational Development (Pangea) is a social enterprise, based in Uganda, with a mission to create culturally relevant content and programmes that help children learn to read and inspire them to read more often. Founded in 2010, the organization's work includes under-represented content development, innovating access to reading materials, and literacy instruction training. At the beginning of the COVID-19 pandemic, Pangea had to pause or pivot many of its programmes. These changes have led to the expansion of its operations, from Uganda to Liberia, South Sudan and the United States of America, and its reach to 54 countries around the world.

¹⁴. Author Drew Edwards is the CEO and Co-founder of Pangea, Author Kavita Kar is a Pangea Intern, and author Brenda Apeta is Pangea's Director of Programmes

COVID-19 context

The COVID-19 pandemic has had a severe impact on education systems around the world; at one point, nine out of 10 children were out of school, globally (UNICEF, 2021). In many countries, including Uganda, the pandemic is having an ongoing impact on schools and learning 16 months on. Further complicating the crisis, access to any form of learning has been limited. While much of the world has taken to digital education, 82 per cent of homes across the African continent do not have a computer or affordable access to the internet (UNESCO, 2020). Subsequently, governments and civil society organizations have had to rethink how learners access education, as well as what education is relevant to them in a rapidly changing environment.

Problem statement

With schools closed and the world in lockdown, parents and children alike were fearful of the pandemic and its impact on their lives. Their routines were disrupted, including in education. It posed an important question for Pangea: How should we quickly disseminate urgent public health information and learning materials to guide families working through the crisis?

Pangea response

Pangea facilitated a rapid and coordinated response, leveraging multi-sector partnerships across the private sector, government and civil society. Pangea's publishing arm, Pangea Publishing, rapidly developed content in an unprecedented timeframe to offer a continuation of learning in three mediums for four cultural contexts, and made it available in 14 different languages. The response has provided insight on how to integrate different technologies, including radio and phone use, in home-learning settings and how to include and empower parents, as well as what kind of content and pedagogy effectively engage learners. Pangea found that children were overwhelmingly interested in books about COVID-19, as opposed to modern and ancient history. These findings provide lasting insight into the evolving modes of hybrid education.

INNOVATION GENERATED

Theory of action: Practical information, SEL, parent inclusion

UNESCO defines literacy as 'the ability to identify, understand, interpret, create, communicate and compute, using printed and written materials associated with varying contexts' (Montoya, 2018). Thus, Pangea's theory of action was premised on the belief that by providing access to time-relevant information in a culturally responsive communication style, a practice that integrates and values identities and cultural assumptions familiar to readers, primary school learners

would show higher levels of engagement with reading materials, better understand safe operating practices, and cope emotionally with the pandemic. This would continue literacy skill development through helping learners, but also engage and facilitate discussion with their caregivers.

This theory is grounded in a strong body of research about learner engagement and reading comprehension. In particular, research on storytelling and project-based learning, particularly in low-income communities, suggests that people find stories more interesting than other types of text, even when they contain similar information (Britton et al., 1983). Research also finds that stories are ‘psychologically privileged’ and treated differently in memory than other types of material (Willingham, 2010). Additionally, the story itself and the tasks that learners followed were based in project-based learning (PBL). Research suggests that PBL is often more beneficial for economically disadvantaged students than for their more advantaged peers (Anderson & Pešikan, 2016).

Programme design: ‘Real-time content development’ model

Pangea developed pedagogy in ‘real-time’, or as events in the world were unfolding, to accomplish these goals. The team worked with public health officials from the Centers for Disease Control (CDC) in the United States to document accurate information on the most recent scientific knowledge on preventing COVID-19 transmission. It then distilled this information into an understandable storyline. The team wanted to address the significant social disruption and the emotional impact this was having on children, in addition to communicating the science effectively.

The team developed an allegory and created a COVID-19 children’s storybook series titled *The Unwelcome Stranger*. The book included the story, three project-based learning activities designed for low-resource home settings, and local ministry of health contact information. Working across several time zones the team wrote, illustrated, designed and shared the first book within 16 days. It was published on 2 April 2020, nine days after the first COVID-19 case was reported in Uganda.

Creating access: Finding the right technology

Pangea partnered with Save The Children Uganda to print and distribute the books as part of home learning packs. These were sent directly to children in their homes. As schools began to open, Pangea then partnered with Girls’ Education South Sudan and the Vice President’s Office in Liberia to print copies and place them in schools across each country.

Printing and transportation were limited due to ongoing pandemic restrictions, however. First, Pangea shared the book through accessible social media sites. Facebook posts reached more than 500,000 people in the first month alone. Individuals outside the organization

read and translated the book into additional languages, including sign language, and shared on YouTube. It partnered with Worldreader, which works with 18 million children in 48 countries, the Inter-Agency Network for Education in Emergencies (INEE) and KIPP Public Charter Schools in New York to make the books accessible to students in a variety of different contexts. The book was also shared widely and praised by public figures, including Lori Lightfoot, Mayor of the City of Chicago, USA, and by the Harvard Center for the Developing Child. Meanwhile, Jewel Howard-Taylor, Vice President of Liberia, read the book aloud on national television in her country. The book was also read aloud on national television over the Uganda Broadcasting Channel. In each case, the book was made available for free, but limited to learners with access to those platforms.

Data and internet access are not widespread or affordable for all, though, especially where health resources are sparse. The team began to explore whether an audio version of the story, available through an accessible medium, such as radio, would create more effective reach. Pangea partnered with Big Spit Cooperative (a music studio), Read for Life Uganda (an organization broadcasting daily radio lessons) and countless radio stations to share stories and activities.

This distribution through multimedia platforms helped the ‘real-time’ content reach readers faster within a broader scope. These partnerships show a willingness to partner for impact. Traditional printing and distribution, by comparison, would have taken weeks, even months to achieve the same reach.

Adapting content

As the book travelled, Pangea observed that the story was being consumed at equal or even higher rates in other cultural regions outside of East Africa. The team made cultural adaptations to the content for matriarchal societies in North Africa, the Middle East Gulf Region and Europe/North America.

These adaptations were made to key structural components within the story, including to the different ways in which children travel home from school and if and how that would change during a crisis. The changes extended to the figures likely to communicate information in crisis situations across different cultural contexts. While, in patriarchal societies, it was common that the eldest male would communicate and validate information to children, in matriarchal societies this would be confusing and inappropriate. Equally, phenomena such as items stored during lockdown varied by location. While toilet paper was hoarded in the United States, dry food stock commodities were bought in large quantities across East Africa. These and many other adjustments were made to make the story relevant to readers.

As the crisis evolved, the team adapted content. Students began looking forward to the reopening of schools in some areas, while new issues of misinformation, psychological fatigue and vaccination resistance became relevant topics. To address these, the team developed content about psychological resilience, and made books about contracting COVID-19 during the relaxing of restrictions, and about vaccines.

The purpose of the products changed as the pandemic continued. During the first lockdown, in March 2020, when the first book was published, they served to relay time-sensitive information which was otherwise inaccessible. Public health campaigns had not yet been coordinated, and the book was essential in delivering health information to families. Since the first adaptations were made in April 2020, the organization has published five more titles on various subtopics relevant to the pandemic.

EVIDENCE AND LESSONS LEARNED

The subsequent titles evolved from offering important health information to complementing other factual public health campaigns and news. The research for this chapter was undertaken 18 months into the pandemic, a period during which COVID-19 had been perpetually in the news (and people may have begun to feel ‘COVID fatigue’, caused by oversaturation in news cycles).

Fake news about COVID-19 has been prevalent throughout the pandemic, and the project has been a source of factual information which has helped clarify and dispel rumors about the virus, its spread and its treatment.

The book and its subsequent adaptations served as a carrier of timely, potentially lifesaving information. Pangea not only developed and disseminated these titles, it surveyed their impact with readers. With the book’s widespread reach, the team surveyed students between Primary 1 and Primary 7 who had read *The Unwelcome Stranger*. The team aimed to analyse reader engagement based on situational relevance of content and comprehension of key ideas, and to understand how children’s emotions evolved when interacting with the content. This survey was conducted at the beginning of Uganda’s fourth lockdown, when COVID-19 cases were spiking in the country.

Pangea found that children were able to comprehend key messages

Of students surveyed, 95.9 per cent successfully recalled at least one safe operating practice. This is significant given Uganda’s historically poor national performance in reading comprehension; in 2013, for example, only 11 per cent of students could successfully answer a single comprehension question (USAID, 2013).

The book also enabled children to reflect on their emotions regarding the pandemic. Almost two-thirds (63.1%) of children stated that they felt happy or informed, and most indicated that they were happy to read the book because they 'learned how to stop the spread of COVID-19'. On the other hand, 29.5 per cent of children felt scared or sad, and they identified the emotional toll of the pandemic itself as their source of negative emotions. This variation in emotions is wholly understandable as COVID-19 has taken a toll on many families.

Furthermore, the books offer children an individual pathway to connect with their community and health information through the PBL tasks included in the book. Almost a third (29.5%) of children reported that they had learned how to prevent the spread of COVID-19. A nine-year-old boy noted that he would 'place a jerrycan of water with soap in his compound to protect his family'. The book empowered him to create a plan of action based on the health information relayed, affirming the necessity of multimedia dissemination of information in a low-resource setting.

Pangea learned that higher levels of children's engagement were achieved with reading materials that were situationally relevant to them. Two-thirds (66.4%) of children preferred to read about a time-relevant topic such as COVID-19 rather than literature in other time periods in the near present or past. In a country where engagement with cultural and political topics is normally incredibly high, this response was significant. This difference is likely pronounced because, through situationally relevant content, children are enabled to comprehend and problem-solve issues occurring around them.

As we look ahead to the future of education, this protracted pandemic has shone a light on both the possibilities and the limitations of the increasingly digital world. Pangea was able to reach users immediately over airwaves, on the internet, and through a variety of devices to deliver 'real-time' content that accelerated student's learning. This, of course, would never be a replacement for learning in the classroom, but it does expand the scope of possibilities to transform both classrooms and homes into more integrated learning environments where students are problem-solving with topics relevant to their lives and to this moment in which they live.

Digital solutions are still largely dependent on infrastructure, heavily reliant on scale, and, as a result, not yet accessible to everyone. What Pangea showed was that, notwithstanding the speed and cost-efficiency of production and dissemination to learners, the majority of people were still reliant on traditional books, with entire governments investing in the printing and distribution – a time consuming and costly solution.

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Chapter 14. ENGLAND

Tutoring as a targeted intervention to accelerate learning

Liberty King

ABSTRACT

The National Tutoring Programme (NTP) was born out of one of the biggest crises England's education system has faced in decades: schools having to close their doors to the majority of their students to stop the spread of COVID-19. The NTP makes high-quality tutoring available to schools in England to support students whose education has been affected by school closures, the impact of which is likely to widen the attainment gap.¹⁵ Extensive evidence has shown that tutoring can be a highly effective targeted intervention to accelerate learning, but its impact will depend on implementation. This chapter will explore the case of the NTP as an evidence-based policy response to COVID-19 related school closures, and consider the lessons that other countries can learn about influencing a system of tutoring that is complementary to, not competing with, the school sector.

KEYWORDS

School community partnerships, teacher collaboration, at-home learning, targeted education, bottom-up change.

**BIG IDEAS**

Evidence suggests that tutoring has the largest impact when it is closely linked to learning that is happening in the classroom. Building a high-quality tutoring system that works closely with schools to accelerate the learning of students, particularly those from socio-economically disadvantaged backgrounds, will ensure this targeted intervention has the best possible chance of having the desired impact.

15. The attainment gap (sometimes called the disadvantage gap) is the difference between the average academic outcomes achieved by students from socio-economically disadvantaged backgrounds and their peers who do not fall under this category. Eligibility for free school meals is the most common proxy of defining a student as socio-economically disadvantaged in England. The Education Endowment Foundation (EEF) conducted a rapid evidence assessment which indicated the attainment gap will widen by a median of 36 per cent as a result of school closures (EEF, June 2020).

INTRODUCTION

The prevalence of private tutoring in England is well-documented, as is the disparity in who typically receives it. Research from the Sutton Trust shows that, in 2019, 34 per cent of children from affluent homes reported having received private tuition, compared to 20 per cent of children from disadvantaged backgrounds (Cullinane, 2019). It is a common solution, usually by parents or carers, to buy in tutoring for their children to give them extra support to their classroom learning. Schools buying in tutoring to support students, however, is not as common and the NTP set out to influence the market to this end.

Through the NTP, schools can access tutoring from an approved list of external providers, or from an in-house tutor who is trained and placed in the school, and the cost of this is fully or mostly covered by a government subsidy. Tuition in particular was chosen as a tool to support students to 'catch-up' on their learning as there is extensive evidence from global research literature of the positive impact that one-to-one and small group tutoring can have on outcomes for students, particularly those from disadvantaged backgrounds. The evidence base will be explored in more detail later in this chapter.

Early on, it was clear that the NTP was an opportunity for system-level change, in particular for how the private tutoring sector interacts with English schools. The policy proposal therefore contained wider aims linked to reforming the market within its three key objectives:

- First and foremost, to make an impact on the students enrolled on to the programme through tailored catch-up support to mitigate the impact of school closures.
- Second, to reform the 'wild west' of the current tutoring market by improving the quality, targeting and scale of tutoring available to disadvantaged children and communities. This included setting clear quality criteria for tutoring and encouraging the market to grow in areas where fewer pupils access tutoring.
- Third, to create a legacy in the system by changing the role of tutoring and making this targeted intervention available to more schools as a viable 'Pupil Premium'¹⁶ spend and position it as an additional tool for classroom teachers. Schools trying tutoring at a reduced cost would recognize the benefit it could have, meaning demand for tutoring would likely remain, even as subsidies reduced.

HOW AND WHY THE NTP WAS ESTABLISHED

The NTP is a sector-led, government-funded initiative that was first proposed by a group of charities, including the Education Endowment Foundation (EEF), in March 2020. The EEF was

16. The Pupil Premium is where publicly funded schools in England get extra funding from the government to help them improve the attainment of their disadvantaged students. Per year, they get an additional £1,345 for every primary age student and £955 for every secondary age student who claims free school meals.

established in 2011 with the aim of breaking the link between family income and educational achievement. Inspired by Obama's Race to the Top initiative,¹⁷ the EEF was established to generate, synthesize and promote the use of high-quality evidence to improve teaching and other school practices (Edovald & Nevill, 2021).

The EEF is, therefore, uniquely placed in the English education system, with solid expertise in 'what works' to improve student outcomes and a trusted profile with school leaders and teachers. Working with a core group of partners – the Sutton Trust, Impetus, Nesta and Teach First¹⁸ – the EEF identified high-quality tutoring as a potential solution to mitigate the negative impacts of school closures. The evidence base and the existing culture of tutoring in England were key factors in the policy proposal being approved by government.

The evidence base

The best available evidence shows that high-quality classroom teaching is the most important lever for schools to improve student outcomes (EEF, April 2021). The evidence also shows that tutoring can be used as an effective *additional* tool for schools to accelerate the learning of their students. For example, a randomized control trial of Tutor Trust (a charity that aims to provide affordable tutoring to schools through trained university students/recent graduates) showed that students participating in the programme made three months' additional progress in comparison to students in control schools (EEF, November 2018). This trial, and 184 other high-quality trials in the EEF Teaching & Learning Toolkit (EEF, October 2018),¹⁹ indicate that tuition can, on average, add three to five months' additional progress to a student's academic attainment.

A recent meta-analysis by Nickow et al found that tutoring programmes have 'consistent and substantial positive impacts on learning outcomes' (Nickow et al, 2020). The overall pooled effect size of 0.37 standard deviations (SD) noted in this review translates to a student advancing from the 50th percentile to nearly the 66th percentile (J-PAL Evidence Review, 2020). Carlana & Ferrera specifically explored the effectiveness of tutoring in response to COVID-19 related school closures through a programme delivered online to disadvantaged students in Italy. The results showed that the programme substantially increased their academic outcomes, by 0.26 SD on average (Carlana & Ferrera, 2021).

17. The Race to the Top initiative, established in 2009, involved states in the US being offered incentives to drive rigorous and data-led systemic reform to improve teaching and learning in America's schools.

18. Part of the Teach for All group, Teach First is a charity that supports and develops teachers and leaders with a particular focus on addressing educational disadvantage. The Sutton Trust champions social mobility through evidence-based programmes, agenda-setting research and policy advocacy. Impetus transforms the lives of young people from disadvantaged backgrounds by ensuring they get the right support to succeed in school, in work and in life. Nesta is the UK's innovation agency for social good. It designs, tests and scales new solutions to society's biggest problems, changing millions of lives for the better.

19. The EEF Teaching & Learning Toolkit is an accessible summary (meta-analysis) of the best-available international evidence across different approaches aimed at improving student outcomes. Its purpose is to support teachers and school leaders who are making decisions about how to improve outcomes.

The evidence shows that the way in which tutoring is implemented is a key determinant of impact. The EEF Teaching & Learning Toolkit suggests that tutoring is most effective when:

- it is explicitly linked to classroom teaching to ensure it builds on what has been covered by the students' class teacher;
- students who need the most support are accurately identified and knowledge gaps are established in order to tailor content appropriately;
- students' progress is monitored regularly and provision is adjusted accordingly;
- tutoring is organized into short regular sessions (e.g. about 30 minutes, three to five times a week) over a sustained period of time (six to 12 weeks);
- tutors are provided with training and ongoing professional development (in the case of tutors who are not qualified teachers, a structured programme is advisable).

Taking this into account, an 'NTP model' of tutoring was created, bringing together best practice from the evidence base on tutoring from around the world. Two pillars of the NTP were established:

NTP Tuition Partners: Participating schools can access high-quality subsidized tutoring from a list of approved external Tuition Partners. These organizations are given funding to offer a 15-hour block of tuition per student, at 25 per cent of the normal cost.

NTP Academic Mentor²⁰: Trained graduates are employed by schools in the most disadvantaged areas to provide intensive catch-up support to their students, allowing teachers in these schools to focus on their classrooms. The cost of these graduates is fully subsidised. Teach First recruits, trains and provides ongoing support to the Academic Mentors.

Culture of tutoring in England

In addition to the evidence base, there is a compelling social argument for making tutoring more accessible. Tutoring is popular in wealthier homes, with parents who can afford to pay for it choosing to do so. However, children from disadvantaged homes are accessing this highly effective approach at a lower rate.

This disparity has been further increased by the pandemic. Before schools had even officially shut there was already a significant increase in demand for private tutors from wealthier families worried about the impending school closures (Batty, 2020). The demand for tuition meant hourly rates increasing further beyond the reach of poorer families. These trends are part of the reason the global market in private tuition is set to increase in value from \$123.8bn in 2020 to \$201.8bn by 2026 as 'the COVID-19 pandemic resulted in an unprecedented surge in adoption of online/remote classes' (Global Industry Analysis Inc, 2020).

²⁰ The academic mentors model was inspired by Perry Beeches Coaching Programme (EEF, 2015)

In England, the NTP would help to address the existing social disparity, supporting schools to acknowledge this as a viable option and supporting the tutoring market to grow in areas where there was not previously demand. This dual approach of stimulating demand, while also supporting quality supply, should provide a sustainable market that would support the growth of quality tutoring purchased by schools in the long-term.

REACH, IMPACT AND EVALUATION

Pilot study to test preparedness of sectors

Ahead of the formal roll-out of the NTP in November 2020, the EEF commissioned a National Online Tuition Pilot which aimed to test how effectively disadvantaged students could be reached through online tutoring during the period of COVID-19 school closures (EEF, January 2021). More than 1,600 students in 70 schools participated in the pilot study, which concluded that delivering online tuition during school closures was feasible and could have wide reach in a short period of time. It highlighted the adaptability of providers, schools, tutors and students when switching to an online model, while the outcomes for students included increased confidence, engagement and preparedness for future learning.

Initial reach and impact

The NTP has been a major breakthrough in proving how an innovative idea can be rapidly scaled-up to support students across a country. By the end of the academic year, the NTP is projected to enroll 250,000 children across more than 7,000 schools, representing almost one-third of all state-funded schools in the country. Additionally, more than 27,000 tutors have been enrolled to deliver the tutoring.

As the following quotations show, the response from the sector has been extremely positive:

For the students working with our academic mentor, there has been tangible progress. They're showing more mathematical and academic resilience (Simrat, deputy head teacher).

My English tutor explained things very clearly, and it was good to work in a small group. I feel as though my English has improved and I have grown in confidence (Emma, student).

Every week when we have tutoring, I feel like I am getting better at physics whenever it comes around. I also feel like I am doing well at the topic because I am getting the help I need (Lee, student).

The initial commitment was to fund the NTP for the 2020/21 academic year only. Catch-up support was always envisioned as a long-term project, but the government was understandably hesitant about committing to multiple years of funding for a programme that did not yet exist and lacked proof of scale and uptake. However, the reach achieved by the NTP in eight months convinced the government to commit to continue the programme for at least another three years; an additional £130m has been committed for Year 2 alone. With this commitment an estimated £1.5 billion, in addition to expenditure in 2020/21, will have been spent on tutoring by 2024.

Independent evaluation of the NTP

Concurrent with to the initial roll-out, the NTP commissioned a wide-scale independent evaluation to consider its viability and impact. This is an important opportunity to evaluate a system-level innovation being delivered at a large scale; something which does not often happen. It will provide vital information that can be further used to improve future implementation of the NTP, adding to the evidence base about tutoring and providing the opportunity to improve the principles underpinning the NTP.

The results of the pilot study gave organizers confidence in the results of the much-larger NTP Tuition Partners evaluation. At time of writing (July 2021), the Tuition Partners evaluation is still in progress. The results are set to be published in Summer 2022.

Initial challenges

While there were notable successes in Year 1 of the NTP, some challenges have emerged with the rapid scale-up of this brand new programme. Three of the key challenges are outlined below, while key areas for consideration for countries wishing to adopt a similar model are explored in the next section.

Stimulating demand: one of the aims of the NTP was to increase demand for tutoring from schools, in particular for disadvantaged pupils that would not usually access it. However, at the start of the programme, uptake of the offer was much more prevalent in areas of the country where connections between schools and tutoring organizations were already well-established (e.g. London and the South). The uptake in other areas of the country, particularly the North East, was much slower. This was further exacerbated by the fact that the pandemic resulted in varying rates of absence in schools at different points in the year.²¹ It was very challenging for schools to deliver normal classroom learning, meaning the appetite and capacity for additional learning opportunities was reduced.

21. Absence rates in the first school term in September 2020 were at around 13 per cent, up from 5 per cent at the same point in 2019 (DfE, 2021)

Hesitancy to use external staff: Schools were sometimes hesitant about bringing in external tutors to support their students, often noting that the strength of existing relationships between a student and someone they know is more likely to result in impact. Many schools were disappointed that they could not access NTP funding to use their own staff to deliver additional catch-up sessions for their pupils. A lot of time was spent myth-busting the idea that students could not have a positive experience with external tutors. However, this was not always enough to convince school leaders to access the programme.

Fidelity to evidence vs. delivery flexibility: The NTP model was established in order to maintain integrity to the evidence as well as to allow as many students as possible to access it. However, maintaining quality in scale-up is a common challenge. Certain aspects of the model (e.g. each pupil receiving a sustained 15-hour block in one subject) caused tension in the sector as, without the knowledge of the evidence-base (or even with this knowledge but a preference for certain delivery practicalities), the NTP model seemed unnecessarily inflexible. The biggest challenge here was insisting that tutoring was delivered at school, preferably within the school day, as many schools and tutoring organizations had a preference to deliver sessions online, at home.²² A lot of time was spent clarifying what was and was not permitted in programme delivery, and some frustration emerged in the school sector around the NTP model. Incidentally, the NTP ended up allowing providers to deliver to students at home online due to the third national lockdown that England entered in January 2021, so that students could continue to benefit from the programme offer. This posed more challenges due to the inconsistency in messaging around delivery expectations.

A LOOK TO THE FUTURE

The convincing evidence base around tutoring was vital in the take-up of the programme by policy-makers, though the existing market of tutoring in England meant that rapid scale-up was made easier. Scaling up was also made easier by the option of online delivery, which accounts for around 58 per cent of NTP sessions. For countries that do not currently have an established tutoring market, the process for creating a large-scale tutoring programme might be slower, though not impossible. The take-up in areas of England where the tutoring market was much less prevalent certainly took longer, but, with targeted communication and outreach, demand in these areas eventually increased. The option for online delivery is likely to be more critical in countries where private tutoring has historically been less common.

One of the keys to success in producing change at scale is to build capacity by increasing the number of providers and, crucially, increasing the quality of new and existing providers.

²². Nickow et al confirm that tutoring programmes delivered during the school day tend to have larger impacts on student outcomes (2020)

So, as part of the programme in its formative year, NTP Tuition Partners received capacity-building support to help ensure the delivery of high-quality tutoring. This offer of support was there to help providers understand what outstanding and effective tutoring looks like, as well as to support them to grow with quality and improve their programmes. This capacity-building support should be a key consideration for countries looking to increase their own tutoring market for schools to use as an additional tool to support their students.

The NTP has so far been successful in increasing the supply of organizations offering high-quality tutoring and the number of individual tutors, as well as shifting their target market. It has also influenced the demand of a demographic that typically would not access tutoring by shifting the typical customer from parents to schools, and the typical beneficiary from more affluent students to disadvantaged students. For countries looking to increase the uptake of tutoring for highest impact, it is vital that tutoring is closely aligned to what a student is learning in the classroom. The tutoring sector should work with schools to this end to ensure that tutoring remains an additional tool for schools to use to support their students, and does not aim to replace what the evidence suggests is the most effective lever for improving student outcomes: high-quality classroom teaching.

For countries interested in exploring the option of tutoring as an additional tool to accelerate learning of students, there are a few key areas to consider:

Quality of tutoring

- How will you assure the quality of tutoring and align programmes with the evidence base on best practice?
- What training will you consider a minimum expectation, and how will this training be differentiated by the level of qualification that tutors hold?

Framing tutoring as an additional tool to support classroom teachers

- How will you ensure that the content of tutoring aligns with classroom teaching?
- Building on the previous consideration, how will you ensure that positive relationships and regular feedback loops are maintained between teacher, tutor and student?

Access and engagement

- What economic measures can you put in place so that the high cost of tutoring does not preclude disadvantaged students from accessing it?
- Considering the increasing prevalence and preference of online delivery (and therefore the importance of technology and suitable internet connection), how will you ensure equity of access to tutoring?
- How will you frame tutoring as an opportunity, rather than a burden, to both classroom teachers and students, so that engagement and attendance is high?

Embedding high-quality tutoring in the system

- How will you help tutoring providers understand what outstanding and effective tutoring looks like, as well as support them to grow with quality and improve their programmes?
- How will you develop a network of providers to connect and share best practice and learn from each other in order to support the continuity of the market reform?
- How will you evaluate programmes for impact to provide detailed learnings that can support policy-makers and sector leaders to make improvements?

Market-influencing (supply and demand)

- How will you incentivize and support the private and non-profit sectors to increase the supply of organizations offering high-quality tutoring programmes?
- How will you assure the school sector that tutoring is a powerful additional tool to accelerate the learning of its students?

CONCLUDING REMARKS

It is important to take stock of ideas, innovations, policy reforms and system changes that have been given space and validity to thrive in the wake of the pandemic. Future reforms in our approach to education around the world will, in many ways, be positively affected by the innovations that have been necessary during this time.

In England, the National Tutoring Programme will bring wide-scale, targeted learning to upwards of one million students in its first two years. Embedding tutoring into the education system as not only a viable option for supporting disadvantaged students in the short-term, but as an evidence-informed approach that has the potential to become an integrated part of the education sector for the long term. The measurable impact of this is yet to be established, but indicative evidence looks promising indeed.

A lot can be learned from this process for other countries wishing to harness the power of tutoring in their own education systems. Most crucial is to ensure a symbiotic relationship is maintained between the school and tutoring sectors, not least because the evidence suggests the cooperation between these two will likely result in the highest impacts for students.

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Chapter 15. URUGUAY**Ceibal Integrado: Innovation in the public education system**

Leandro Folgar

ABSTRACT

Plan Ceibal was created in 2007 as a Uruguayan government plan to promote equity and inclusion in digital technologies. It has supported policies in education with technologies ever since, evolving from its original conception. Originally, the goal was to reduce the digital gap between the vulnerable and privileged sectors in society, as the first nationwide implementation of the One Laptop per Child (OLPC) model created by Nicholas Negroponte. Since 2010, every student in elementary and middle public schools receives a device (a laptop or tablet) free-of-charge, and every school has internet access (in both rural and urban settings). Given these facts, it is tempting to suppose that Uruguay should not have had significant problems in mitigating the negative impacts of the COVID-19 pandemic in education. However, although pre-existing resources were vital to implementing the necessary contingency plans to minimize the disruptions and offer a holistic online learning experience, the connectivity model was challenged, due to the relocation of teaching and learning practices from school buildings to virtual spaces accessed from students' and teachers' homes. In this context, the possibility of connecting to the internet – which is not equally available to all teachers and students became a necessary condition to access education. This document examines how the Plan Ceibal reshaped its connectivity service, moving from a centralized model – in school buildings – to a decentralized approach for equal and ubiquitous access to all members of the educational community. Ultimately, this innovation addresses the importance of connectivity as an indispensable condition to accessing education and, therefore, expands the definition of the right to education.

KEYWORDS

Blended learning, multimedia platforms, public-private partnerships, information, and communications technology.

**BIG IDEAS**

During the pandemic, internet connectivity, which is not equally accessible to all community members, became necessary to access education. This chapter examines how Plan Ceibal reshaped its connectivity service, creating a strategy to provide free access to all students and teachers across the country. This innovation addresses the importance of connectivity as an indispensable condition for accessing education and expands the definition of the right to education. It also highlights the importance of teacher training in digital pedagogies to build more resilient educational systems and the crucial role of a government agency dedicated to innovation in education to facilitate these processes.

THE CONTEXT

In 2020, Plan Ceibal became Uruguay's centre for innovation in education with digital technologies, supporting the development of public policy for the Ministry of Education. Its mission is to promote technology integration in the Uruguayan education system to improve and support teaching and learning processes, innovation, inclusion and personal growth. Plan Ceibal offers several pedagogical approaches, cloud services, devices, platforms and connectivity for schools. Teachers can access professional development opportunities in different edtech-related areas, including a versatile learning management system (LMS) with communication features, digital-learning platforms, and more than 173,000 educational resources, including adaptive solutions and gamification.

This context put Uruguay in a privileged position when it came to facing the disruption caused by the COVID-19 pandemic. The infrastructure and existing support and development opportunities allowed it rapidly to create a strategy that enabled school continuity with online connections and resources and Plan Ceibal's ecosystem of platforms. However, as soon as the school closures began, the underlying weaknesses of the system became evident. Despite all the technological infrastructure available, less than half of the students and teachers in the educational system had enough training, expertise and experience to migrate fully, as needed, to online teaching and learning. Moreover, many students and teachers were not using the contact systems at their disposal to continue education in emergencies.

The first phase of the Uruguayan response to the COVID-19 crisis – Ceibal en Casa – was developed in 2020, immediately after schools closed, drawing on the pre-existing systematic deployment of Plan Ceibal's digital resources. It was primarily a contingency phase, with a reactive approach to the emergency created by the COVID-19 crisis. It provided the foundational elements to facilitate learning and allowed for the design of a second and interconnected phase, which could be described as an adaptive cycle. This cycle also led to the rethinking of formats and pedagogical approaches that would be suitable for the emergency context. Plan Ceibal redesigned face-to-face learning initiatives and adapted them to be delivered entirely in a virtual environment, including Ceibal en Inglés – a program for teaching English as a second language – a computational thinking project, and other initiatives that focus on twenty-first-century skills, such as Plan Ceibal's maker spaces.

Although pre-existing resources were vital in implementing Ceibal en Casa, the connectivity model was still a source of disparity. The relocation of the teaching and learning practices from school buildings to virtual spaces had, as entry points, the infrastructure of students' homes and their families. The computerized devices provided by Plan Ceibal worked as drivers of parity to access the educational virtual space; however, although Uruguay has a high level of internet penetration, students from vulnerable families had limited or no access to the internet due to socio-economical constraints.

THE INNOVATION: CEIBAL INTEGRADO

Ceibal Integrado (Integrated Ceibal) developed from the first response plan for school closures in Uruguay introduced because of the COVID-19 pandemic. In 2020, Ceibal en Casa had prioritized the continuity of the contact between students, teachers, and families through the devices, internet connectivity, and cloud infrastructure. Ceibal Integrado started as a consequence of the monitoring connectivity metrics and attrition rates in education at different stages of the pandemic in that period. The reality was that the benefits of the available solutions were not distributed equitably. Plan Ceibal, in agreement with the National Administration of Public Education and the Ministry of Education, decided to implement a strategy to mitigate the effect that school closures had on internet access for students and teachers.

Ceibal Integrado managed to overcome the connectivity challenge by facilitating free access to all students and teachers across the country. This was done through a complex set of negotiations and technical arrangements that allowed the exonerated of data consumption, to guarantee equal access to the national education platform from all mobile and home connections across the country. The move, which had no precedent in Uruguay or the region, was key to guaranteeing inclusion and equity in accessing education.

This innovation involves vital stakeholders and particular technologies already available to the Uruguayan school system. CREA Contents and Resources for Education and Learning (Contenidos y Recursos para la Educación y el Aprendizaje in Spanish), for example, is an LMS with virtual classrooms and interaction tools that comprise the entire database of students and teachers from the public school system. In March 2020, education authorities declared CREA the official platform for education continuity. This declaration created a high spike of connections, and the use-rate grew exponentially (Plan Ceibal, 2020). In 2021, Plan Ceibal integrated into CREA an open-source video conferencing tool, to provide an alternative for virtual lessons.

This whole initiative involved complex negotiations and a series of actions to implement this nationwide innovation successfully. The process required agreements with edtech providers, the localization of servers in the country, management of cyber-security issues, tech integrations, and deals with the telephone companies to zero-rate data consumption for education. All these changes made the Uruguayan public education system accessible whether students were in school or at home. Online access and video conferencing for education became completely free of charge for every student in the country. Consequently, the usage of Plan Ceibal platforms and video conferencing tools in 2021 increased by 25 per cent compared to 2020, when Uruguay had records of coverage and access to Plan Ceibal's platform ecosystem. The removal of obstacles in connectivity substantially impacted the type of use and the number of students and teachers from all levels who took advantage

of the combined models implemented during the first semester of 2021, making CREA one of the most visited sites in Uruguay.

THE THEORY OF ACTION

The theory of action of this initiative is that if governments, telephone companies and edtech providers collaborate to remove the obstacles that impede students, teachers and families from benefitting from the tools available online for education, the efficacy and efficiency of digital technologies for learning, in the hybrid models created during the school reopenings after COVID-19, will increase. Additionally, pairing those infrastructure optimization strategies with focused adaptations of the educational programmes and contents available will enable a transformation in the daily practices of students, teachers, and families, even when schools remain closed.

THE PROCESS

The timeline of the process illustrates how fast this innovation unfolded. In April 2020, Plan Ceibal started migrating all its pedagogical frameworks and educational programmes to function online. For example, the Ceibal en Inglés programme, which delivers online lessons to more than 75,000 students with remote teachers from different parts of the world using the video conferencing rooms installed in public schools, had to change the way it functioned. Teachers recorded four video lessons per week for each grade until another mode of delivery was made available. The computational thinking programme, present in 1,764 groups in public primary schools, reaching over 35,500 students, adapted to the challenges so that students could meet the missions assigned promptly. Red Global de Aprendizajes, a network of schools and administrators implementing a competency-based model with active pedagogies in their communities, moved all their events and resources to a digital format supported by the Plan Ceibal platform's ecosystem.

By the end of 2020, Plan Ceibal had started a planning process in collaboration with ANTEL, the state internet service provider, and Blindside Networks (BN), the provider of Plan Ceibal's video conferencing tool, to migrate the service to local servers (in 2020, it was located on US servers). This strategy was crucial to removing the costs of internet traffic. Additionally, negotiations with private internet service providers (Claro and Movistar) started to remove charges from mobile telephone internet plans.

In January 2021, the telecom teams at Plan Ceibal and ANTEL started migrating the conferencing tool to ANTEL's Virtual Data Centre (VDC). This action allowed Plan Ceibal to identify the traffic generated in the platform and to understand the challenges of scaling up the solution to serve 800,000 users. The system's total capacity is now provided by the

infrastructure available at VDC, securing the same use conditions at all times of the day, as well as responsiveness to the adjustments necessary for periods of significant usage.

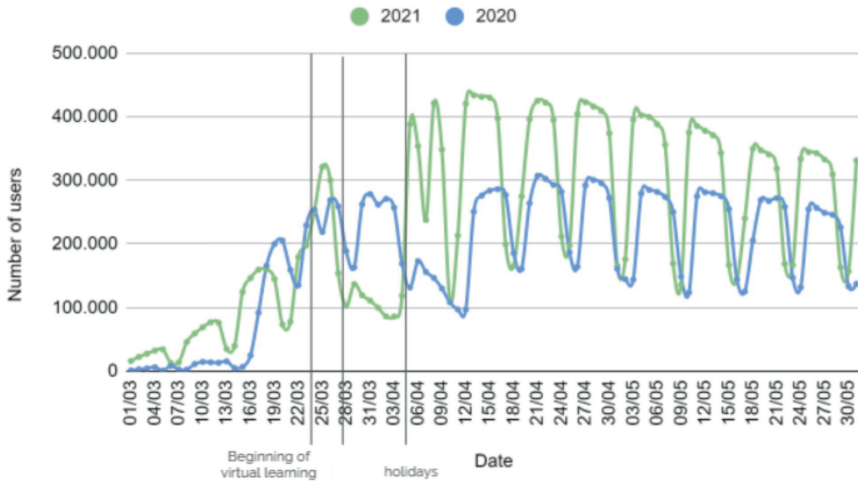
RESULTS

Plan Ceibal delivered a series of interconnected responses, providing pedagogical solutions focused on facilitating interaction among teachers and students through CREA. Before the COVID-19 pandemic, only 48 per cent of students and 60 per cent of teachers had at least explored this medium of communication. And only 10 per cent of students and teachers accessed the platform on a daily basis. During the pandemic, most teachers and students, for the first time, utilized CREA as their main medium for learning.

During the first phase of the Plan Ceibal response (Ceibal en Casa), the solution was accessible for most of the national education community – 88 per cent of students and 95 per cent of teachers – but primarily to maintain contact and exchange learning materials among students, teachers and families. Further action was required to provide systemic access to vulnerable students and allow for more strategic use for learning from the communities, which was addressed in the second phase (Ceibal Integrado).

Access to computers and the provision of online comprehensive pedagogical services did not guarantee reasonable connection rates for the most vulnerable students. Nor was it guaranteed that teachers were able to use or felt comfortable using the digital learning mediums for education. In the light of the disturbance caused by changing conditions of teaching and learning settings, the second phase of Plan Ceibal's response provided ambitious personalized training for teachers and access to the programmes' learning platform, with an embedded video-conference service, at no cost, increasing its level of accessibility significantly (see Figure 1). There was also an increase in the usage and the recurrence of contact, by 25 per cent compared with the previous year when Plan Ceibal registered all-time records. The connections to Plan Ceibal's platform ecosystem increased, and the number of assignments completed by students rose by more than 50 per cent (see Figure 2). These were the fundamental elements to provide better access to what could be described as a virtual public national education system. With this move, Plan Ceibal showed distinctive aspects of resilience: its ability to self-organize, to increase its capacity, to learn and to adapt.

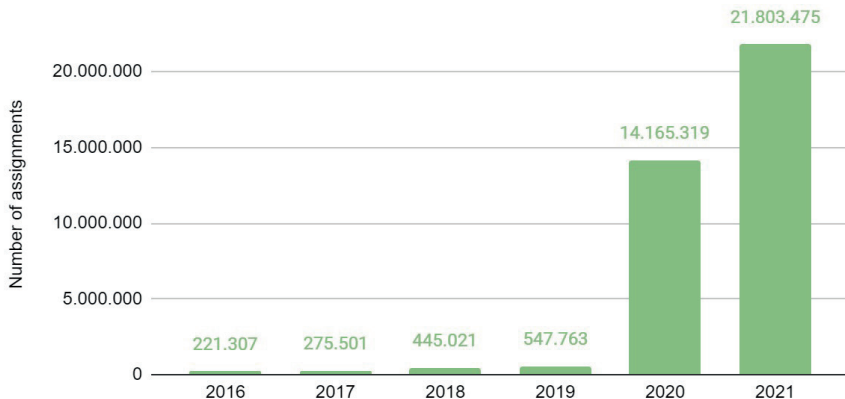
Figure 1. Comparison of users' access to CREA LMS: March to May 2020, 2021



Source: Plan Ceibal internal reports, June 2021.

During this time, not only did the connection between students and teachers improve but also the delivery of pedagogical programmes. The network Red Global de Aprendizajes trained more than 3,100 teachers in online courses on new pedagogies. Ceibal en Inglés was delivered at no cost when all the English video lessons were embedded in the relocated LMS. The computational thinking programme provided more than 1,700 lessons each week. None of these results would have been possible at this scale without the innovations introduced. Ceibal Integrado augmented the reach of schools and helped students gain autonomy over their learning process while helping them develop digital skills in a tremendously challenging situation.

Figure 2. Number of assignments completed by students in May at CREA LMS: 2016, 2021



Source: Plan Ceibal internal reports, June 2021.

FUTURE PERSPECTIVES

The innovation presented here generates conditions that will enable education authorities and key stakeholders to think about sustainable hybrid education models and how to balance most of their components. Ceibal Integrado could help leverage systems that could be scalable nationwide, create new blended formats of schooling, and exploit the potential of technology while extending learning outside school buildings.

The innovations represent a reorganization of elements, services and resources of the education system to face the challenges of a world of increasing complexity, uncertainty and disparity. Ceibal Integrado is: i) inclusive and student-centered, as it facilitates access to the national LMS to every student whenever and wherever (mobile data at no charge guarantees access from any place in the country with personal computers provided by Plan Ceibal or other devices); ii) multi-sectoral since it was possible, thanks to the collaboration of public-private actors, to reorganize infrastructure and commercial procedures and arrangements; and iii) quality-oriented, considering the enhancement of CREA as a result of the integration of a video-conference service. Additionally, and in alignment with public action ideas of UNESCO's Futures of Education initiative (UNESCO, 2020), it expands the definition of the right to education, as it addresses the importance of connectivity and access to knowledge and information. At the same time, it highlights the need for sustained investment in innovation and technological infrastructure to provide quality education worldwide. Technical infrastructure, professional development, pedagogical innovations and internet access might not, together, address every issue facing education around the world. However, there is no equitable future for education without them.

This case study concentrates on the analysis of infrastructure settings and suggests that technology is not a neutral component in the education ecosystem, but needs to be strategically deployed in order to guarantee an inclusive and equal approach to education. Further research needs to be done to better understand how free models of connectivity can be sustained beyond emergency contexts and the implications of this for the quality of education.

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About the author

Leandro Folgar began his career in education as an English teacher and extra-curricular educator in recreation and leisure programs. At 23, he founded an enterprise dedicated to building high-performance teams, organizational learning, and educational recreation. He obtained his Bachelor's Degree in Education from the Universidad Católica del Uruguay and a Master's Degree in Innovation, Technology, and Education from Harvard. He also earned his business administration certification from Harvard. He currently serves as President of Plan Ceibal, which is the Uruguayan state's educational innovation agency.





INNOVATIONS SUPPORTING
DEEPER LEARNING



Chapter 16. FINLANDSupporting student collaboration
and engagement through online project-based learning,

Jari Lavonen and Katariina Salmela-Aro

ABSTRACT

One of the consequences of the COVID-19 pandemic has been the limited opportunities for students to collaborate and interact, which has negatively affected their well-being. This chapter considers the use of project-based learning (PBL) in a middle school distance-learning science class. According to survey data (N = 163), teachers can increase interaction and collaboration and the use of scientific practices among students through PBL. However, it is important that teachers use scaffolding techniques with students when collaborating or asking questions in the chat function of a break-out room. Scaffolding is challenging for teachers, even when the digital infrastructure is well organized and they have appropriate digital pedagogy skills and have been actively participating in a research-practice partnership.

KEYWORDS

Loneliness, collaboration, scientific practices, project-based learning.

**BIG IDEAS**

This chapter introduces how the PBL model could be used in distance teaching and discusses how teachers can scaffold students' participation beyond their abilities, especially in scientific practices and, moreover, use the chat function of a break-out room for scaffolding student collaboration and other activities.

INTRODUCTION

Lavonen and Salmela-Aro (2021) summarized the experiences of Finnish teachers and students during the COVID-19 pandemic on the basis of national surveys and case studies. They found that preconditions for organizing effective distance teaching and learning in Finland were in place: teacher and student digital competences were at a good level, and digital infrastructure and the availability of digital tools were also well established. Iivari et al. (2020) recognized a digital leap in teachers' and students' competences. However, Lavonen and Salmela-Aro (2021) documented decreased engagement and well-being at

the student level. One of the most serious threats to students' well-being has been the limited options for collaboration and interaction during the pandemic. Loades et al. (2020) found that social isolation and loneliness has a significant effect on the well-being and mental health of children and adolescents in the context of COVID-19. This demonstrates how pedagogical approaches, such as project-based learning, that engage students even in distance learning situations in collaborative learning and prevent feelings of loneliness can play a critical role in supporting distance teaching and learning.

Project-based learning (PBL) engages students in problem-oriented, collaborative and meaningful learning in a small group (Blumenfeld et al., 1991; Krajcik & Czerniak, 2013). Scaffolding techniques help students engaged in scientific practices participate beyond their abilities. However, scaffolding is challenging in science distance teaching in middle school, and teachers need ideas as to how they can support students' collaboration in a distance-learning context. This chapter introduces the development and use of PBL, especially the use of chat and break-out rooms, in middle school science teaching, to scaffold students' collaboration in the Helsinki metropolitan area during the pandemic.

PROJECT-BASED LEARNING IN MIDDLE SCHOOL SCIENCE

The idea of PBL has been proposed several times as an approach to teaching reform and as a way to engage students in collaborative learning (Thomas, 2000). However, the word *project* is used in various ways, and not all projects are necessarily PBL, in the way it is understood in this chapter. PBL is based on ideas set forth in the 1930s by John Dewey and involves students engaging in active and collaborative learning or project-based activities (Mayhew & Edwards, 1965). However, Thomas's (2000) review of the literature indicates that PBL studies lack a common understanding of what project-based education means.

The PBL model presented in this chapter is based on the ideas of Blumenfeld and Krajcik and their colleagues (Blumenfeld et al., 1991; Krajcik & Shin, 2015). In this model, students are engaged in problem-oriented, meaningful learning in a small group (i.e. a project). The aim of PBL is to support students in combining disciplinary core ideas or concepts with their previous knowledge. Learning in a small group works towards a concrete output, built by students, such as a model, for example, that describes a natural phenomenon based on collected evidence. PBL is supported through the use of digital tools.

Learning sciences research has shown that students cannot learn disciplinary content without engaging actively in disciplinary practices, and they cannot learn these practices without actively constructing their understanding of the content by working with and using ideas in real-world contexts (Krajcik & Merritt, 2012). The key features of PBL are as follows (Blumenfeld et al., 1991; Krajcik & Czerniak, 2013):

- PBL starts with a 'driving question', which contextualizes learning, connects new ideas to previous ideas and guides the learning process (Greeno, 2006; Lave & Wenger, 1991).
- PBL focuses on the learning goals of the curriculum/standards of which students are required to demonstrate mastery.
- Students explore the driving question by participating in scientific practices – processes of problem-solving that are central to expert performance in the discipline. As students explore the driving question, they learn and apply important ideas in the discipline. They investigate questions, propose hypotheses and explanations, argue for their ideas, try out new ideas and challenge the ideas of others.
- Students engage in collaborative activities to find solutions to the driving question. This mirrors the complex social situation of expert problem-solving.
- Students create a set of tangible products that address the driving question. These are shared artefacts, publicly accessible external representations of the class's learning.
- While engaged in scientific practices, scaffolding techniques help the students participate in activities normally beyond their abilities.

Consequently, to support students in their learning or in forming usable understandings, knowing and doing cannot be separated; rather, they must be combined in the planning, inquiring, problem-solving, decision-making and explaining of real-world phenomena. Learning is achieved by building knowledge through the process of creating cognitive artefacts, such as concepts and models, as a result of common activity, i.e. students develop understandings through sharing, using and debating ideas with others (Blumenfeld et al., 1991).

Krajcik and Merritt (2012) have emphasized the use of scientific practices as a part of PBL. In so doing, students engage in scientific practices similar to those of professional scientists, such as reasoning, critical thinking and knowledge practices – for example, questioning, observing, inferring, classifying, predicting, measuring, interpreting and analysing – as a part of learning. These practices, as a dimension of PBL, also have the potential to promote engagement in science learning (Niemiec & Ryan, 2009).

Finally, Krajcik and Shin (2015) stressed the importance of cognitive tools, such as graphic representations on a computer screen, which help learners see patterns in data. Various digital tools could, therefore, be considered cognitive tools because they allow learners to carry out tasks. In this case, the design of the teaching modules was based on the assumption that science education should better represent real scientific practices and support collaboration in order to make science learning engaging and effective (Anderson, 2007; European Union, 2004; Tytler, 2014).

RESEARCH-PRACTICE PARTNERSHIP FOR SUPPORTING TEACHERS IN LEARNING THE USE OF PBL DURING THE PANDEMIC

The teachers who participated in this project had been collaborating with researchers prior to the pandemic. This type of research-practice partnership (RPP) supports teachers in designing project-based teaching modules for middle school science education while also supporting teachers in their professional learning (Nonaka et al., 2006; Coburn & Penuel, 2016). In an RPP, teachers are positioned as members of the research group and as educational innovators, able to design and develop teaching modules. In the RPP, teachers and researchers appreciate each other's expertise; while teachers are experts on subject and praxis, researchers are experts on learning science. In partnership, both parties invest their time and resources and both can learn from their participation.

During the pandemic, the teachers discussed, in three two-hour Zoom meetings, how the PBL teaching modules developed before the pandemic could be modified for distance teaching and learning. The teachers and researchers focused on the pedagogy used, specifically the digital pedagogy, such as in break-out room interactions.

ENGAGING STUDENTS IN DISTANCE LEARNING THROUGH PBL

There follows a description of PBL in action. During this process, PBL was organized through Google Classroom, in a form of distance teaching. The description is based on observations of lessons and discussions with teachers. The example, part of six 75-minute lesson periods, aims to guide students to become familiar with models that describe movement with constant and changing velocity and the reasons velocity changes. The PBL supported contextualising, through means of a driving question and a demonstration aimed at supporting understanding of the driving question, as described below. While engaging in scientific practices, students were encouraged to interact socially in break-out rooms, to collaborate and to use digital tools, such as their own mobile phones, for capturing and analysing movement. A teacher visited the rooms and guided students in the development of a final product or artefact resulting from their work, such as a science model, which describes the phenomena under study. These student products became publicly accessible external representations of their learning through whole-class discussion. In addition, during the learning process, scaffolding techniques enabled students to participate in activities normally beyond their ability (Krajcik & Czerniak, 2013). The description contains two examples of how a teacher guides students in collaboration and interaction.

The teacher begins the lesson by introducing the topic on the Google Classroom platform: 'We will look at different movements, the change in movement and the reasons behind the change. We will design experiments and models and discuss those models. Experiments will be conducted with your own mobile phone. A specific driving question is: Why do different objects take different times to fall when they are dropped from the same height, and what is the motion of a falling object like? In order for us to understand the driving question, let's look at the coffee filter drop. I have one filter in one hand and two nested filters in the other hand. What do you think? How do filters fall? Do they fall at the same time? Look closely at what is happening.' Based on the teacher demonstration, it is found that a heavier object hits the ground first. The teacher continues the demonstration by dropping heavier filters. The findings are surprising to students, and they are asked to summarize these findings, first independently, then in groups of four in a break-out room. The rooms are named A, B, C, 1, 2 and 3.

Next, the teacher invites the students back to class and asks them to make three groups, A-1, B-2 and C-3, and summarize their ideas. Finally, a whole-group discussion is organized. The teacher says that this demonstration was the anchoring phenomenon of the upcoming study period, which introduces the students to the theme of the five lessons of the course. 'Later, we will explain in more detail what we all noticed. At the moment, it may seem confusing, but let's start with this. Natural phenomena are often not simple.' The teacher re-introduces the driving question of the course: 'Why do different objects fall at different rates when they are dropped from the same height?'

The teacher guides the four-student groups to break-out rooms and asks them to draw up research questions, on the basis of which the phenomenon can be studied and an answer to the driving question obtained. Students were asked to write questions on the online platform. The teacher wrote supportive questions in the chat to help students orient themselves when developing the questions:

- What do you already know about the topic?
- What do you want to find out by studying the phenomenon? In what way should your question be changed so that it is clear to everyone what phenomenon you are going to study?
- Is it clear from the question what you intend to measure or observe? How should your question be changed so that everyone knows what you are going to measure?
- What do you aim to learn when from this investigation?

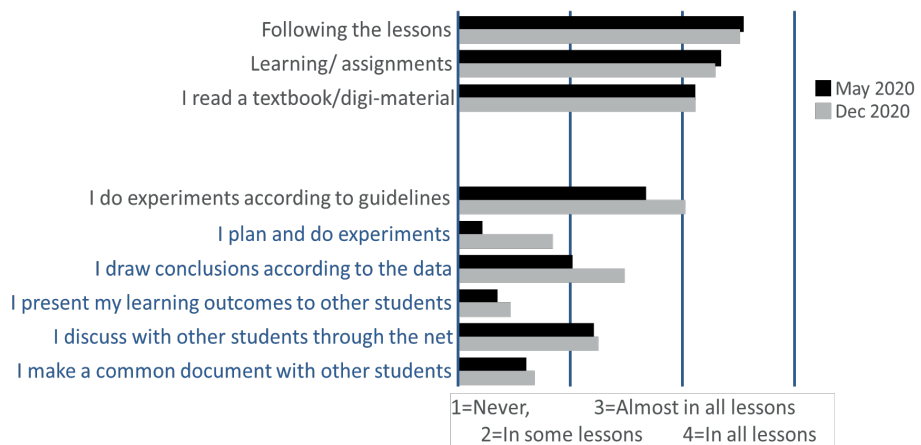
Students formulate questions related to motion (e.g. How does velocity change during a fall? Is the speed of a falling object the same throughout the fall?) and questions related to the causes of motion change (e.g. How does the mass of a falling object affect the fall time? How does shape [crumpled filter/non-crumpled filter] affect fall time?).

The teacher invited students back to the Google Classroom main meeting and asked them to classify the questions posed in the learning environment in a meaningful way. The teacher explains, ‘After you have classified the questions, your group will introduce them to the other groups in order to discuss and compare the classification of questions. Make a common classification that you present to the whole class.’

STUDENTS’ VIEWS OF PBL

In order to evaluate how a PBL period influenced students’ experiences during the spring and autumn pandemic of 2020, students’ opinions on their learning were collected at the end of each term. A survey was prepared and organized at the beginning of May in four middle schools (N = 95) and in mid-December in two middle schools (N = 58). During the spring, students were taught ‘traditionally’ through Google Classroom and, during the autumn, a PBL period was part of their studies. Figure 1 displays a sample of students’ evaluations of typical activities during a science class.

Figure 1. *Students’ evaluations of their learning during the distance-learning period*



The students reported a slight increase in interaction/collaboration with other students and a bigger increase in the use of scientific practices, such as planning investigations and drawing conclusions based on the data. However, students reported only a minor decrease in working alone by following the lessons, independent learning and assignments, and reading a textbook or digital material.

DISCUSSION

According to student experiences, a teacher can support and increase interactions among students and the use of scientific practices by employing PBL. This was possible because teachers and students had sufficient digital skills and infrastructure to support the productive use of digital tools. Pedagogy that supports student collaboration is important because one of the consequences of the COVID-19 pandemic has been limited opportunities for student collaboration and interaction, which has negatively influenced students' well-being. Social isolation and loneliness have had a negative impact on the well-being and mental health of children and adolescents in the context of COVID-19 (Loades et al., 2020).

Although the students experienced an increase in a number of scientific practices, they did not experience an increase in collaboration and interaction at the level the for which teacher and researchers were aiming. Teachers should focus on guiding and facilitating student learning in small groups or in a break-out room; however, this guidance and facilitation is challenging for teachers and requires them to prepare scaffolding beforehand. Facilitation and scaffolding are central to PBL. In situations that the teacher knows to be challenging for students, instructions should be provided as a text. Facilitation and scaffolding, in many situations, occurs through asking questions. The teacher supports students in looking at the phenomenon or the subject being studied from different perspectives, such as by asking, 'What is your claim? On what material is your argument based?'

In addition to collaboration during lessons, a teacher could organize or facilitate collaboration outside lessons. For example, students' problem-solving activities or homework could be supported through voluntary break-out rooms or using other digital tools that allow chat-style interaction.

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Chapter 17. FINLAND**Kide Science: Play-based science learning**

Sarah Lee and Jenni Vartiainen

ABSTRACT

Kide Science is a Finland-based company that offers a technology-enabled and research-backed solution for early childhood teacher professional development to engage young children (primarily aged 3–6 years) in play-based blended learning focused on the acquisition of twenty-first century skills through science, technology, engineering, the arts and mathematics (STEAM) content.

Kide Science was founded on the premise that high-quality digital teacher training coupled with research-backed content is inherently a scalable model. Its vision is to raise children to become the problem-solvers and creative thinkers that future society needs. Kide Science created a full version of its programme for distance learning during the pandemic which could further be adapted for a broader global audience. In this chapter, we aim to show how Kide Science translated its early science education model to answer distance learning needs that arose during the COVID-19 pandemic. More precisely, we will address the question: How can children’s engagement be supported in distance learning in the context of science education?

The global pandemic put significant stress on designing new ways to learn science in a distance education mode. Early childhood science education is traditionally heavily dependent on hands-on experimenting in carefully scaffolded in-person learning environments. Due to the pandemic, Kide Science translated its pedagogical model of early science education to be fully remote learning, enabled for educators and for parents in the home environment. In this chapter, we will explore the pedagogical model of Kide Science and describe the transformation process from onsite to online learning. Furthermore, we will consider the characteristics of learning science in a distance mode by reflecting on Kide Science’s distance learning model from the perspective of engagement theory. This case study shows that Kide Science’s pedagogical approach has remarkable possibilities to scale as an onsite classroom solution but also as a distance learning innovation. Our study demonstrates that the Kide Science distance learning model can effectively support young children’s engagement in learning. The fully online Kide Science teacher training programme is critical to further acceleration of scale for this programme.

KEYWORDS

Edtech, early childhood education, teacher training, remote education, distance education, distance learning, international education, science education, emotional intelligence, remote learning, home learning, twenty-first century skills, inquiry-based learning.



BIG IDEAS

Interactive science education is critical to developing twenty-first century skills. With technology, high-quality science education for younger children and accompanying teacher training can be delivered at scale – in multiple languages and across a variety of education and care settings.

INTRODUCTION

This chapter will describe the theoretical perspectives behind Kide Science's innovation, while also examining the practical implementation of the programme at scale. Further, it will describe how Kide Science's early science education model was translated for distance learning for both schools (including childcare centres) and the home environment. Kide Science is an early childhood science, technology, engineering, arts and mathematics (STEAM) content provider based in Finland providing early childhood and primary school educators in 28 countries around the world with research-backed content for teaching a play-based science curriculum. Through partnership with Sanoma Media Finland, the largest Finnish learning and media company, Kide Science has also sold more than 25,000 story-activity books based on its learning model and currently reaches approximately 300,000 Finnish children through its Kide Science television show.

In 2013, Dr Jenni Vartiainen began researching science education among young children in Finland (Vartiainen, 2016; Vartiainen & Kumpulainen, 2020). The empirical part of her work focused on developing a new model to implement play-based science education. In earlier studies, data was collected from science clubs, while later studies concentrated on scrutinizing implementation of the model in schools. Dr Vartiainen founded Kide Science in 2017 in response to demand for the science clubs she created. The distribution of the Kide Science pedagogy today occurs through a comprehensive, technology-enabled STEAM learning programme delivered through kindergartens and primary schools around the world. Demand for Kide Science grew significantly during the COVID-19 pandemic and now reaches more than 800 schools and learning environments. Some of these learning locations are purely online schools that existed pre-pandemic, while some emerged and are still operating because of the pandemic. This scale translates to more than 2,000 paying teacher-customers and approximately 60,000 children globally.

PEDAGOGICAL BACKGROUND OF KIDE SCIENCE

The Kide Science pedagogy approaches science education from the inquiry-based learning perspective (Minner et al., 2010). It is based on socio-cultural learning theory (Vygotsky, 1978). Inquiry-based learning refers to science education that includes consideration of the process and the nature of science (Abd-El-Khalick et al., 2004). It seeks to provide children with skills to produce, evaluate and apply knowledge rather than merely demonstrate what is already known. For young children, the inquiry is divided into three stages to scaffold the complex inquiry process: 1) Orientation, 2) Investigation and 3) Conclusion. The emphasis is on science process skills that emerge throughout these phases. Science process skills are transferable skills needed in all fields of science and across other academic subject areas. Examples of these exercises include making observations, measuring, classifying and drawing conclusions. According to Vygotsky, play is a leading activity for a child and can generate a zone of proximal development. For Vygotsky (1978), pivotal in play is creating imaginary situations. Kide Science follows a pedagogical model of scientific play (Vartiainen & Kumpulainen, 2020) that centres on imaginary science situations where inquiry can emerge. Imaginary situations are triggered and maintained with stories and props as science accessories. Kide Science pedagogy can be summarized as a method that blends ‘hands-on, heads-on, and hearts-on’ approaches. In addition to learning science process and critical thinking skills, children’s emotions and sense of meaningfulness are also taken into account.

Kide Science provides an online platform named Supra for teachers to implement the programme in classrooms or to enact Kide Science via distance learning. Supra includes professional development in play-based STEAM education and a vast library of lesson plans designed around Kide Science pedagogical principles. For children, Kide Science appears as stories and hands-on inquiry activities using typical classroom (or household) supplies. The average Kide Science classroom lesson requires between 2 and 7 supplies, including items such as: plates, masking tape, water, pipettes, sugar and a flashlight. For the adapted remote learning model, this supply list remained simple for families to procure. Some schools and daycare centres provided physical learning kits to support children in learning at home.

The robust teacher training for facilitation of Kide Science content made the addition of remote teacher training during the early days of the COVID-19 pandemic seamless. The content team quickly adjusted the focus of training, to virtual environments, while maintaining fidelity to the fundamental pedagogical approach described above and ensuring minimal impact on the student experience. This transformation process was guided by the question of how to maintain young children’s engagement when the social dimension of science education in classrooms is reduced to interaction with a teacher behind a screen. An example of a Kide Science lesson named ‘The Thirsty Robot’ (see Table 1) shows this transformation, comparing

a regular classroom activity with the distance learning version of the same lesson. Online lessons generally follow the same structure as onsite lessons. The most notable differences between regular and distance learning lessons are in the preparation, entering the science adventure and the communication practices with children. The actual experimentation phase is exactly the same in both modes. The outcome of Kide Science’s distance learning model was observed, and the characteristics of distance learning reflected the engagement theory that will be described below.

Table 1. *Characteristics in onsite vs distance implementations of ‘The Thirsty Robot’ lesson*

The Thirsty Robot lesson SUPPLIES	
Regular onsite classroom activity	Distance learning activity
<ul style="list-style-type: none"> - Scientists’ accessories for children and a teacher (lab coats, goggles etc.) - Robot Hoseli prop (Usually Robot Hoseli shaped lamp) - Printed story - Transparent cups - Teaspoons - Ice tray, many lids or small plates - Water - Skimmed milk - Cola - Orange juice - Vinegar - Cooking oil - Lemon juice 	<ul style="list-style-type: none"> - Transparent cups or jars - Spoons - Several plates or reaction plate - Cooking oil - Optional liquids - Skimmed milk - Soda - Water - Orange juice - Vinegar - Lemon juice - Other liquids you have <p>If possible, children can prepare their own scientist accessories to use during the online lesson</p>

The Thirsty Robot lesson PREPARATIONS BEFORE THE LESSON

Regular onsite classroom activity

Teacher gathers supplies so that children work in small groups (max. four children). Each group gets a set that contains all equipment.

Teacher prepares the experiment stations, setting out the supplies that children will use, and pours the liquids into transparent cups before the lesson starts so that children don't know which one is which.

Distance learning activity

Choosing online platform: Platform should allow all families to join and should support a 45-minute lesson.

Clear communication with parents: Teachers send parents the participation link, list of supplies and other considerations such as covering the table for messy substances. Teachers should send photos of the experiment setup. Parents are reminded of online platform usage tips.

Preparing the scene: Teachers plan the research station so that children can see the teacher and the experiment supplies. Everything needed should be nearby, so the teacher doesn't have to leave the station.

Preparing the research station at home: Parents collect the supplies and set them near the children. Parents fill up one jar/cup per substance in advance so that children won't know which one is which. The original packages are kept close by during the lesson so that children can match the substances to these.

The Thirsty Robot lesson

ORIENTATION: ENTERING THE SCIENCE ADVENTURE

Regular onsite classroom activity

Teacher gathers children in a circle on the floor. Everyone puts on their scientist accessories and participants take roles as little scientists. Teacher reminds children about the mysterious Supraland and Robot Hoseli. Teacher introduces the Hoseli prop and finds a letter that Hoseli has delivered.

Distance learning activity

Teacher welcomes children and reminds them how to use the online platform. Teacher also reminds parents about their role as research assistants.

Teacher reminds children about the mysterious Supraland. Everyone puts on their scientist accessories if applicable.

Teacher uses a picture of Robot Hoseli or a Hoseli prop, then introduces a letter that Hoseli has delivered.

The Thirsty Robot lesson

ORIENTATION: SETTING THE AIM BY READING A STORY

Regular onsite classroom activity

Distance learning activity

Teacher reads a letter from Supraland aloud (excerpt of letter below):

Dear scientist friend,

My name is Kelvin. You'll never guess what me and my friends, Esther and Pi, found in the garden!

It was some kind of little creature, with a blinking light on top of his head. What is it? Could this be a REAL robot? The little robot seemed lost and confused and was making little beeping sounds: 'Blip blip... Hello, my name is Hoseli... blip... what is this place? Blip blip... Hoseli is very

The Thirsty Robot lesson

INVESTIGATION: EXPERIMENTING

Regular onsite classroom activity

Distance learning activity

Experiment: Hoseli's favourite drink

Phase 1: Liquids from kitchen

'Let's try to find out what the substances are!'

1. Ask the scientists to choose one substance and observe it closely using different senses. What colours do you see? If you try to move the substance around in the cup, how does it move? What does it smell like?
2. Repeat until you have observed each substance.
3. Next, ask the scientists to interpret what the different substances might be. Name the substances together.
4. Classify the substances and put them next to the correct picture

Phase 2: Hoseli's drink

'Remember the confused and thirsty robot? The only thing he remembers is that he should drink something that doesn't mix with anything else. Let's try to find out together what that is!'

1. Ask the scientists to choose one substance.
2. Measure two spoonfuls of the substance on a plate.
3. Pick another substance and measure it on the plate, on top of the first substance.
4. Observe: What happens to the substances? Make an interpretation: Do the substances mix?
5. You can then let the scientists continue the experiment freely. Repeat the process so that everyone has used each substance at least once.
6. Conclude together: Which substance didn't mix with any of the others?
7. How could you help Hoseli? Which substance will quench Hoseli's thirst?

The Thirsty Robot lesson	
COMMUNICATION DURING THE EXPERIMENTATION	
Regular onsite classroom activity	Distance learning activity
<p>Teacher observes children’s experimenting and frequently asks questions that help children develop science process skills and solve the problem. Encouraging and praising feedback is often given.</p> <p>Teacher aims to create communication between children. If needed, teachers model asking for help from each other.</p> <p>Children use multiple modes to communicate their ideas: words, gestures, pictures and videos.</p> <p>Teacher draws attention back to the story to keep children engaged and to help them remember the activity’s aim.</p>	<p>As communication through the screen is less dynamic than in person, the teacher communicates more intensively than they would in a regular setting. Still, the teacher doesn’t have to pretend excitement and finds a way to communicate in a concentrated and inspirational way. Gestures and facial expressions are important to creating connection with children.</p> <p>To give the children confidence to communicate their ideas, the teacher listens carefully to what children have to say and makes clear that their comments and thoughts are valuable.</p> <p>There are moments when children must keep their microphones on, making it possible for teachers to hear children’s ideas and hence scaffold children’s working.</p> <p>Every child should feel that they are participating and heard. Teacher asks simple questions directed to the whole group. Children can answer by showing their artefacts or using gestures. Every child should be given the chance to describe their observations individually.</p>

The Thirsty Robot lesson	
CONCLUSION: REPORTING BACK	
<p>Teacher attracts the children’s attention and they prepare to report to Kelvin by writing him a letter or drawing a picture:</p> <ul style="list-style-type: none"> - Which substance will quench Hoseli’s thirst? - How can Hoseli identify this substance? - What could Hoseli do to avoid this problem in the future? <p>After the report, science accessories are taken off and the teacher and children step out of the science adventure.</p>	

SUPPORTING ENGAGEMENT IN DISTANCE LEARNING

The pandemic forced schools and kindergartens to implement distance learning widely. Online learning presents challenges in engaging learners. Particularly affected is emotional engagement, which gets little attention when online learning solutions are designed (Plass & Kaplan, 2016). The Kide Science transformation from science education taking place in physical facilities to online science education was based in engagement theory (Fredrics et al., 2004). There are three overlapping dimensions in engagement: 1) Cognitive, 2) Behavioral and 3) Emotional. By cognitive engagement, we mean that a child is willing to put cognitive effort into learning and resist distractions. Behavioral engagement refers to the engagement through which a child is willing to do activities and show perseverance. Emotional engagement means that a child shows interest in learning: they are having positive emotions and experience tasks as meaningful.

To understand children's engagement, a qualitative case study of Kide Science (Yin, 2012) was conducted. The observational data were collected from 12 children and video-recorded data from six children to better understand how Kide Science supports children's engagement in distance learning. The data were analysed using theory-driven content analysis and the results support each dimension of engagement. Children using Kide Science are 3 – years old and therefore parents or other assisting adults play an important role in organizing the materials. To support engagement, it is important that the equipment is ready and children's attention is not affected by searching for equipment during the lesson.

Children's behavioral engagement was high when children were able to interact with the material environment. From a pedagogical point of view, this means that there should be only a short interval with the teacher talking and a lot of hands-on working. Parents are needed to guide and scaffold hands-on work if children's fine motor skills are still developing. However, the data revealed that children didn't need much help from parents because the level of the tasks was suitable for children to act independently, according to their age group. To make sure children are able to maintain behavioral engagement, teachers need to give verbal instructions, use visual aids, and model actions for children. For the parents at home, they are reminded to observe and intervene only when needed, for example, if a child's fine motor skills are still developing and a child cannot fill cups or use a pen.

Overall, children's behavioural engagement was undistracted throughout the 45-minute story and play-based lesson. The children's willingness to undertake activities indicated interest and curiosity about the lesson's tasks. The results revealed that children's cognitive engagement was high and they worked intensively to solve the problem. A deep level of cognitive engagement was evident when children drew connections between new concepts

and phenomena and their previous knowledge and experiences. The story-based approach supports cognitive engagement as the story sets the aims for inquiry. Children feel that solving a problem arising from a story is meaningful. By using a story-based approach in distance learning, it is possible to increase children's willingness to understand the phenomenon, and hence to support children's cognitive engagement.

The child's emotional engagement was also strengthened with the story-based approach. Emotional engagement was evident in the joyful atmosphere when laughter and exclamations of amazement were observed. However, it was evident that distance learning did make frequent high-emotional engagement challenging. The interaction between children is thin and therefore the joy of shared learning and 'finding out together' is difficult to support. Notwithstanding, data showed that emotional engagement can be supported by a teacher if they maintain an intensive interaction with all children.

In conclusion, Kide Science pedagogy is effective for engaging children in STEAM education in physical learning environments and in distance learning. Prior to the school shutdowns induced by the pandemic, Kide Science was a supplementary science programme, or was identified as the core science curriculum in daycare centres, primarily in early years (age 3–6) learning. As schools begin to re-open, Kide Science users around the world continue in their usage of the remote learning content, indicating a desire to retain the Kide Science distance model.

Behavioural engagement is high when children are allowed to do most of the hands-on work in a lesson on their own, supported by an engaged remote teacher. Inactive listening time should be minimal. To engage behaviourally, children need clear instruction that is mediated through multiple modes of communication. Cognitive engagement can be effectively supported by utilizing stories. Children want to help story characters and their motivation to stay cognitively engaged is strong. Stories also support emotional engagement. When implementing online STEAM education, careful attention should be paid to supporting emotional engagement. The teacher should take into account that every child feels the need to be heard. Successful moments should be praised and celebrated with a child. Multimodal features of online-based environments, such as emojis and virtual reactions, can be used to strengthen emotional engagement in a virtual setting.

ALIGNMENT WITH THE FUTURES OF EDUCATION VISION

Kide Science pedagogy is especially aligned with the learning of twenty-first century skills among young children. Some institutions stress economic growth as a motivation to implement twenty-first century skills, while others underscore citizens' ability to manage

everyday life. Despite the diversity of aims for implementing these skills, almost all frameworks identify similar core skills: collaboration, communication, ICT literacy, social and cultural competencies, creativity, critical thinking and problem-solving (Voogt & Roblin, 2010). Kide Science allows children to practice these skills and pays particular attention to problem-solving and critical thinking, weaving the theoretical principles of learning into socio-cultural approaches of collaboration, communication, and social and cultural competencies in all their lesson activities, training and content.

With regard to twenty-first century skill development in children, it is essential to consider teachers' professional development. UNESCO states that teachers' professional development should steer them to implement pedagogies and tools that underscore the depth of understanding in learning (Voogt & Roblin, 2010). Kide Science's professional development programme supports teachers' adoption of pedagogical approaches that emphasize children's thinking skills, cooperative learning and problem-solving skills.

Kide Science teacher training is delivered through an online platform that includes training modules and step-by-step instruction for each lesson. Teachers are provided with multimodal instructions (text, video, pictures) to ensure effective teaching. The online platform allows training whenever and wherever it is most suitable for teachers. The training is integrated into the lesson plans: teachers learn by doing STEAM with children. This braided approach ensures teachers are highly engaged and immediately see the meaningfulness of the training in action. The platform allows teachers to train in bite-size playlists and, hence, it is not distracting for busy teachers. In addition, the use of a web-based platform increases teacher training equality: teachers don't need to travel to expensive in-person workshops; they can use the platform with any internet browser regardless of their device or user interface. Basic Kide Science teacher training takes approximately 20 hours and is currently offered in Finnish, English and Mandarin Chinese. Furthermore, there is the possibility of continuing teacher development by using the extensive Kide Science lesson plan library. With a Kide Science licence, teachers can obtain support from the Kide Science team and an extensive global teacher-peer network.

CONSIDERATIONS FOR SCALE

The Kide Science programme currently reaches a broad spectrum of educators. It has the potential to scale across an even broader range of geographies and educational environments. As an education technology innovation, it holds pedagogy as its core technology, yet the actual technology platform has been pivotal in facilitating distribution prior to the COVID-19 pandemic.

Post COVID-19, as government and educational leaders rebuild and recover, Kide Science provides a case study for science/STEAM education continuance for younger children. With additional training and professional development content, Kide Science was able to respond to school shutdown, and quickly enable remote learning to mitigate learning loss in the critical subjects of science and twenty-first century skills.

Kide Science has continued to build additional distribution channels for its pedagogy. The highly transformative, yet flexible, nature of the programme makes it resistant to many issues that humanity and global education systems will inevitably face in the future. Kide Science already has meaningful evidence that its pedagogy translates via the channels of television shows, children's books, classroom activities, distance learning activities, hobby centre activities and home activities with parents.

As an example of scaling the programme to homes, Kide Science confirmed a partnership with technology company TCL Alcatel during the pandemic to provide a free family version of the Kide Science programme, pre-installed in more than five million of the new affordable tablets for children that will be sold/distributed by the end of 2021.

Kide Science has embraced a vision for global scale since its inception. From this viewpoint, the founding team believes that the COVID-19 pandemic only accelerated the mass demand for their programme and content, as well as the significant increase in adoption of remote learning for both children and adults.

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Chapter 18. QATAR**Internet-free learning in low-resource contexts**

Janhvi Maheshwari Kanoria and Leena Zahir

ABSTRACT

Education Above All's Innovation Development Directorate created the Internet-Free Education Resource Bank (IFERB), a repository of hundreds of educational resources designed specifically for internet-free, technology-free and low-resource contexts to enable beneficiaries to continue and enhance meaningful learning. IFERB contains project-based learning resources, activities for learners with special needs, and games to practise mathematics skills. The materials were developed based on global curricular outcomes for four different age groups between 4 and 14 years. Designed to be used as a stop-gap solution when education is interrupted, a blended solution for partial school reopening or a solution to enhance learning in any context, IFERB has been implemented both face-to-face and in a remote learning context. The interactive pedagogical approach emphasizes student and community-led learning requiring minimal guidance by educators or facilitators. IFERB resources were used in pilot programmes across five countries, through 24 implementing partners, reaching more than 110,000 students directly and a further 200,000 students indirectly, as well as being downloaded and used tens of thousands of times in over 130 countries.

KEYWORDS

Project-based learning, school community partnerships, school community relations, at-home learning, play-based education, student collaboration..

**BIG IDEAS**

A supporting environment, enabled by non-government organizations (NGOs), and intentionally designed learning experiences can enable holistic and authentic learning in low-resource contexts.

INTRODUCTION

During the COVID-19 pandemic, more than 188 countries imposed country-wide school closures, creating an unprecedented rise in the need for distance-learning solutions (OECD, 2021). The most prevalent responses were digital remote-learning programmes that were accessible through devices such as computers, smartphones, TV or radio. Given the lack of access to

such devices and the internet in many parts of the world, these remote learning programmes were not available to almost half of the world's households. Around 463 million children, or one out of every three school-aged children, were unable to access education over the course of the pandemic. Three quarters of them live in the poorest households with limited resources or parental support. (UNICEF, 2020).

Education Above All (EAA) is a foundation based in Qatar, with a global mandate to provide the world's most marginalized communities with access to quality education. The COVID-19 related school closures prompted EAA's Innovation Development Directorate (ID), to design and pilot a new solution to reach digitally disconnected learners in low-resource contexts. The education solution was focused on those who lack internet and technological devices, and who also face additional barriers in terms of the absence of learning resources at home and limited parental support.

The Internet-Free Education Resource Bank (IFERB) was designed and developed as a growing bank of different screen-free resources for learners aged between 2 and 14 years to ensure access to continued quality learning for underrepresented communities, including learners with special needs, mathematics-related anxiety or socio-emotional learning needs.

The theory of action for IFERB is that through the deliberate design of educational materials and pedagogy based on these principles, along with adequate training for all associated stakeholders, educators can overcome the challenges of low-resource contexts. These materials, pedagogy and training build capabilities to support and enrich student learning. This, in turn, results in meaningful experiences that build twenty-first century skills and foster academic learning. In the long term, this generates more resilient education systems and a real shift in pedagogical paradigm that ensures that relevant learning can happen anywhere and at all times.

INTERNET-FREE EDUCATION RESOURCE BANK

IFERB is a repository of learning resources that contains diverse learning and teaching materials, including project-based learning resources, maths games and an activity bank for learners with disabilities. The IFERB project-based learning resources came about as an early response to the pandemic and were developed and reviewed by EAA within a month of the global school closures announced in March 2020. They were made publicly available in multiple languages on an open-source and cost-free website that serves as the primary channel of dissemination. Projects are available for multiple subjects, including maths, science, language and social studies, and provide interdisciplinary and multi-dimensional learning that mimics real-life experiences, integrating literacy and numeracy and twenty-first

century skills, particularly critical thinking, creativity and communication skills. One project, for example, requires students to create household budgets, while another teaches them how to save water while working on numeracy.

The activities for children with disabilities, maths games and other resources were subsequently added and, collectively, these resources have been downloaded tens of thousands of times by users across 130 countries. Once downloaded, parents and educators can access the detailed instructions included in each project to use with their learners.

To expand IFERB's reach across diverse low-resource and emergency contexts, EAA partnered with 24 organizations in five countries – Kenya, India, Zambia, Pakistan and Lebanon – through which the resources were made accessible to more than 110,000 learners. The implementing partners were non-government organizations (NGOs) and schools that work with a variety of beneficiary groups, including remote, rural, semi-urban, urban-slum, refugee and tribal communities. Some of the partnerships developed organically through connections between EAA and partner organization staff, while, for others, EAA contacted and invited the organizations to submit a proposal detailing why IFERB was needed and how it would be used in their context. The implementing organizations used a variety of methods to reach learners, including face-to-face instruction, remote learning and blended models of delivery. Due to the lack of internet connectivity in learners' communities, the implementing partners typically download the IFERB materials and share it with learners using available means, including face-to-face group sessions, group phone calls, printed instructions in newspapers or other printed materials. The IFERB materials are designed to be adaptable to any of these delivery formats in order to facilitate reaching the least-connected learners. To ensure that the materials are accessible to learners, implementing partners adapted project tasks and activities into different formats including phone-based instructions, radio scripts, student-friendly printable instructions, and facilitator-led lesson plans.

Building the capabilities and confidence of educators and facilitators was necessary but challenging given the novelty of the approach and the additional challenges of remote teaching. The absence of alternatives in some of the contexts provided a good opportunity for educators to try a new instructional approach that could keep learners engaged during school closures. More than 60 per cent of the implementing partner organizations had never been exposed to project-based learning (PBL) previously, and 80 per cent reported that the educators and teachers did not have the required capabilities to implement it. Recognizing these challenges, the EAA team worked closely with implementing partners to further simplify the content, including through the development of scripted guides for local community facilitators, where teachers were not available.

In addition to the shortage of qualified educators, learners in low-resource contexts also had limited home support – a quarter of the parents in the pilot contexts had never attended school and an overwhelming majority of 84 per cent had not completed secondary school. IFERB project-based learning resources addressed these challenges through simplified instruction, helpful scaffolds and student-led tasks that empower educators – whether parents, volunteers or novice teachers – to facilitate student learning regardless of their expertise and skill level. Learners accustomed to a didactic approach required additional support to own their learning and to exercise the voice and choice given to them. In the absence of reference materials such as textbooks and instructional support, the IFERB resources enabled learners to sustain an inquiry- and discovery-based approach. The gamified design ensures engagement, while the minimal equipment required allows for the execution of projects using simple scrap materials.

The IFERB learning resources were designed for a global audience and mapped to multiple global curricula. However, localizing the projects is an important step toward ensuring their relevance for target learners. Implementing educators must ensure that the selected projects are aligned to the local curriculum and student learning levels, and that their content is culturally relevant and appropriate. To this end, EAA trained implementing partners on project selection, contextualization and implementation, provided feedback and support with these activities, and reviewed the final adapted content. In almost all of the pilot programmes, the contextualization process was led by implementing partners and not educators. One NGO that was part of the Mantra for Change pilot – a collective of 16 organizations based in remote and rural locations in India – implemented, among others, a project called ABC by me, where students author their own ABC book. When students (who belonged to remote tribal areas ridden with conflict) were being guided on developing their books, they were told to draw an object to represent each letter. Instead of ‘A for apple’, students chose to draw an arrow! This is an example of how projects were adapted to local contexts to ensure relevance and spark interest by drawing on students’ realities. EAA adopted a cascaded training model in IFERB pilots. NGO staff first received comprehensive virtual training from EAA members on project selection, project contextualization, learner and parent engagement, and learner assessment. They then trained educators who used the projects directly with learners on relevant aspects including IFERB characteristics, learner and parent engagement, differentiation of instruction, and student assessment. Educators did not typically receive training on project selection or contextualization since the finalized adapted lesson plans and materials were provided to them by partner NGOs. In contexts where parents directly facilitated students’ learning (such as in EAA’s IFERB pilot with the British Council Pakistan), orientation sessions were held by the NGO to train parents on implementation.

Besides the COVID-19 related public health challenges, the difficulties associated with remote learning and the lack of digital infrastructure in low-resource contexts, one of the biggest

challenges was the introduction of a new and innovative approach to teaching and learning that enabled students to exercise their agency and gave the community an important role in learning. Across pilot locations, learner communities initially struggled to understand how play-based projects contributed to academic learning and had a limited understanding and appreciation for the growth in twenty-first century skills that learners exhibited. Parents were also not prepared to support the students with their learning and many requested familiar sources of learning, such as worksheets and textbooks. The IFERB methodology necessitates the involvement of families, even those with limited schooling, in guiding students and building essential practical skills that are relevant in their contexts. For instance, a project called Grandmother's Tales allowed learners to learn from their grandmothers – regardless of their literacy levels – who were asked to share folk stories that students then re-imagine and re-write for a contemporary context, employing their critical thinking, creativity and literacy skills.

Gradual and consistent exposure to PBL and bringing visible connections to academic learning outcomes helped parents overcome their initial resistance; many of the partners reported that learners' communities contributed significantly to their growth. In many of the communities, this was also one of the first opportunities for the parents to work closely with their children, which built the foundation for strong and enduring relationships among educators, parents and children. Most of the pilot-implementing partners reported improved student-teacher rapport and the development of stronger and mutually beneficial partnerships with the community.

The results of the short pilots (which typically lasted 4–6 months) were promising despite the challenges of working with heterogeneous learner populations at different levels of learning. Based on the results of a pre-post assessment that was conducted in all but one pilot, average scores increased by 16.5 per cent after 12 weeks of implementation. Growth in twenty-first century skills was measured using an assessment that consisted of a prompt and an accompanying rubric for assessors to place students in different levels (from 1 to 4) according to how they responded to the prompt. The three skills that were assessed were communication, creativity and critical thinking – 80 per cent of the implementing partners reported that their students grew in these twenty-first century skills by at least one level during the pilot period.

Traditional schooling has conditioned many students to follow instructions, stay quiet and focus on knowledge acquisition and regurgitation. IFERB forces learners to emerge from these constraints by teaching them to manage their time, be thoughtful with their choices, reflect on their decisions, make hypotheses that they test and adjust, problem-solve, observe and draw conclusions, present their product to an audience, and reflect on their learning. While the EAA team has focused on measuring changes in creativity, communication and critical thinking, the projects promoted many other skills, including entrepreneurial skills that

were demonstrated by students who designed their own little stores (for a project titled Setting up my Store) and by those who set up community libraries with books they had authored (as part of their final product for the ABC by Me project). The projects also empowered students to take social responsibility, solve community-level problems and design sustainable solutions to challenges in their contexts. From creating alternatives to single-use plastics to designing evacuation plans in preparation for natural disasters, participating students have supported their communities with lasting solutions.

The following quote from an experienced teacher summarizes the experience of designing a learning experience that is aligned with the future of education vision – an authentic learning that engages all students to participate and grow holistically:

The children who were failing and sitting quietly at the back of class are suddenly asking questions, asking for more work and doing new things, even beyond my instructions. Instead of problems, they now are finding their own solutions and are asking for more work! - Ektara educator, India.

Education has been substantially rethought throughout this pandemic, and the IFERB programme has helped cultivate a sense of possibility and optimism that learning can happen constantly everywhere and all the time through real-life experiences. Many of the implementing partners report having learned ‘a new language of learning’ that is not limited to the physical structures of school. This not only helps mitigate the effect of ongoing disruptions to learning, but also provides an essential learning experience with more engaging opportunities related to children’s real lives.

The most important success parameter is the enduring change that IFERB has brought in the communities where it was implemented: 92 per cent of implementing partners have said that they would like to sustain PBL use in their context, 96 per cent would be interested in promoting IFERB within their networks, and 100 per cent of partners who were surveyed six months after their pilots had ended reported that they have continued using IFERB. Over 90 per cent of educators have also expressed their desire to continue using IFERB and PBL more broadly. Partners have also reported lasting changes in student behaviors, especially an enhanced sense of social responsibility and citizenship, respecting natural resources and challenging gender biases.

Moving forward, the scope of IFERB will be expanded from being a crisis response to a resilience measure that can ensure learning continuity whenever learning is interrupted, as well as a complementary solution to promote holistic learning outside school hours or be used to augment learning by fully integrating it within the curriculum.

The IFERB programme has helped us recognize the importance of creating personalized and bespoke content and partnering with NGOs to build a learning ecosystem that is more resilient, holistic and student-centred.

EAA foundation intends to empower more partners in different geographies to sustain this approach, while additionally developing training materials and tools to ensure further transfer of capabilities. New resources will also be added as IFERB expands, with a focus on creating new types of materials in areas of need. IFERB implementing partners will also align with government bodies at different levels either to adopt IFERB as an ongoing intervention in their geography or to integrate the PBL approach more broadly as they re-think their education policies and incorporate more holistic pedagogical approaches. The hope is that these programmes prompt governments and school systems not simply to return to business as usual but, instead, to harness the momentum and progress made during the pandemic to build new systems of learning that promote community-driven and relevant learning.

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INNOVATIONS SUPPORTING
STUDENT SOCIO-EMOTIONAL
DEVELOPMENT AND WELL-BEING



Chapter 19. COLOMBIA

Using audio to deliver social and emotional education to refugee and migrant children

Delanie Honda

ABSTRACT

The COVID-19 pandemic has affected millions of students and brought the discussion of the importance of social and emotional learning (SEL) to the forefront, as educators, community leaders and caregivers seek to find ways to support young people's academic development and well-being. Children affected by disaster, conflict and displacement are at a particular disadvantage as they are less likely to re-enrol in schools once they reopen and are often at the greatest risk of the long-term consequences of learning disruption. This situation can contribute to negative impacts on physical and mental well-being, as well as reduced educational attainment. Quality education opportunities, including SEL skills, is one tool that can be used to mitigate these negative effects and support children's academic progress and healthy development. This chapter discusses the implementation, lessons learned and future outlook of the Play Well programme, implemented in Colombia by the International Rescue Committee (IRC), with funding from the Lego Foundation. Play Well is an audio-based programme aiming to strengthen SEL skills through play and specifically designed for distribution through various low-tech media, targeting refugee and migrant school-aged children.

KEYWORDS

Socio-emotional development, play-based education.



BIG IDEAS

Providing audio-based, socio-emotional education materials can support socio-emotional learning skill development, a critical area for children affected by disaster, conflict or displacement. The audio-based delivery method enables distribution through low-tech channels, essential for enabling learners in low-resource communities to have access to high-quality educational opportunities.

INTRODUCTION

Since 2014, more than 5.4 million Venezuelans have fled their homes, as part of the second largest mass displacement in the world. Fleeing violence, hunger and economic collapse, Venezuelans have sought refuge in neighboring countries such as Ecuador, Colombia and Peru. Colombia is currently the main host country, with 1.7 million Venezuelans living across the country (IRC, 2021). An estimated 460,000 of them are school-aged children (UNESCO, 2020).

The Colombian government has made significant efforts to address refugees' humanitarian needs, notably by granting Venezuelans access to education and health systems. Despite considerable progress in enrolling and integrating children into the Colombian school system, UNESCO (2020) reported that 260,000 Venezuelan school-aged children remained out of school.

Millions of children around the world have been affected by school closures due to COVID-19, but children affected by disaster, conflict and displacement have been at a particular disadvantage. Not only were they more likely to be out of school before the pandemic, but they are also less likely to re-enrol in schools when they reopen, and the pandemic has compounded existing uncertainty and stress in their lives. For these vulnerable children, learning disruptions can have lasting consequences, including negative impacts on educational attainment, and mental health and other long-term outcomes. Quality education opportunities, including socio-emotional learning (SEL) skills is one tool that can be used to mitigate these negative effects and support these learners' education and well-being.

This case study discusses the implementation, lessons learned, and future outlook of an audio-based educational programme called Play Well which can encourage SEL skill development among refugee and migrant school-aged children.

PLAY WELL

In response to the COVID-19 pandemic, the International Rescue Committee (IRC) began developing Play Well in September 2020, with emergency funding from the Lego Foundation. The IRC is a global non-governmental organization (NGO) which responds to humanitarian crises. The organization supports refugees and displaced persons through various services including quality educational opportunities. The IRC and the Lego Foundation have collaborated on other learning-through-play projects, including Play Matters, a programme designed for pre-primary and primary-aged children in East Africa.

Play Well is an audio-based programme which promotes SEL skills through play. The content is delivered in 25-minute episodes, primarily through radio, and is available on streaming platforms. Families can also access content on mobile devices through SMS, WhatsApp and interactive voice response (IVR). The programme is designed for primary school children aged 6–12 years. Colombia was identified as a context where socio-emotional education was critical, as IRC colleagues in the country were reporting concern about the out-of-school children there.

When developing Play Well, the IRC knew it wanted to create a low-tech solution which would provide easy access to their content. The pandemic has exposed digital divides in countries around the world; access to remote learning through online platforms has been challenging for millions of learners, due to inadequate infrastructure, high prices for data packages, and other barriers. The target audience of this programme – refugees and migrants – are among those who face these challenges and often have limited access to internet connection or devices compatible with online-based platforms.

The content designed for the Colombian context is centred around a show called *Al Aire con Enrique* (On the Air with Henry). Enrique is a migrant chameleon, and is joined by a cast of friends throughout the show. The show has segments for news from their village, interviews, music, and discussion. Throughout the episode, children are invited to participate and engage with the content by listening for specific information or reflecting on their own experiences with the topic. For example, the topic of the first episode is home and migration. Listeners are invited to think about three things they remember most when they are far from home. In another section, Enrique encourages listeners to ask their parents or grandparents if they have ever moved homes, and what emotions they felt. Although the show’s target audience is refugees and migrants, the content is applicable to all children who can learn from Enrique’s lessons about self-knowledge, learning from mistakes, and exploring the world through the senses. The programme has 20 episodes.

Play Well’s theory of action is that if children and families are provided with access to high-quality socio-emotional education which encourages engagement with the content and learning through play, they will strengthen their SEL skills, enabling healthy cognitive development, strong relationships with themselves and others, and the ability to cope with adversity, which are critical for children who have experienced trauma or stress and will support improved long-term outcomes.

IMPLEMENTATION

During the design process, IRC engaged global and regional experts to develop an SEL framework that suited the needs of refugee children living in Colombia. To inform the focus

of the content, IRC first sent out surveys in Spanish and English to experts in education in emergencies, SEL, child development and/or education in Colombia and Venezuela. The survey asked respondents to choose the most important SEL skills refugee children in Colombia needed.

Based on the results from the survey, the IRC chose to focus *Al Aire con Enrique* content on the SEL domains of emotion and identity, which were ranked as the most important for target listeners in Venezuela and Colombia. Skill areas such as emotional and behavioural regulation, empathy and perspective taking, self-knowledge, and self-esteem were identified as critical for children in this context because they may have emotional challenges and low self-esteem, which can affect learning. In addition, respondents believed that it was important for children to understand their emotions and communicate their feelings to others, such as an adult or peer. Building and strengthening identity was prioritized because a strong understanding of oneself is important to developing support networks and helping develop resilience.

After identifying the SEL skill areas to focus on, the IRC convened two advisory groups which provided technical support and feedback throughout the project. Both advisory groups were composed of experts in the fields of education and holistic child development, learning through play, education in emergencies, and educational audio. They were also joined by representatives of the Lego Foundation. The results of the survey and the outputs of the advisory group workshops were used to develop an SEL framework which defined the learning objectives for the emotion and identity domains.

The IRC partnered with a local Colombian production company, Click Arte, to develop audio content. When testing content, the IRC had to be creative to gather feedback from beneficiaries. Normally, they would visit families to gather insights about engagement with the materials and ask questions to understand what worked and what did not. However, with lockdown measures in place, face-to-face meetings were not possible.

Instead, the IRC used WhatsApp. The team created a simple survey to send out to families and shared clips of *Al Aire con Enrique*. They requested parents or caregivers to send voice recordings of their children engaging with the activities. Although this was a new way of receiving feedback, the Play Well team found this method exceeded expectations. Not only were they able to reach out to more people remotely, but they also believed the natural environment – people recording themselves instead of a team watching and making notes – helped them collect authentic reactions.

Al Aire con Enrique broadcasts weekly on RCN, Colombia's largest radio station, and will soon be on public radio, supported by the Ministry of National Education (MEN). Episodes are also available for streaming on online platforms. Information about the episodes is

shared through SMS text messaging, WhatsApp, social media channels and IVR. Of all the distribution channels, the IRC has found IVR to be the most successful in reaching beneficiaries with limited access to the internet.

The project has provided an opportunity to learn how best to reach the target audience with this audio content. For example, the Play Well team found that sharing a whole episode through IVR was not effective and most people did not listen to the full 25 minutes. Instead, they tried calling once a day, sharing two-to-five-minute segments of the show. This strategy has resulted in much higher engagement. IVR has also been more flexible as families are able to call a number at any time. The process is continually being adjusted, as the team tests different types of messages or timings.

By June 2021, Play Well episodes had been shared with 60,000 numbers through WhatsApp, SMS and IVR. Over four million people across Colombia had been exposed to *Al Aire con Enrique*²³, although this figure does not necessarily represent engagement with the content. More insights into listenership from the radio broadcasts are expected later in 2021.

LOOKING TO THE FUTURE

Scaling up Play Well can be done in different ways. One method is through the conventional definition of scale: reaching more beneficiaries. The IRC is currently in the process of expanding Play Well in East Africa. They will implement the same model of creating locally driven content by soliciting input through advisory groups to develop an SEL framework. In the next year, the IRC expects to have launched the programme in East Africa, ultimately reaching 1.5 million children and 350,000 caregivers.

Success in a new context also means being adaptable to the new environment. While Colombia has been a relatively high-tech context with a large mobile phone user population, this might not be the case in other settings. Thus, the way Play Well delivers episodes may need to be adapted in order to have the anticipated reach.

The second form of scaling up could be through integrating Play Well within the formal education system. At the moment, Play Well is a light touch intervention which interacts directly with children and caregivers. But since the launch of Play Well, the Colombian MEN and Ministry of Culture has shown interest in the programme and supported its distribution through public channels. In the future, Play Well content could be used to complement or supplement SEL curricula used in the classroom.

The final form of scaling could be through a library of high-quality, playful SEL content. Future crises will necessitate the need for materials such as Play Well, which can be accessed in low-resource areas. Episodes focusing on different skill areas, which are appropriate

23. According to RCN surveys

for varying contexts and available in multiple languages, could be a resource on which educators and families can draw.

Play Well is an innovation developed in response to COVID-19. But the programme, with its aim to strengthen SEL skills through play, specifically designed for distribution through low-tech media, has its advantages in other crises beyond the pandemic. Radio-based and other low-tech distance education materials will continue to be a valuable resource to reach refugees, displaced persons and other communities with limited infrastructure and limited access to high-tech devices.

Building SEL skills is not only important in the current moment; it will continue to be critical for learners of the future who will face new and unprecedented challenges in the coming century. In particular, vulnerable children affected by disaster, conflict and displacement will continue to face uncertainty and stress even after the world returns to normal. Without proper support, these learners may struggle academically and socially on their return to school. Thus, strong SEL programmes which complement academic initiatives, have the opportunity to benefit educational outcomes. As the world builds back from the pandemic and looks towards the twenty-first century, it is essential not to forget children in vulnerable situations.

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About the author

Delanie Honda is a 2020 graduate of the International Education Policy programme at the Harvard Graduate School of Education. She connected with the IRC while working with the GIRL Center at the Population Council on a report studying the gendered effects of COVID-19 school closures. During this time, she was introduced to the Play Well programme. She would like to thank Katie Murphy and Payton Young at the IRC for the times they took to speak with her about Play Well and share details about the programme to support the development of this case study.

Chapter 20. COLOMBIA**A schoolwide strategy for social and emotional learning in the community**

María Fernanda Beltrán Rico, Charlotte Greniez Rodríguez
and Pablo Jaramillo Quintero

ABSTRACT

During the COVID-19 pandemic, Alianza Educativa (Alianza), a non-profit organization that runs 11 charter schools in Bogotá, Colombia, transformed a traditional social and emotional learning (SEL) homeroom programme into a schoolwide strategy. With the belief that SEL skills are developed and mastered only when put into practice, and that schools need to provide opportunities not only for students but also for teachers and families to develop SEL skills, Alianza created a new comprehensive approach to develop SEL skills in school and family environments by : a) developing SEL skills at home and with families; b) developing SEL resources and activities to address relevant problems of the community; c) designing self-evaluation tools to reflect on SEL development; d) turning teachers and other school members into SEL learners; and e) promoting SEL practice in daily life through a communication campaign. Early results show that teachers highly value these actions as motivating and relevant for their SEL development and practice. Nonetheless, the limited time available has made it difficult to make the most of the strategy. Even families that actively engaged in SEL activities during lockdown have tended to participate less since they went back to work. Finally, student surveys show positive correlations between SEL skills development and social-risk prevention, which confirms the importance of strengthening SEL development for underserved students in vulnerable communities.

KEYWORDS

Social and emotional development, school-community partnerships/school community relations, teacher professional development.

**BIG IDEAS**

Creating a comprehensive schoolwide strategy that fosters a social and emotional learning environment for the whole community allows students to have more opportunities to put SEL skills into practice and makes it more likely that they will use those skills actively in their lives.

INTRODUCTION

Alianza Educativa is a non-profit organization established in 2000 by four leading private educational institutions in Colombia to contribute to the transformation of education in the country. It currently runs 11 top-performing charter schools in five underprivileged communities of Bogotá. For over 15 years, Alianza has implemented a homeroom social and emotional learning (SEL) programme called Navegar Seguro (Safe Sailing) to help students develop and fulfill their life projects, manage the social risks they face in their environment, build positive relationships, and contribute peacefully to the transformation of their communities. In 2019, inspired by the most recent literature on the importance of SEL skills for students' development²⁴, Alianza adapted the CASEL framework and the Step by Step toolkit developed by the World Bank to update Navegar Seguro. It now includes 24 class sessions, from kindergarten to eleventh grade²⁵ and has the purpose of developing the 18 SEL skills from the framework (see Appendix).

THE INNOVATION

During the pandemic, Alianza decided to expand its Navegar Seguro programme and transformed it into a new schoolwide strategy that fosters an SEL environment for the whole community. The theory of action of this innovation was that if Alianza created a more comprehensive SEL approach that transcended the homeroom curriculum, included other school members such as teachers, school leaders, and family members as SEL learners themselves, and developed additional resources, such as online materials, self-assessment tools, and a communication campaign, students would have more opportunities to put SEL skills into practice both at home and at school, and would therefore have a higher likelihood of using those skills actively in their daily lives.

THE IMPLEMENTATION

Developing SEL skills at home and with families

To strengthen the role of families in students' social and emotional learning, Alianza designed SEL activities that could be carried out at home and explicitly involved family interactions while

24. Meta-analysis studies of SEL programmes and interventions, from preschool to high school, have shown an increase in prosocial behaviour, an improvement in academic performance and students' attitudes towards themselves and others, and a reduction in emotional and behavioural problems (Boncu et al., 2017; Durlak et al., 2011; Taylor et al., 2017). These positive effects can be found years after students graduate. A study that measured prosocial communication skills in preschool children and then followed them up almost two decades later found that these skills were significant predictors of academic success and getting a stable job in adulthood, as well as getting a full-time job at a young age. Participants who had a high score had professional success. In particular, they predicted timely graduation from high school, attainment of a university degree, and a lesser likelihood of committing a crime (Jones et al., 2015).

25. Equivalent to twelfth grade in the United States of America.

taking into account the different problems in the local context. For instance, the pandemic caused an increase in emotional difficulties, such as anxiety and sadness. To give families tools to prevent and address this problem, the student well-being team (psychologists, social workers and auxiliary nurses) designed emotional awareness activities for families. In one of those activities, students from ninth to eleventh grade and their families reflected on the emotions they had experienced during lockdown and the things they had lost due to the pandemic, and then explored a past situation in which they had overcome a hardship so that they could capitalize on that experience. A total of 72 activities in print, audio, and video format were designed, covering the 18 SEL skills for four grade groups: kindergarten to second grade, third to fifth grade, sixth to eighth grade, and ninth to eleventh grade.

Developing resources to address relevant problems in the community

One of the purposes of SEL is developing tools to deal with complex situations in life. With this in mind, Alianza designed four reinforcement strategies with prioritized SEL skills to address more complex problems and challenges that had arisen during the pandemic. For instance, the increase in domestic violence during lockdown, of which women, children and teenagers were the main victims (Pacheco & Rudas, 2021), led to the creation of a Violence Prevention Strategy. With that strategy, students and their families worked on their emotional regulation, assertiveness and conflict-management skills, and learned healthy mechanisms to deal with anger and conflict. Alianza also designed resilience, autonomy and self-care strategies, each one of which consists of an additional homeroom session, a families workshop and a conversation protocol to facilitate talks between the school staff, the students and families, as well as infographics with strategies for practising the prioritized SEL skills.

Additionally, in response to the social crisis of protests that arose in Colombia in 2021, a toolkit for schools and families was created. Alianza's schools are located in neighborhoods that have faced the most severe violence during this time, resulting in fear and anger in the community. To address this situation, a families workshop was designed in which parents learned how to talk to their children about the current situation, using active listening and assertiveness, and identified actions to take care of themselves and their families. This toolkit also included a class activity in which students used music to express their emotions and came up with transformative actions to enact the change they wanted to see in their communities. These actions were complemented with infographics about emotional regulation, frustration tolerance and conflict management.

Lastly, as Colombia started planning a safe and progressive return to schools, Alianza created a toolkit to welcome students back and to help them deal with the emotions that arose from the pandemic. It consisted of a collection of activities to be implemented at schools on the topics

of biosafety and self-care, emotional containment and experience-processing. During one of the experience-processing sessions, students identified challenges they had faced during the pandemic, achievements that had made them proud during this time, and opportunities they had encountered. With this in mind, students identified resources they could use to face adversity and take advantage of opportunities to foster self-efficacy.

Designing self-evaluation tools to reflect on SEL development

Evaluating the SEL development of students is key to generating reflections on opportunities to practise SEL skills. Because of this, it is fundamental to have an evaluation process that goes beyond grading the performance of students and becomes a tool for them to self-assess their learning process, receive feedback, and identify which skills they need to work on. To achieve this, Alianza's teachers carry out six self-evaluation sessions over the course of the school year²⁶. During these sessions, students from third to eleventh grade²⁷ fill out the Navegar Seguro questionnaire by grading affirmations related to their SEL skills and then receive written feedback about how to improve their SEL process. Additionally, in February 2021, teachers held a psycho-social risk and SEL diagnosis,²⁸ in which students answered self-evaluation questions on five specific SEL skills, which were prioritized in light of the circumstances students had faced during the pandemic²⁹. Both of these evaluations were autonomous and anonymous. Lastly, the SEL team and teachers carried out class observations, after which they filled out a questionnaire with their perceptions. This helped gather information about the implementation of Navegar Seguro, activities for families, and activities for the return to school.

Turning teachers and other school members into SEL learners

Other fundamental actors for SEL in children are teachers. Considering that fostering SEL skills in students starts with the development of these skills in their educators, Alianza created a comprehensive SEL learning process for them. Not only were teachers taught how to implement Navegar Seguro, but they also learned to reflect on their own SEL skills, filled a self-assessment questionnaire³⁰ like the one used with students, and formulated a self-improvement plan for the skills of their choice. After the survey's results were analysed, they

26. These self-evaluations take place after the sessions of each general SEL skill are finished (see Appendix).

27. Students from third to fifth grade use the Navegar Seguro instrument for primary school, which comprises 29 questions, while students from sixth grade on use the version for secondary school, with 70 questions. Younger students (kindergarten to second grade) have a self-assessment session that consists of verbal reflection only.

28. Both the self-evaluation survey and the diagnosis draw their questions from the Navegar Seguro instrument and include at least one question for each of the SEL skills. The skills present in both evaluations have the same items.

29. These five skills were: emotional awareness, emotional regulation, frustration tolerance, delayed gratification, and stress management.

30. Alianza's collaborators answered the Navegar Seguro instrument that was designed for secondary school students. It consists of 70 questions that cover the SEL skills from the framework and it is graded from 0 to 4, according to the self-reported frequency in which they practise the affirmations from the questionnaire.

were publicly shared with the collaborators during the following meetings, so that they could generate a reflection about the state of social-emotional learning at Alianza. This way, while students were developing their SEL skills, their educators were working on their own processes and drawing on those experiences to enrich their professional practice. This idea was taken beyond the classroom, including the student-well-being team and school administrators, who also participated in the development of an improvement plan for themselves and their staff.

Promoting SEL practice on daily life situations through a communication campaign

It is important to create opportunities for all Alianza’s collaborators to practice SEL skills in their everyday life. To do so, a communication campaign called Conexión Socioemocional (Socio-Emotional Connection) was created. It consisted of clips, podcasts, games, surveys and useful tips for practising SEL skills in daily situations, which were sent by email to all of Alianza’s collaborators from schools and headquarters. For instance, one of these activities involved a short video that showed examples of small actions that could benefit others, along with a survey that asked collaborators to think about other prosocial behaviour ideas. The responses included giving emotional support to others, donating food to those in need, and learning first-aid to help others in case of an emergency. Another activity consisted of a short mindfulness practice, after which collaborators were asked about the emotions they had experienced in the past days, to foster their emotional awareness.

RESULTS

After over a year of implementation, there are already some interesting and promising results of this strategy. First, self-report evaluations have showed students’ average score in both the SEL diagnosis and the self-assessment sessions³¹ to be in the medium to high range³².

These results show that students have found opportunities to put the general SEL skills evaluated into practice. However, there are still some challenges regarding the skills related to self-regulation, which is interestingly also the case for Alianza’s collaborators (see Table 1). These difficulties are particularly persistent among secondary school students: both evaluations have shown that average SEL skills scores get lower every grade until eleventh grade, where they increase once again.

31. These were carried out between February and July.

32. Scores can range from low (0.00 to 0.99), medium to low (1.00 to 1.99), medium to high (2.00 to 2.99) to high (3.00 to 4.00).

Table 1. *Self-assessment survey results. June 2021* ³³

SEL Skill	3°	4°	5°	6°	7°	8°	9°	10°	11°	Primary school average	Secondary school average	school average
Self-awareness	3,25	3,26	3,23	3,22	3,03	2,91	2,86	2,77	2,93	3,325	2,95	3,05
Self regulation	2,77	2,77	2,75	2,69	2,57	2,27	2,27	2,26	2,42	2,76	2,42	2,53
Social awareness	3,30	3,20	3,20	2,86	2,75	2,57	2,51	2,50	2,63	3,23	2,63	2,83
Positive Communication	3,02	2,96	2,84	2,77	2,65	2,47				2,96	2,60	2,79

Second, the psycho-social risks and SEL diagnosis showed positive and significant correlations between the SEL skills evaluated and both the World Health Organization (WHO) well-being score³⁴ and the Family APGAR score,³⁵ which means that the higher the score one gets on any of the measured skills, the higher the well-being and family functioning scores. There was also a negative and significant correlation between SEL skills and the anxiety and sadness score³⁶, as well as significant differences in SEL scores between students who have been exposed to adverse life experiences (psychoactive substances consumption, violence at home, and self-harming) and those who had not³⁷. While these results do not imply causality, they are a powerful insight that shows that SEL development can have a profound impact on family mindsets, habits and environments, which are key for student learning and well-being.

However, there were some alerts for students in the upper grades. The psycho-social risks and SEL diagnosis carried out in February 2021 showed that 24.12 per cent of the secondary school students had a low score in the WHO well-being index³⁸, 35.77 per cent reported a moderate to severe family dysfunction,³⁹ 26.61 per cent had a high score for anxiety and sadness,⁴⁰ 16.47 per cent had experienced violence in their home, and 23.22 per cent had had at least one self-harm incident in their lives.

33. By June 2021, the self-assessment of four general SEL skills had been carried out. Grey spaces indicate that the self-evaluation has not been carried out in those grades. Green indicates the higher scores, while yellow indicates the lower ones.

34. The World Health Organization-5 Well-being Index is a self-report questionnaire that measures current subjective well-being. It consists of five questions that can be scored from 0 to 5.

35. The Family APGAR score measures perceived family functioning regarding adaptation, partnership, growth, affection and resolve in the family. It consists of five questions that can be scored from 0 to 4.

36. Anxiety and sadness are measured with the SRQ-20, a self-report questionnaire used to screen for common mental disorders that consists of 20 yes-or-no questions. For primary school, one question about playing a useful part in one's life was omitted.

37. These results come from t-tests and analysis of variance performed on the survey data.

38. A WHO well-being score under 13 is considered low and an indicator of poor well-being.

39. A Family APGAR score between 13 and 10 shows moderate family dysfunction; a score under 10 shows a severe one.

40. The SRQ-20 typically uses 8 and 11 as cut-off points (the score over which there is an indicator for mental distress). Cut-off point 8 was used here. For cut-off point 11, the percentage would be 14.55 per cent.

Table 2. Percentages of students at risk, according to the diagnosis

Scale	Criteria	Percentage of students at risk	
		4th to 5th grade	6th to 11th grade
Well being	Score under 13 (low well-being)	11,22 %	24,12%
Family functioning	Score under 13 (low well-being)	19,7%	34,77%
Anxiety and sadness	Score under 13 (low well-being)	≥ 8: 17,44%	≥ 8: 25,61%
		≥ 11: 5,00%	≥ 11: 14,55%
Violence	Score under 13 (low well-being)	9,82 %	16,47 %
Self-harm behaviours	Score under 13 (low well-being)	NA %	23,22 %

Third, SEL activities for families were perceived by teachers as motivating (98%), useful for putting SEL skills into practice (99%), and as contributing to the construction of positive relationships (67%), the development of their life project (38%) and the prevention of psychosocial risks (29%).⁴¹ This was also true for SEL activities to support the return to schools. Alianza's SEL team observed some class sessions and found that most of them were motivating, resulted in significant learning experiences for the students, and were challenging but achievable. All the observed class sessions achieved the expected goals.

Fourth, teachers and other school stakeholders have valued the strategy positively for their learning process. An internal survey conducted in May 2021 found that 79% of Alianza's team members (principals, coordinators, teachers and well-being teams) considered that the actions that had been carried out regarding social-emotional and psychosocial challenges were relevant or very relevant. On top of that, more than 70 per cent of the school staff considered that the activities of the communications campaign had been motivating and useful for developing their SEL skills. Regarding their SEL self-reflection, results showed strengths in general and specific skills such as self-awareness and prosocial behaviour, and challenges in others, such as self-regulation and perspective taking.

41. These percentages indicate the number of teacher reports that agree with the statements. There was a total of 3,040 reports.

Table 3. Teachers' and other school members' self-assessment results⁴²

General SEL skills	Average	General SEL skills	Average
Self awareness	3,44	Prosocial behaviour	3,63
Responsible decision-making	3,32	Active listening	3,53
Determination	3,31	Perseverance	3,52
Social awareness	3,23	Self-concept	3,48
Positive communication	3,17	Emotional awareness	3,43
Self-regulation	2,97	Self-efficacy	3,40
		Achievement motivation	3,40
		Analysis of consequences	3,39
		Decision-making	3,38
		Empathy	3,35
		Generation of options	3,20
		Conflict management	3,06
		Frustration tolerance	3,02
		Stress management	2,99
		Delayed gratification	2,97
		Assertiveness	2,93
		Emotional regulation	2,91
		Perspectivetaking	2,71

CHALLENGES AND LESSONS LEARNED

Despite these positive results, some challenges remain. First, it is now more evident than ever that time is a limited resource. At the beginning of the pandemic, school staff, students and their families stayed at home and several parents even stopped working, which helped to involve families in school activities and classes successfully. However, as Colombia started switching to hybrid models of work and education, time dedicated to commutes and other activities made it more difficult to have parents actively participating. To help relieve their time demands, Alianza decided to switch family activities from mandatory to optional. However, this caused students and families to stop engaging in the activities. This has resulted in the challenge of finding new strategies to involve working families in school activities.

Additionally, teachers and other collaborators started having more responsibilities, such as preparing both virtual and face-to-face lessons, which led to a feeling of overload and a struggle to find time for optional activities. This caused a decline in interactions with the Conexión Socioemocional activities. Furthermore, an internal survey showed that over 50 per cent of school staff had found it difficult to make the time in their workday to participate in Conexión Socioemocional. To address this, it is important to create incentives and set formal spaces in the schedule, such as meetings, to give collaborators the time to engage with the activities.

42. The table shows the ranking of SEL skills scores obtained by the collaborators, from the ones with the highest average score (green) to the ones with the lowest (red).

Second, the training process for teachers remains a challenge. It is fundamental that educators are involved in a continuous learning process, rather than a one-time lesson about how to implement the SEL curriculum, so that they can take more advantage of the material and become effective SEL instructors. This means that schools need to provide the necessary time and resources to support teachers in the development of their SEL skills in both the school setting and their personal lives.

Finally, there is an important challenge regarding the evaluation process. While self-assessments and observations provide significant insights, they do not allow us to identify causal relationships. Furthermore, ethical dilemmas make it difficult to carry out experimental studies, since these would require a control group of students that would leave a portion of the community unattended. It is important to design an integral evaluation strategy that takes into account both the reported experiences of the community and more objective assessments. This will provide useful information to adapt the strategy to the needs of the community so that it can be sustainable in the long run.

CONCLUSION

Creating a comprehensive approach that transcends the homeroom curriculum, that includes the school and families as SEL learners, and that makes additional resources available, allows for more opportunities to put SEL skills into practice and makes it more likely that students will use those skills actively in their lives. While this can be challenging in terms of time, coordination and motivation, Alianza’s experience has resulted in key insights that can guide schoolwide strategies moving forward. It is important to encourage schools to think about their communities as SEL environments with the ability to foster growth in all their members. To do so, it is key for school networks or systems that want to implement comprehensive SEL strategies at a schoolwide level to allocate enough time and resources for their members to engage actively in the opportunities such strategies can offer to the entire community.

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INNOVATIONS SUPPORTING TEACHER AND SCHOOL PRINCIPAL PROFESSIONAL DEVELOPMENT



Chapter 21. SÃO PAULO BRAZIL

Developing a platform for learning activities and formative assessment

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ABSTRACT

This chapter presents some key characteristics of the education policy and Programme for Recovery and Deepening of Learning developed in the state of São Paulo, Brazil, in response to the COVID-19 pandemic. Its focus is on the assessment and training actions taken by government to ensure the continuity of students' learning in a remote learning context. The chapter describes how a learning support platform was developed to offer activities and assessments for students, thus helping teachers' work. The platform, itself an educational technology, also provides a training course for teachers and school principals with the main objective of enabling them to use the results of assessments to plan their actions.

KEYWORDS

Formative student assessment, teachers' professional development, multimedia platforms.



BIG IDEAS

With the interruption of face-to-face school activities throughout Brazil, the state of São Paulo developed, in partnership with the Center of Public Policy and Education Assessment of the Federal University of Juiz de Fora (CAEd/UFJF), a platform that allowed the application of different formative assessments and activities, in order to monitor students' learning and reinforce the development of essential skills in an atypical moment of remote teaching. To ensure proper use of these instruments, a professional development course for teachers and school principals was also created and made available on the platform, with a focus on the interpretation of results and curriculum management.

PLATFORM FOR LEARNING ACTIVITIES AND FORMATIVE ASSESSMENT OF SÃO PAULO

The state of São Paulo was extremely active in the field of educational public policy during the COVID-19 pandemic, as it attempted to continue to guarantee access to education for its more than 3.5 million students, supported by more than 100,000 professionals working in approximately 5,600 schools. In Brazil, many states have had difficulties in organizing effective and systematic actions in response to the pandemic, for reasons of infrastructure, in particular, as well as governmental capacity. The pandemic brought many challenges to Brazil, with education among the areas most affected. This led the government of São Paulo to create, in 2020, the Programme for Recovery and Deepening of Learning. The programme was the first major experience, at state level, of formative assessment within the scope of an entire public education network, linking curriculum, teaching material and digital assessment. Implemented in partnership with the Federal University of Juiz de Fora (UFJF), through its Center for Public Policies and Education Assessment (CAEd), it embraces a set of specific actions for each featured dimension of education, designed to support students' learning in a period of remote teaching.

This initiative had, at its heart, a concern to provide instruments so that the State Education Department could i) make educational resources available for the continuity of teaching and learning in state schools, and ii) train network professionals in the use of these resources in the unfamiliar context of remote, virtual learning. In its first phase, it was about making available teaching materials produced or adapted specifically for the context of the pandemic and offering support so that teachers and principals could carry out the evaluation process for their students and schools. To this end, it created the Platform for Learning Activities and Formative Assessment of São Paulo, a digital tool through which materials for student learning and assessment were made available for use by professors and managers of the state network, according to a schedule and logistics established by the São Paulo State Education Department. The platform was developed in partnership with CAEd, which has longstanding expertise in supporting education management and assessment policies in public networks in Brazil.

In the second phase, the Education Department's concern focused on enabling its professionals to use the platform and all of its functionalities, particularly with regard to the necessary combination of the available teaching materials and the proposed assessment instruments. Establishing this link, which is not trivial even in face-to-face education contexts, was made more complex by the virtual environment in which the teaching and learning process had to be carried out.

An immediate challenge concerned the Education Department's guarantee that the state network's professionals and students would have access to the platform. With the teaching process taking place remotely, the platform had taken, since its inception, a leading role in the actions designed by the state, including the Media Center⁴³ and classes broadcast on TV and radio. These innovations required, in turn, access to the internet (and equipment for such access). In Brazil, this is a sensitive point in the context of public discussion about remote education, given the digital divide and its reflection of wider socio-economic inequalities, a limitation that became even more evident during the pandemic.⁴⁴ With this in mind, the Education Department distributed 500,000 mobile chips with 3 GB of internet data to students and 250,000 with 5 GB to teachers and other professionals, to support the activities required by the platform and other virtual systems on the network.

These actions were part of the network's Programme for Recovery and Deepening of Learning, which consisted of six action fronts (curriculum, teaching material, training, assessment, technology, and pedagogical monitoring), for each of which the platform provides space. Strictly speaking, the platform is itself a technology through which teaching materials, activities and assessment instruments are made available to the network. It is also necessary to stress that these actions are interrelated, so that their division serves analytical purposes. Based on the state curriculum and the Common National Curriculum Base (BNCC), the Education Department defined the essential skills that must be developed by any student, in an admittedly limited context.

Teaching materials were, therefore, produced or adjusted on the basis of this prioritization. These materials, in turn, provided the basis for the development of specific activities, organized in digital sequences. Based on the curriculum prioritization, a Skills Matrix was produced, supporting the development of different assessment instruments, the results of which serve as a basis for pedagogical monitoring and for the development of actions linked to them. All this material and the evaluation processes, which is described below, were made available through the platform's technology, which integrates all these actions in a single virtual space.

ACTIVITIES AND ASSESSMENTS

The programme makes available, periodically, a digital sequence of activities, for Portuguese and mathematics, focused on students from the fourth grade of elementary school to the third grade of high school. Essential skills were selected for all subjects, as were teaching

43. *The Media Center was another platform developed by São Paulo State Education Department, focused on training teachers and conducting remote classes.*

44. *In 2019, 83.7 per cent of public-school students in Brazil had access to the internet, and only 64.8 per cent had a personal cell phone. When it comes to computer internet access, the percentage of students from public schools is 43 per cent (IBGE, 2020).*

materials. However, the programme's focus was on Portuguese and mathematics, considered the basis of learning for other curricular subjects. These digital sequences can be performed by the student through a mobile application or on the platform page itself (there is also the possibility of activities being accomplished in printed format, for students or schools without access to electronic devices) and their results are generated quickly, so that the students and teachers can follow them. In addition, the sequences are supported by a guide with the question's resolutions, so that each assessed skill can be understood as clearly as possible. These sequences are based on Learning Always, a set of teaching materials prepared by the department specifically to serve students during the pandemic.

With regard to the evaluation instruments, there are two fronts of action. One of them is a set of formative assessments, called Assessment of Learning in Process, which consists of bimonthly assessments (at the end of each bimester), applied from the first year of elementary school to the third grade of high school, in order to monitor the development of students at each stage of the academic year. These are standardized, multiple-choice tests, through which the student is assessed on skills included in the Skills Matrix. This action, which had already been carried out by the Education Department, took on a new dimension through the partnership of CAEd: the organization of items into specific blocks, which will allow the construction of a formative assessment scale, something that is still in development in Brazil. As with the digital sequences, students can perform these assessments through the platform or mobile application, with their percentage of correct answers available 3–5 days after all tests or activities are completed.

As a result of the limitations imposed by the COVID-19 pandemic, students can perform these activities and assessments at home, with the possibility of consulting teaching materials and receiving support from someone else, with a deadline of 48 hours. This, of course, interferes with the performance results, which tend to be a little higher than the expected average. However, this flexibility gave the instruments a character of reinforcement activity, by putting students in contact with tasks that demand essential skills, allowing them to use different means in solving them. Thus, even though the assessments and activities have not generated results as accurate as those of traditional large-scale assessments, they contributed to students and teachers remaining focused on the prioritized skill set.

A diagnostic assessment was also applied to students from the first year of elementary school to the third grade of high school, in Portuguese and mathematics, in order to assess the impact of the isolation period on learning. To reach as many students as possible, these tests also had flexible application criteria; therefore, a sample evaluation was also applied, for the fifth and ninth grades of elementary school and third grade of high school, with results calculated on the National Assessment of Basic Education (SAEB) proficiency scale, in order to produce more accurate data on the impact of the remote teaching period on student learning.

Unlike the other assessments and activities, the results of the diagnostic sample assessment were not published on the platform. The data revealed a great challenge for the state of São Paulo, since, in relation to 2019, students in the evaluated grades lagged between one and two school years, information critical to guiding the actions of the State Education Department. On the other hand, the assessments and activities applied to all students at all school years have in common the fact that the teacher is the focus, something new in the context of large-scale assessment in Brazil. The term ‘formative assessment’ can have many meanings (Pinto & Rocha, 2011). In this chapter, we use the idea of Perrenoud (1999): the formative assessment focuses, directly and essentially, on the teacher’s management of student learning.

Large-scale assessment systems in the country have a history spanning more than 30 years and their results have always been primarily addressed to the management teams responsible for the systems. Over time, as these systems developed and expanded their scope of action, schools, through their principals, became privileged recipients of the results of the assessments. The assessment model implemented in São Paulo takes the teacher as the primary recipient of information and transforms him/her into the central actor. The application of results is the central purpose of educational assessment, to the point that it has become one of the recurrent objects of research in assessment (Calderón, 2017). The objective, in this respect, remains the same: that the results can be read and interpreted, and serve as a basis for decision-making in the context of networks and schools, in particular, guiding their planning. What formative assessment distinctively offers is the focus is on the teacher’s action, so that he/she can use the information from the assessment instruments as support for the re-planning of their pedagogical actions.

The attention to the teacher is manifested in the timeliness of the delivery of results – so that they can, in fact, guide the reflection and teaching action – and in the care taken over the language and the explanations about what the results actually mean, in order to avoid mistaken conclusions. To communicate directly with teachers, the feedback on the results includes pedagogical analysis of each test item, presenting the task associated with the ability measured, in addition to the percentages of correct answers by students, both in general and for each item.

PROFESSIONAL DEVELOPMENT

As this is the first time that an initiative of this nature has been implemented, it is necessary to consider the actors involved throughout the process. The training offer is based on the recognition that education actors, as the whole, were not prepared to deal with the challenges of the pandemic, particularly the specificities of remote education. In fact, issues such as the use of assessment results as part of schoolwork routines were not fully understood by school

professionals even before the pandemic. Therefore, a programme with these characteristics had to include a training process for those involved.

This took the form of two actions. In February 2021, a training course began, in an extension format, for teachers, school principals and managers, and technicians from the Education Department. The course lasts 90 hours and takes place completely remotely through the platform, with a UFJF certification on completion of three modules. Table 1 summarizes the modules and classes that comprise them.

Table 1. *Professional development in educational assessment extension course modules and lessons – São Paulo state network, 2021*

Lessons/ modules	Module 1. Curriculum and formative assessments, interpretation of results and development of digital sequence of activities	Module 2. Learning objectives and the use of assessment tools	Module 3. Curriculum management in schools and teacher collaboration
Lesson 1	Assessment and curriculum: An ongoing dialogue	Measures and scales of formative assessment	Curriculum management at school
Lesson 2	Profile of the Assessment of Process Learning and Diagnostic Assessment tests	Analysis and use of assessment results in the classroom I	Suggestions and experiences about curriculum management at school I
Lesson 3	Assessment and milestones of learning development	Analysis and use of assessment results in the classroom II	Suggestions and experiences about curriculum management at school II
Lesson 4	Assessment results and learning gaps	Analysis and use of assessment results in the classroom III	Collaboration for curriculum management with emphasis on years/grades
Lesson 5	Didactic sequences and digital sequences of activities as pedagogical support tools I	Analysis and use of assessment results in the classroom IV	Collaboration for curriculum management, with an emphasis on curricular components

Lessons/ modules	Module 1. Curriculum and formative assessments, interpretation of results and development of digital sequence of activities	Module 2. Learning objectives and the use of assessment tools	Module 3. Curriculum management in schools and teacher collaboration
Lesson 6	Didactic sequences and digital sequences of activities as pedagogical support tools II	Analysis and use of assessment results in the classroom V	Collaboration for the management of the school's curriculum, with an emphasis on curricular components and years/grades
Lesson 7	School planning based on the results of the Diagnostic Assessment	Protocol for curriculum analysis meeting	-

Source: São Paulo Activities and Formative Assessment Platform, 2021. Own tabulation.

The course is strongly inspired by the proposal of Data Wise in the United States of America (Boudett et al, 2020). Its focus is to guide education actors through the use of evidence, and, in particular, assessment results, as part of their work routines, supporting planning, whether in the school as a whole or in the classroom. Therefore, it is necessary to organize collaborative work at the school, outline common goals, define attainable goals and distribute responsibilities, involving teachers and the entire pedagogical team. The use of results within the school is still one of the main challenges for evaluation in the Brazilian scenario, which remains focused on the dissemination of results, and sometimes neglects the fundamental step of ensuring their effective application, especially considering actions at school level.

PRELIMINARY RESULTS

The programme is still running, so it is not yet possible to estimate all the effects and obstacles it will have. However, we can already observe some of them. As for the difficulties, they are mainly related to the participation and development of technology. Participation is a concern both in the scope of evaluative actions and in the extension course. High participation rates have always been a goal for evaluation systems, an indicator of the robustness and representativeness of their results. But, in the case of the São Paulo programme, participation in assessments is sought for pedagogical reasons, not just for issues related to the measure. So, when we look at the data, we see that participation was lower than expected, with rates ranging between 50 per cent and 60 per cent in each test. It is important to emphasize that these evaluations and activities were highly encouraged by the network and schools, but it

was not mandatory, so there was no sanction for those who did not participate. It is interesting to note that, as we progress through the schooling stages, participation rates decrease (lower rates in secondary education when compared to those in the initial years).

An important point to be observed regarding these rates refers to the fact that, in some educational districts,⁴⁵ the participation rates have been high, close to 100 per cent. This means that it is not impossible to get rates at that level. And these are not isolated cases, with few schools and few students. In São Carlos, for example, a city close to São Paulo, participation is almost universal. One hypothesis to explain these differences in participation between the districts relates to the management profile in each one. Common to all the districts with higher participation is the presence of an active, participative management that is concerned by poor results and that works closely with the directors of each school to ensure that students participate in the proposed activities and assessments. A more detailed investigation of the characteristics of this type of management will require further research work. However, circulation of information, effective dissemination and demands on directors in relation to participation seem to play an important role in this type of management.

Regarding the extension course, participation is also a challenge. This is a known problem in continuing education offered in-service and in the context of remote education (usually, an option made precisely by those who are in service). The extension course is being carried out entirely through a virtual environment and the course participants continue to exercise their functions normally in the network, maintaining their workload. Added to this is the context of the pandemic and all that it has meant from a psychological and social point of view. Despite this, even given expectations of a certain drop-out rate, the course is showing a participation rate far below expectations. As we know, the network has around 100,000 employees, including technicians, principals and teachers, and the initial idea was to offer training to all of them. Almost 20,000 of them were registered as course participants. However, only 5,000 have actively participated in the proposed activities.

Difficulties in reconciling work and course actions, in addition to problems related to the pandemic (physical and mental health, as well as logistical problems related to the fact that the home is now the main working environment), have been identified as the main causes of this low participation. To deal with this, the department will apply an instrument in order to find out what educational actors identify as their reasons for not participating in the course. A new course offer is also scheduled. It is also necessary to collect information about the virtual learning environment and the educational resources used in the course, so that it is possible to assess what can be improved, in those terms, to increase participation.

45. São Paulo state network is divided into 91 educational districts. Each one supports the management and implementation of public policies for all schools in their region.

LESSONS AND CHALLENGES

When we look at the participation rates, it is clear that they could be higher, which is exactly what the Education Department expected. However, it should be noted that, in absolute terms, participation can be surprising. The São Paulo network has around 3.5 million students and, in a pandemic context, is managing to evaluate more than 1.8 million of them. These students are taking tests and activities through a virtual platform that needs to be prepared to handle so many accesses, often simultaneous. The extension course currently engages 5,000 people. In Brazil, there are few examples of an extension course aimed at so many course participants at the same time.

Another important issue concerns the students' achievements in the formative assessments and activities, considering that they had more time and flexibility to perform them, with the possibility of consulting materials and receiving support. As already pointed out, the data showed an above-average performance, which is positive, not in terms of the result itself, but in revealing that students made an effort to perform the tests and activities correctly and, through this process, may have learned and developed the skills required in the instruments. Therefore, in addition to pointing to skills that need to be reinforced in the classroom, these formative assessments and activities also contribute to students and teachers remaining focused on the prioritized skill set.

One last challenge concerns technology. It is related not only to the Education Department, but also to CAEd, a partner institution in its execution. The platform requires continuous and detailed attention. As all programme actions are taking place through it, problems of access and speed need to be avoided at all costs. This has demanded of CAEd technological solutions to allow access by many people at the same time and to ensure that activities and assessments are carried out (for students in the network and for course participants).

Although some specific technology problems have occurred (lack of access for a few hours and slowness on other occasions), so far, we can say that the programme has managed to advance in its actions to support learning throughout the pandemic period. The mass participation in some educational districts of São Paulo state network invites further research, so that we know the factors associated with this success. They can be the key to extending the positive effects of the programme to the entire network.

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Chapter 22. BRAZIL

Digital competence as an enabler for teachers' professional development

Lucia Dellagnelo

ABSTRACT

Teachers' professional development during the COVID-19 pandemic highlighted how digital competence has become a pre-condition and enabler of teachers' learning and their development of new skills. Most of the methodologies used for professional development during the crisis, such as communities of practice, webinars, peer-to-peer learning and platforms with digital educational resources, relied on some form of digital technology. Examples from three state departments of education in Brazil illustrate the importance of incorporating assessments of teachers' levels of digital competence to ensure that all teachers are able to fully participate in the training programmes. The development of teachers' digital competence needs to be an objective of professional development to enhance further learning in other domains. Teachers' digital competence is one, though not the only, key element in allowing technology to improve education. Public policies need to ensure that schools and students have the infrastructure and resources to use technology for teaching and learning. It is the intersection of innovative pedagogical vision, teachers' digital competence, high-quality educational resources, and infrastructure that will allow technology to transcend its instrumental nature to become a catalyst for educational change.

KEYWORDS

Teacher professional development, teacher collaboration, teacher assessment, digital education.



BIG IDEAS

Big idea: Teachers' digital competence needs to be developed to enable effective professional development based on methodologies which require the use of digital technologies.

INTRODUCTION

Features of effective teacher professional development have already been identified by research: the main elements of successful programmes include a focus on subject domain, active methodologies, collaboration, coaching, feedback and reflection, and integration of theory and practice (Reimers, 2020). There is also evidence that programmes based on learning communities provide collaborative and job-embedded professional development and can be a source of self-efficacy and confidence for teachers (Darling-Hammond et al, 2017).

Countries with large school systems, with millions of teachers, face considerable challenges in implementing these elements of professional development programmes at scale (Schleicher, 2018). The COVID-19 pandemic generated an unprecedented opportunity to rethink and try new models of teachers' professional development based on digital technologies.

In Brazil, as in many other countries, most teacher professional development programmes implemented during the closure of public school were based on the use of digital technologies. Online platforms were used to hold group meetings, offer webinars and courses, and monitor the activities of teachers and students. The underlying assumption was that teachers would be prepared to fully participate in these online activities and develop new skills and competencies needed for remote teaching. However, considering the great variability in the level of digital competence among teachers, it is reasonable to assume that teachers with low digital competence were not able to fully participate in the professional development programmes offered during this period.

Teachers need digital competence to create new pedagogies and learning experiences for their students and to understand and provide guidance on issues related to digital citizenship. However, digital competence is also necessary to enable teachers' learning and professional development, by allowing the participation in online courses, communities of practice, self-assessments and online collaboration.

TEACHERS' PROFESSIONAL DEVELOPMENT IN BRAZIL

According to the Organisation for Economic Co-operation and Development (OECD) Teaching and Learning International Survey (TALIS, 2018), professional development programmes offered by state departments of education in Brazil tend to be abstract, fragmented and not based on skills identified by teachers as most needed. Approximately 65 per cent of Brazilian teachers reported that attending courses and seminars was the most prevalent activity for professional development, while only 26 per cent of teachers

participated in training with peer-learning and collaboration. As with other OECD countries, teachers in Brazil who reported participating in such impactful training tend to display higher levels of self-efficacy and job satisfaction.

Following the approval of the new national curriculum guidelines in Brazil (Base Nacional Comum Curricular, BNCC) in 2018 (BNCC, 2018), education leaders focused on how to prepare teachers to develop the student competencies outlined in BNCC (Costin and Pontual, 2020). The National Council of Education (Conselho Nacional de Educação, CNE) approved new guidelines regarding professional development for teachers (CNE/CP n^o1/2020), with three intertwined dimensions: content, pedagogical practice, and professional engagement. The guidelines also indicate a number of key elements, to make teacher training effective: content knowledge, active pedagogical practices, peer-to-peer collaborative work, length of training and systemic coherence. Although the guidelines are aligned with international best practice in teacher professional development, it was not clear whether Brazilian state and municipal departments of education would have the human and financial resources to implement them at scale.

In March 2020, most of the 180,000 public schools in Brazil were closed to contain the COVID-19 pandemic. With few exceptions, school closures happened with no prior planning, leaving 2.2 million teachers without clear instructions on how to continue teaching or even contact their students.

As the pandemic advanced and school closures continued during 2020, some departments of education implemented strategies for educational continuity and rapidly planned and deployed training programmes to prepare teachers for remote teaching.

A multi-phase survey designed to capture teachers' professional and emotional responses during this period shows that 9 out of 10 Brazilian teachers reported having no prior experience in the use of technology or remote teaching. Most of them expressed fear and anxiety and a feeling of inadequacy when it came to promoting students' learning. Teachers also reported suffering burnout caused by having to learn to use technology for teaching, and by the blurring of the boundaries between home and work activities (IP, 2020).

State departments of education in Brazil responded to teachers' need for professional development and support in different ways. Although not always intentional and integrated, three elements stand out in the training offered to teachers: peer-to-peer learning, training in the use of specific online platforms, and emotional support. Another innovative element, considering the Brazilian context, was the effort to identify the different levels of teachers' expertise and skills to personalize their learning journey and to recruit the most advanced teachers to lead peer-to-peer training.

EXAMPLES OF PROFESSIONAL DEVELOPMENT PROGRAMMES IN BRAZIL

The experiences of the professional development programmes offered by three state departments of education in Brazil during the pandemic are presented in Tables 1–3.

Table 1. *Teacher training and emotional support in Espírito Santo (Southeast)*

Teacher training and emotional support in Espírito Santo (Southeast)

The state Department of Education of Espírito Santo employs approximately 13,000 teachers and offered four strategies for professional development during the pandemic: the creation of communities of practice, large audience webinars, online formal courses and a website with digital materials and tutorials. It is estimated that more than 85 per cent of teachers engaged in at least one form of training. The Department of Education also offered emotional support for teachers through a partnership with a national non-governmental organization (NGO) which has a platform addressing teachers' emotional and professional needs. Concerning digital skills, the state assessed the level of competency of teachers to identify leaders for the new communities of practice; more than 300 teachers have already been identified as having the potential to become ICT leaders of the communities of practice. All teachers received a financial subsidy to acquire a personal computer and access to the internet to further develop their digital skills. Currently, there are 19 communities of practice, organized by region, with approximately 5,000 teachers participating.

Table 2. *Teachers in Action in Paraná (South)*

Teachers in Action in Paraná (South)

The state Department of Education has approximately 41,000 teachers working in 1,117 schools. During the pandemic, the department implemented a new strategy for in-service training called Teachers in Action (*Professores em Ação*), based around study groups with up to 20 teachers of the same subject area led by pre-selected teachers. The department opened a public selection to find 890 leaders for the study groups across different curricular areas and grades. The criteria for selection focused on content knowledge, digital skills and leadership. Selected teachers receive a scholarship to perform training activities but must also continue with their teaching assignments in schools. The Department of Education has a team of professionals to support the leaders of the study groups producing digital materials about curriculum content and designing active methodologies and technologies. The study groups hold weekly meetings during which members plan lessons collectively and discuss

the learning challenges faced by their students. More than 15,000 teachers are currently participating in Teachers in Action. It also created a Teachers Channel (Canal do Professor) on YouTube to offer digital content, social interaction and technical support.

Table 3. *Mapping digital skills in Ceará (Northeast)*

Mapping digital skills in Ceará (Northeast)

The Department of Education in Ceará has 17,600 teachers working in 731 state schools. It works in close collaboration with 184 municipalities, offering training to teachers working at municipal schools. The Department of Education created a developmental journey called Digital Competencies for Teaching to ensure that teachers would have the basic skills to use technology for remote teaching. To be able to personalize the learning, teachers were required to undertake a self-assessment to identify their level of digital competence in three dimensions: pedagogy with ICT, digital citizenship and using technology for professional development. The department also created a new position called Agent of Educational Innovation (Agente de Gestão da Inovação Educacional -AGI), a professional with responsibility for supporting the design and implementation of hybrid learning in schools. So far, 9,300 teachers from the state schools and 11,600 from municipal schools have participated in the learning journey.

A common feature among the examples is some form of pre-assessment of the level of teachers' digital competence, not only to identify potential leaders of the communities of practice or study groups, but also to personalize the learning journey of teachers.

In Ceará and Espírito Santo, teachers used the Teachers' Digital Competencies Self-Assessment Tool developed by the Center of Innovation for Brazilian Education (Centro de Inovação para a Educação Brasileira, CIEB,). The tool explores teachers' perception of competency in the use of technology in three dimensions: pedagogy, digital citizenship and the use of technology for professional development.

Data from more than 80,000 Brazilian teachers show, on average, an initial level of familiarity with digital technologies (Level 2 out of five competence levels). Teachers report having insufficient skills to use technology to personalize their students' learning, to apply digital assessments, and to select quality digital educational materials. They also report having little information or experience of responsible and critical use of technology, either as a user or as an advisor for their students (CIEB, 2019).

Brazilian teachers also display low levels of competence when it comes to the use of technology for professional development. Teachers find participating in online collaborative work and sharing information with their peers challenging. They also report difficulties in augmenting and managing their own learning and professional development.

The low level of digital competence among teachers in Brazil is comparable to that in other countries. The application of CIEB's Digital Competencies Self-Assessment Tool in Costa Rica generated similar findings. A recent study by the European Commission (EC, 2020) showed that only 29 per cent of teachers in Europe feel prepared to use digital technologies for teaching and to enhance their own professional development.

PREPARING TEACHERS FOR THE FUTURE OF EDUCATION

Although the development of professional competencies should start during teachers' pre-service education, their dynamic nature and rapid evolution mean that they need to be part of professional development programmes, turning teachers into lifelong learners (Reimers, 2020). This is particularly true in relation to digital competence.

According to the new European Digital Education Action Plan (EC, 2020), being digitally competent involves the confident, critical and responsible use of and engagement with digital technologies for learning, work and participation in society. It includes a set of knowledge, skills and attitudes essential for any learner, at any stage of their personal and professional life. In twenty-first century education, teachers are required to become designers of blended learning experiences and thus need digital competence to explore how digital technologies can enhance students' learning (Paniagua & Instance, 2018).

Moreover, digital competence is an enabler of other elements of effective professional development, such as online collaboration, peer-to-peer learning and mutual support, and the co-creation and sharing of innovative pedagogical practices among teachers across schools. Digital technologies can also be an inducer and catalyst for educational innovations, transforming schools into learning organizations. The challenge of using digital technologies during the pandemic stimulated principals and teachers to plan, assess and redesign strategies to keep all students learning.

IMPLICATIONS FOR PUBLIC POLICY

Digital competence is both an enabler and an objective for teachers' professional development. Without improving teachers' digital competence, it will be hard to ensure the effectiveness and scale-up of the models of teachers' professional development described in this chapter, or, indeed, any other model based on online learning and interactions.

Considering the impact of technologies in education, digital competence will, increasingly, be an essential requirement for the teaching profession, both in terms of the creation of innovative pedagogical approaches and hybrid modes of education delivery, and to enable teachers to become lifelong learners.

It is important to note that the development and nurturing of teachers' digital competence requires a work environment with the minimum conditions for the effective use of digital technologies. That means providing all schools with connectivity and devices inside classrooms, spaces for creation and innovation, and quality educational online resources.

The combination of innovative pedagogical vision, teachers' digital competence, high-quality educational resources, and connected infrastructure is what will allow technology to transcend its instrumental nature to become a catalyst for educational change.

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Chapter 23. PEOPLE'S REPUBLIC OF CHINA

Professional development of the higher education workforce

Bingran Zeng, Siyuan Feng and Lim Cher Ping

ABSTRACT

COVID-19 exacerbated the digital divide in education between developed and developing countries and highlighted the need for higher education institutions (HEIs) to implement online and blended teaching and learning (OBTL), engage in ICT-enabled education administration and management, and integrate emerging technologies into programmes and courses. The International Institution of Online Education (IIOE) is a supportive ecosystem that aims to support HEIs in developing countries to address related challenges. It consists of open and free professional development courses and programmes, a quality assurance framework, guidelines and a toolkit, and a global professional learning community and beyond. This case study gives an overview on the key design and implementations of the IIOE and the initial scale and impact that it has achieved globally. The case study also analyses implications and lessons learned from both the IIOE and its global partners to provide actionable insights for similar initiatives and institutions around the globe

KEYWORDS

Teacher professional development, blended learning, multimedia platforms, information and communications technology, digital skills.

**BIG IDEAS**

The International Institute of Online Education (IIOE) is an online ecosystem that supports the higher education workforce in developing countries to develop their ICT-in-education competencies. The IIOE aims to support HEIs to create such ecosystems, to propel the digital transformation of higher education around the world and, in turn, make quality and inclusive higher education more accessible for students and encourage them to be lifelong learners.

CHALLENGE

The higher education sector plays a vital role in facilitating transformation toward digital futures in different societies. A survey of global higher education institutions (HEIs), by the International Association of Universities (IAU), found that 75 per cent of the surveyed HEIs have integrated digital transformation into their institutional strategic plans (Jensen, 2019). However, HEIs in less developed countries were less likely to engage in digital transformation. There was a lack of infrastructure, hardware and software investment on campus, low adoption of online and blended teaching and learning (OBTL), little engagement in information and communication technology (ICT)-enabled education administration and management, and a lack of integration of emerging technologies into ICT-related courses and programmes.

Despite the wide availability of massive open online courses (MOOCs) and open educational resources (OERs), they are often not well taken up by HEIs, especially those in developing countries. The language barrier, differences in learning contexts, cost barriers and limited computer self-efficacy are just a few examples of the obstacles students and teachers in developing countries face when adopting MOOCs and OERs in their teaching and learning (Al-Adwan, 2020; Ma & Lee, 2019). In addition, COVID-19 exacerbated the digital divide in higher education and exposed the costs and consequences of keeping the education status quo (Marinoni et al., 2020; United Nations, 2020). There may be a mismatch between existing available teaching and learning resources and the capacity of the higher education workforce (HEW), including HEI teachers, leaders, and support staff, especially in HEIs in developing countries. The HEW may not have the competencies to drive, support or engage in OBTL, engage in ICT-enabled education administration and management, and integrate emerging technologies into programmes and courses. The HEW in these institutions must be provided with professional development opportunities to develop these competencies.

The International Institute of Online Education (IIOE) is an online ecosystem for HEW from developing countries to develop their ICT-in-education competencies. It consists of open and free professional development courses and programmes, a quality assurance framework, guidelines and a toolkit, and a global professional learning community supported by partner HEIs, enterprises and other stakeholders (e.g. UNESCO and UNESCO Regional Offices, local and international organizations, and governments). In April 2020, the UNESCO International Centre for Higher Education Innovation (UNESCO-ICHEI), along with 15 global HEIs and nine enterprises, jointly launched the IIOE online platform. Since then, the IIOE has served more than 10,000 HEW members from over 135 countries through COVID-19-response education workshops, webinars and advanced training programmes.

The theory of action of the IIOE is that:

... if the higher education workforce participates in online professional development programmes to develop competencies in OBTL, ICT-enabled education administration and management, and/or integration of emerging technologies in programmes, courses and administration/management, they are more likely to create an inclusive and quality ICT-enabled learning environment for their students to achieve the expected learning outcomes. The HEW that have undergone the professional development and have implemented what they have learnt could share their promising practices and lessons learnt with their HEIs' professional learning community. IIOE will support HEIs to create such an ecosystem that will propel the digital transformation of higher education around the world and, in turn, make quality and inclusive higher education more accessible for students and develop them to be lifelong learners.

IMPLEMENTATIONS

Capacity building has always been at the forefront of international education discourse, and there is no lack of literature on best practice in supporting the education workforce. Given the aforementioned needs and challenges, the IIOE seeks to build a supportive ecosystem for HEIs in developing countries to become future-ready, consisting primarily of several key components, such as multilingual courses and programmes, a competency framework, quality assurance guidelines, and global and local professional learning communities, among others.

During the early stage of design and planning the IIOE, UNESCO-ICHEI and partners began to build a hub of multilingual resources for ICT-enabled higher education (with more than 300 courses and programmes, in Chinese, English and French, so far), against the backdrop of the COVID-19 education crisis. However, it soon became evident that a simple compilation of resources would not directly translate into professional development and relevant curriculum and instructions. A systematic pathway that would help HEW navigate the overwhelming number of resources and build up related competencies was missing.

In response to this, UNESCO-ICHEI conducted multiple rounds of in-depth situation analysis and a literature review on the current states and needs for the digital transformation of higher education in Asia and Africa (UNESCO-ICHEI, 2020a, 2020b, 2020c,) and then developed the IIOE Competency Framework for Higher Education Workforce (IIOE-CFHEW). *Figures 1 to 4* demonstrate the three dimensions and four phases of the IIOE-CFHEW, representing a professional development roadmap for HEW to prepare for the futures of education and guide future IIOE programmes. In fact, the IIOE-CFHEW remains a work-in-progress. UNESCO-ICHEI is organizing multiple rounds of expert consultations and

regional meetings to collect feedback and input from global partners to better align it to the needs of HEW in developing countries.

Figure 1. An overview of the IIOE-CFHEW

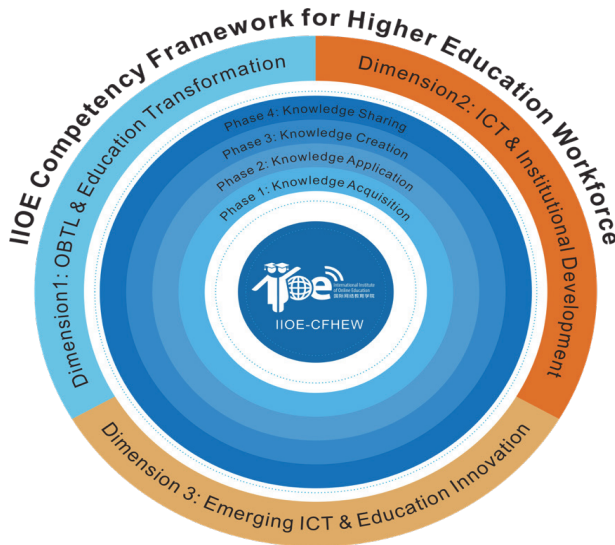


Figure 2. Dimension 1 of the IIOE-CFHEW

	Phase 1 Knowledge Acquisition	Phase 2 Knowledge Application	Phase 3 Knowledge Creation	Phase 4 Knowledge Sharing
Curriculum Development	Understand the definition, philosophies, methodologies, and variety of educational approaches of Online/ Blended Teaching and Learning (OBTL)	Implement OBTL instructional methods and apply various ICT instruments in transforming existing curricula and future development	Design innovative curricular contents and activities with ICT resources to ensure inclusive and integrative OBTL experiences	Share and disseminate innovative OBTL curricular resources and practices in promoting quality, equitable education
Teaching and Learning	Understand the transformative learning modes enabled by ICT in OBTL contexts, and various student-centred Learning (SCL) strategies that situate a digital education environment	Apply and adapt SCL and other pedagogical strategies to OBTL contexts, and equip students with essential digital literacy to thrive in an online learning environment	Explore pedagogical innovation in OBTL beyond conventional teaching and learning modes and take advantage of multiple ICT resources	Lead peer-to-peer communities to actively share and exchange experience of ICT-enabled teaching and learning in OBTL contexts
Assessment and Reflection	Understand how to incorporate ICT in assessing students' learning outcomes and the reflective mechanisms in improving the quality of teaching in OBTL contexts	Implement ICT-/ non-ICT based assessment methods covering various perspectives for comprehensive evaluations of students' learning outcomes, and optimise related OBTL practices	Create suitable assessment methods in OBTL and related quality assurance procedures in providing personalised, collaborative, and constructive learning support	Share and exchange expertise in setting effective OBTL assessment standards in support of transformative curricula integrating teaching and learning feedback at all levels

Figure 3. Dimension 2 of the IIOE-CFHEW

	Phase 1 Knowledge Acquisition	Phase 2 Knowledge Application	Phase 3 Knowledge Creation	Phase 4 Knowledge Sharing	
ICT and Institutional Development	ICT Infrastructure	Understand the role and uses of ICT infrastructure in Higher Education (HE) in leveraging education practices, institutional management, and organisational development	Apply and use various ICT tools, platforms to facilitate research, education, or management processes regarding distinct roles and responsibilities	Mobilise resources and develop cost-effective ICT applications and infrastructure in accordance with local contexts and educational demands	Build a broad consensus of HE digital transformation and promote staff awareness and responsiveness to updated uses of ICT through active communication and support
	ICT and Staff Professional Development and Support	Understand directions and approaches for HE staff professional development enabled by the introduction of ICT resources	Adopt ICT-related professional development pathways as virtual professional learning communities, online novice training systems in ensuring effective staff development	Explore, create, manage, and upgrade ICT-enabled staff professional development programmes at all levels in fostering a learning organisation with improved digital literacy	Establish dynamic networks and communities of practices to empower sharing of knowledge and expertise in ICT-enabled staff professional development
	ICT Policy and Institutional Leadership	Understand the relevance of ICT in HE policies, research, documentation, and their relevance to institutional, local, and national education goals	Establish visions for institutional development and translate values and expectations into achievable goals connected to ICT policies and digital transformation plans	Transform and innovate on institutional development plans integrating global HE digital transformation practices, and formulate locally based ICT policies and route maps	Advocate institutional policy- and decision-making in creating conditions that allow faculty and staff to step forward and take actions for positive changes

Figure 4. Dimension 3 of the IIOE-CFHEW

	Phase 1 Knowledge Acquisition	Phase 2 Knowledge Application	Phase 3 Knowledge Creation	Phase 4 Knowledge Sharing	
Emerging ICT and Education Innovation	Emerging ICT Landscape	Understand the basic knowledge and applications of emerging ICT (listed as AI, Big Data, Cloud, IoT, Blockchain, etc.), and their development trends in higher education contexts	Evaluate the development of emerging ICT and related knowledge production, and reflect on their applications in HE teaching and learning, research, and administration and management	Develop innovative solutions to empower the HE ecosystem for digital transformation in exploring prospective uses of emerging ICT in various social, economic, and industrial settings	Foster knowledge sharing and experience exchange in building a people-centric, data-driven, and technology-enabled Smart campus with emerging ICT
	Disciplinary Development and Future Talent Cultivation	Understand the trends and significance of disciplinary reform and development, and related talent cultivation in emerging ICT fields	Identify existing issues and opportunities in disciplinary development and talent cultivation according to local digital transformation demands	Conceive and reform education disciplines and programmes and create opportunities for students to use, understand, and learn with ICT in mirroring its relevance in future digital workplaces	Build a shared vision of ICT-enabled future talent development for augmented human intelligence and metacognitive learning capabilities in constructing a knowledge-based digital society
	Innovation and Entrepreneurship	Understand the models, processes, and mechanisms for university-industry partnership and entrepreneurship projects capturing digital opportunities	Initiate academic, scientific research, entrepreneurship projects integrating multi-/cross-disciplinary ICT resources, and in collaboration with internal and external partners	Create standards and procedures for research innovation with ICT, funding and support, technology commercialisation, Intellectual Property (IP) rights, and entrepreneurship training and practices	Advocate the development of entrepreneur ecosystems and innovation-driven environments within HEIs addressing the convergence of values, beliefs, and digital transformation of HE

In addition to the competency framework, quality assurance ensures that HEIs have the capacity to drive and support digital transformation; hence, the IIOE is in the process of developing a robust quality assurance framework. As HEIs moved to the new normal of OBTL during the pandemic, new gaps and challenges also emerged, including, but not limited to, a lack of capacity to conduct online student assessments, inadequate online teacher and staff support, and limited capacity to monitor and evaluate education programmes. As a result, the IIOE and partners have been reviewing the first version of the IIOE Quality Assurance (QA) Framework and supplementing it with guidelines and toolkits for operationalization. *Figure*

5 represents the basic structure of the framework. As with the IIOE-CFHEW, the IIOE will continue to build upon inputs and feedback from global stakeholders and plans to officially launch the new IIOE QA Framework by the end of 2021.

Figure 5. *The IIOE quality assurance framework 2.0: components and subcomponents*



SCALE AND IMPACT

By June 2021, the IIOE had served more than 10,000 learners from over 135 countries through various offerings delivered on its online open-access platform. The partnership model of the IIOE and UNESCO-ICHEI has also allowed the IIOE to achieve a depth of impact, especially in its partner HEIs and their corresponding countries. The following two examples demonstrate the IIOE’s impact at the institutional level and its potential to be scaled up to the national and international levels.

As one of the most long-standing IIOE partners, the University of Engineering and Technology (UET), Lahore, has quickly transformed from a national hub for distributing training programmes and organizing offline activities to an active producer and contributor of high-quality, effective online educational resources, especially during COVID-19.

According to the Director of Al-Khwarizimi Institute of Computer Science, Waqar Mahmood, 'the International Institute of Online Education (IIOE) COVID-19 response training played a vital role in teachers' ICT professional development and their user effectivity, with the latest lectures and interactive tools for online and blended learning' (Naeem & Zeeshan, 2021). UET Lahore has become a co-host of the Artificial Intelligence (AI) advanced training programme, in which the university serves two main roles. Firstly, UET Lahore developed an online learning module showcasing AI applications in Pakistan, which provided a case study of AI from the perspective of a developing country. Secondly, the university supported the establishment of teacher development workshops on the campus of UET Lahore and other universities, enabling a blended teacher professional development experience beyond the offering of an online programme.

Meanwhile, Ain Shams University (ASU) in Egypt utilized IIOE courses and programmes to provide a prompt COVID-19 education response to support its HEW in conducting online teaching and assessment. Between autumn 2020 and spring 2021, ASU arranged for more than 450 Egyptian HEW members from 17 educational institutions to participate in the IIOE advanced training programmes in Big Data and AI, and 66 per cent of the participants were female (Abdel-Fattah & Mona, 2021). As a leading HEI in Egypt and the first rotating presidency of the IIOE, not only did ASU take full advantage of the IIOE resources, but it also actively facilitated other HEIs in Egypt and the region to take part in the capacity-building effort, thus fostering a global teacher professional learning community within the ecosystem.

Both UET Lahore and ASU have also been actively involved in developing and applying the IIOE QA Framework and the IIOE-CFHEW. The IIOE QA Framework will support partner HEIs to implement quality and inclusive OBTL at scale, while the IIOE-CFHEW will guide the HEW to build up their capacities systematically.

IMPLICATIONS

Customized course content and programme delivery, adjusted to the needs of developing countries, is especially important to accommodate the HEW's limited availability and access to technology. The implementation of the IIOE's advanced training programmes suggests that transnational teacher-training programmes need to consider whether the themes and scenes align with the local context and whether the local learners have sufficient resources to practice and apply what they learn. Meanwhile, it is also essential to break through the language barriers by offering courses and programmes in multiple languages to facilitate worldwide participation.

Incentives and enabling conditions are also essential to facilitate continued engagement with professional development for educators. While direct financial incentives may not be the best way to motivate engagement, certifications, awards and institution's recognition of teachers' learning outcomes and development appeared more effective motivations. Organized participation, encouragement from the HEI administrations, and online and/or offline professional learning communities also help motivate participants.

In line with creating a supportive ecosystem for HEW's capacity-building, it is critical to engage with stakeholders at institutional and national level within the ecosystem. Institutional partnerships need to be based on agreed-upon frameworks and action plans, such as the IIOE-CFHEW Quality Assurance Framework and guidelines. Such frameworks and guidelines can also naturally facilitate engagement at scale, and thus create professional learning communities at institutional, national and international levels.

THE WAY FORWARD

The COVID-19 pandemic has affected more than 220 million higher education students due to institutional closures globally and has highlighted the role of OBTL in delivering quality and inclusive higher education (World Bank, 2021). The vital role of OBTL in ensuring educational continuity during the pandemic has also shown the world that online education is no longer just a supplement to traditional face-to-face teaching and learning. Nevertheless, to effectively implement OBTL and facilitate the digital transformation of higher education requires more than a teacher, an administrator or an institution; it takes a supportive ecosystem to facilitate the process.

To adequately prepare the global HEW for the futures of education, not only must ICT competency be developed through one-way support from institutions such as the IIOE, but these skills must be actively practised through designing and implementing OBTL programmes, adopting digitally-enhanced strategies for administration and management, and sharing knowledge and skills with the global community. Both the bottom-up and top-down nature of the IIOE has shaped it into a co-ownership of global HEIs, enterprises and international organizations. As the IIOE continues to develop its supportive ecosystem, it aims to become a platform that connects HEIs worldwide, especially from developing countries, to provide the necessary resources, support and guidelines on the digital transformation of higher education. Large-scale and lasting impact has to come from multi-stakeholder partnerships. In addition to collaborations between HEIs, enterprises and international organizations, collaborations with the ministries of education will be an essential next step to implement IIOE programmes on a national scale and realize the full potential of both the IIOE and its partners.

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Chapter 24. COSTA RICA

Accelerating the development of teachers' professional digital competences

Leda Muñoz-García, Magaly Zúñiga-Céspedes
and Natalia Zamora-Bregstein

ABSTRACT

This case study shows the importance of assessing teachers' professional digital competence (PDC) in order to design professional development strategies based on evidence and aligned with teachers' needs. It demonstrates how such assessment can be done quickly and at scale, with the support of partnerships between research and education organizations, through digital platforms. The Omar Dengo Foundation (FOD) and the State of Education Programme of the Council of Rectors of Public Universities (Consejo Nacional de Rectores, CONARE) conducted a nationwide diagnostic regarding educators' levels of PDC and their professional characteristics in the latter months of 2020. A self-assessment instrument to measure the educators' PDC and a digital platform, developed by the Brazilian Education Innovation Centre (Centro de Inovação para a Educação Brasileira), were used, together with a complementary questionnaire built by the FOD. More than 18,000 educators nationwide participated voluntarily in the study. Using the PDC levels and a cluster analysis, three groups of teachers were identified and profiled. The variables that mostly differentiated teachers' clusters were their positive disposition towards the use of technologies, their curricular specialty, their preparation for the use of digital technology in their practice, and their age and years of experience using technologies. The information generated by this type of approach could greatly improve the effectiveness of professional development programmes, not only under critical conditions, such as the COVID-19 pandemic, but in responding generally to teachers' needs for training and support in a more personalized way.

KEYWORDS

Digital competences, virtual learning, professional development, teachers' profile, online evaluation, professional digital competences for teachers, digital technologies.



BIG IDEAS

This case study shows the importance of assessing teachers' professional digital competences to design evidence-based professional development programmes aligned with teachers' needs. It demonstrates how such assessment can be done quickly and at large scale with the support of partnerships between research and educational organizations, through digital platforms.

INTRODUCTION

During the COVID-19 pandemic, educators had to embrace the use of digital technology (DT) in order to help ensure the continuity of the school cycle. However, many teachers were not practised in developing technology-based distance learning opportunities for their students, and the need to use specific professional digital skills for teaching, communication and professional development presented challenges.

The case of Costa Rica, and in particular its use of a large-scale teacher evaluation model for professional digital competence (PDC) that allowed a wide and rapid diagnosis, could have wider significance, to countries that share the objective of finding ways to make their the education systems more effective through the integration of digital technologies. Several partnerships developed by the Omar Dengo Foundation (FOD), alongside the Ministry of Public Education (Ministerio de Educación Pública, MEP) and national and regional research organizations, facilitated the speedy execution of this study.

PDC for teachers is understood here as ‘the responsible, creative and critical use of digital technologies for the improvement of teaching profession in all areas: teaching and learning, professional development and educational management’ (Zúñiga, Molina et al., 2021, p. 9). PDC allows educators to discern why, how and when technology can contribute to the teaching and learning processes (Fraser et al., 2013, as cited in Zúñiga, Molina et al., 2021), and constitutes a fundamental condition for the use of technologies in improving the quality and relevance of education processes.

THE BACKGROUND

In the years prior to the pandemic, the focus of the education system, in Costa Rica and in most of the region, was on content-based programmes; while the migration to a curriculum based on skills supported by technologies has been a slow process.

The FOD, through a long-term partnership with the MEP, has supported the introduction of technologies in schools so that they are readily available for over 93 per cent of students. In rural areas, a 1:1 model provides personal computers to all students so that they can take them home. The MEP has been in charge of ensuring connectivity through with a basic service that reaches more than 90 per cent of schools.

In addition, the FOD designed an innovative pedagogical model to develop cognitive skills through project-based learning, programming and computational thinking, implemented from kindergarten to ninth grade to over 575,000 students in two weekly lessons within the official

curricula. However, the rest of the curricula has remained a traditional one, and neither university initial teacher training programmes nor the MEP itself have been successful on the development of the specific PDCs needed to align the education system with the rapidly-advancing digital society.

DT had been incorporated in regular classes, mainly as a substitute for textbooks and blackboards, or as a method of exchanging messages, with very little value added, wasting the enormous potential technologies have to enrich and augment learning outcomes. Even this basic use of DT had not been perceived as one requiring much training, given that educators, in general, regularly use their own personal computers at home.

However, the closure of schools due to the COVID-19 pandemic required the adoption of digital practices of which most educators had little previous experience, including virtual education. As part of the response to address this challenge, the FOD offered a large and diverse catalogue of virtual courses, live social media sessions, short virtual workshops, webinars and other modalities that were made available immediately to educators through the Foundation’s virtual education platform, “UPE La Puerta al Conocimiento”. Teachers reacted very positively to the remote learning with online accompaniment of a trainer and short practical formats.

There are around 65,000 educators in Costa Rica’s public education system. FOD’s online learning platform experienced a significant increase of 49,6% in users between 2019 and 2020. Additionally, the number of participations in the online learning services offered during 2019 was 18,000 while in 2020 participations increased more than three times to 59,990. This strongly suggests that the COVID-19 crisis generated a clear awareness among teachers about the importance of developing more advanced educational digital competences.

In this context, the need for a rapid diagnosis of the levels of PDC among primary and secondary education teachers at national level became clear. This was a very important step towards implementing evidence-based professional development policies, relevant to the needs of different groups of educators.

THE INITIATIVE

Identifying educator clusters according to PDC levels to guide strategic teacher professional development

The FOD, in partnership with the State of the Education Programme of the Council of Rectors of Public Universities of Costa Rica (CONARE) and the Brazilian Education Innovation Centre (Centro de Inovação para a Educação Brasileira, CIEB), with the support of the MEP,

conducted a large-scale online study to map the state of teachers' PDC during September and October of 2020.

The study was designed to obtain information both on levels of PDC development and on the characteristics of the educators that could support better PDC levels. Through the online digital platform conceptualized and developed by CIEB, translated into Spanish and adapted to the Costa Rican context by the FOD, all primary and secondary educators were invited to participate in a self-assessment of their PDC level.

The self-assessment instrument asks teachers about their knowledge and educational use of DT, and about ways in which they use DT in their pedagogical practice, professional development and digital citizenship. A remarkable characteristic of this instrument is the inclusion of items that ask about how teachers promote digital competences in students ([see](#)). The instrument has 23 single-selection items, with five response options, each of which represent a different level of competence, using a progression based on relevant and recent international models for the study of PDC (CIEB, 2019a, 2019b) ([see](#)). This progression goes from DT use of 'few or none' to 'transformation', where teachers are capable of leading other colleagues in DT educational use. The criteria that distinguish each level are DT fluent use, DT use integrated to the curriculum, and empowering of students (using active pedagogies).

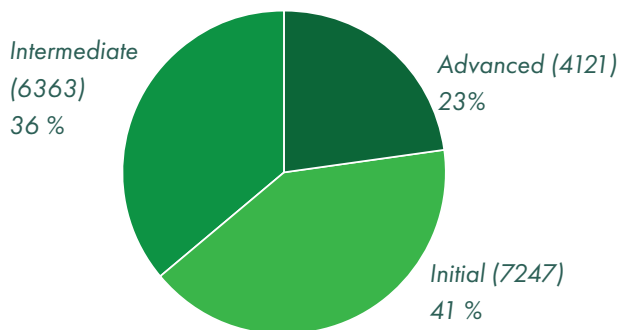
FOD built a complementary questionnaire to obtain information on the professional profile, DT access and the geographic distribution of teachers in relation to: initial training, professional development, access to the internet and digital devices in their homes and in educational centres, geographical location of the school, and disposition towards the use of digital technologies at school. More than 18,000 teachers, out of a total of 42,677, registered on the platform and responded voluntarily to the instrument, providing 17,731 valid cases for analysis.

This study allowed participating educators to obtain an immediate report on their individual proficiency levels, with specific recommendations for actions and free digital resources that they could access to improve (selected by the FOD to replace the Brazilian resources originally included in the CIEB platform). Further, it served as the basis for creating a roadmap with strategic actions to accelerate the development of the competences of each educator.

RESULTS

The study identified the level of each participating teacher in 12 competences related to pedagogical practice, digital citizenship and professional development, and built three large groups according to their PDC level (see Figure 1).

Figure 1. Teachers according to PDC skill level groups



Source: Zúñiga, Núñez et al., 2021

The scope of each group in terms of their predominant level of competence was characterized as follows:

Initial. They had begun to know and use technologies in their activities in a personal or self-centred way; they perceive DT as support.

Intermediate. They use technologies periodically and can integrate them into the planning of pedagogical activities; they identify them as complementary resources for the improvement of teaching and learning processes.

Advanced. They use technologies frequently in the planning of activities and in interactions with students; they work with DT in an integrated and contextualized way in the teaching and learning processes. Most teachers in this group belonged to technical high schools or to the computational thinking programme of the MEP-FOD, suggesting that quality training can significantly improve the PDC of in-service educators.

Using cluster analysis, a specific professional profile was obtained for each group, that included their geographic location. Through regression analysis, the variables that most differentiate these groups were identified: a positive disposition towards the use of technologies; curricular specialty; preparation for the use of DT in their practice, during their initial and in-service training, and age and years of experience in the use of technologies. The competences with the lowest development levels among educators were: secure and critical use of technologies; selection and creation of digital resources; and share with colleagues. The competences strengthened by the need to use DT during the pandemic were: communication, learning assessment and self-professional development.

With these results, a roadmap with the main immediate professional development actions was developed. The priority given to some competencies by the pandemic, such as self-professional development, was considered in order to accelerate the development of other especially relevant competences, such as the selection and creation of digital resources, pedagogical practice, personalization, and the secure and critical use of DT (Zúñiga, Molina et al., 2021; Zúñiga, Núñez et al, 2021).

LOOKING TO THE FUTURE

This case study provides an example of how technologies can be used to facilitate alternatives for quick evaluation interventions, that provide useful information to adjust and improve the training and support initiatives directed towards teachers; in this case for increasing their PDC to adequately implement blended or hybrid models of education. This approach can, in turn, be used to evaluate the effectiveness of training and support interventions.

The development of teachers' PDC needs to be promoted and monitored regularly, so that other indispensable steps can arise, especially the design of pedagogical models that integrate technologies in a specialized way that truly adds value to educators' interventions, and, at the same time, promotes the development of twenty-first century skills in students, including digital competences.

This process can be accelerated and become more effective if specific, timely and relevant information is obtained, to better understand the variables that affect the development of PDC in different groups, and the factors that act as barriers to achieving these goals. This approach could be refined in time, so that a personalized professional development roadmap can be defined, and the progression of each educator can be supported and monitored.

The adoption of technologies to support education in ways that transcend the substitution of textbooks and blackboards is urgent, especially in countries of low to middle incomes that need to carefully select where and how to use limited financial resources. Technologies are still costly when used at scale, and their benefits in education depend on their use.

Insights into the effective and creative integration of technologies in education models are urgently needed, so that education systems can embrace the challenges of the future of education, and deliver the necessary learning outcomes that will support and stimulate the development of our societies.

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Chapter 25. EGYPT

School Transformation Journey: Enabling blended learning in public

Christine Safwat and Ebtelal Elghamrawy

ABSTRACT

Can large low- or middle-income education systems transform schools into learning hubs to enhance learning capacity and quality? The answer is, potentially, yes, if it combines a humanistic approach with blended learning and network-building programmes. This model is currently being implemented in a public-private partnership model in Egypt. The Educate Me Foundation's School Transformation Journey (STJ), a UNESCO award-winning programme⁴⁶, offers preliminary data to support this approach, showing how it can foster higher digital skills. STJ is a school-based programme, founded on the premise that 'Although it is important to develop ICT skills of teachers, it's conditional on working on the mindset and attitude towards digital transformation first.' (Elkadi, 2013)The programme started in 2016, working with more than 6,000 educators in 321 schools across nine governorates. It is indirectly serving 80,400 students, with a growing online community of practice of 5,500 educators.

KEYWORDS

Lifelong learning, humanistic approach, teacher/educator mindset, teacher/educator professional development, blended learning, community of practice, public-private partnership



BIG IDEAS

The programme shows how civil society organizations, in a public-private partnership model, can use a humanistic approach in blended learning and network-building programmes to transform schools into learning hubs to enhance learning capacity and the quality of public education.

INTRODUCTION

Egypt's education system, like others focused mainly on rote memorization, faces a shortage of competent teachers, as well as a scarcity in teacher appreciation and acknowledgment from the community, and many other structural problems (El Baradei & El Baradei, 2004).

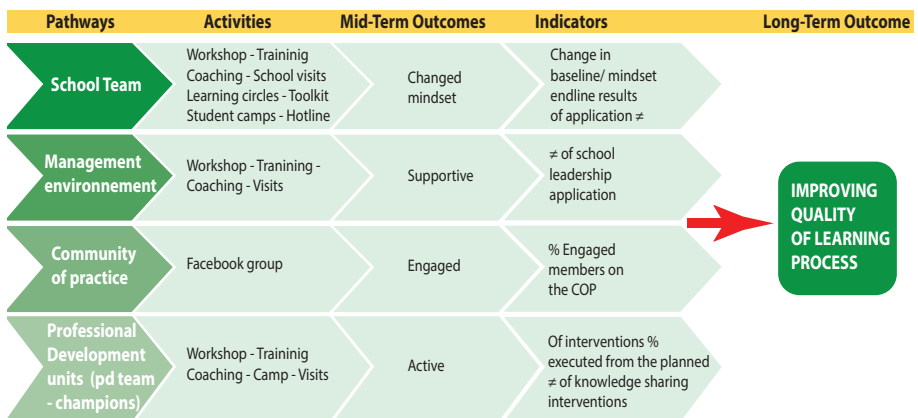
46. The programme was awarded the UNESCO Hamdan Bin Rashid Al-Maktoum prize for Outstanding Practice and Performance in Enhancing the Effectiveness of Teachers, the first time the prize had been awarded to an organization from an Arab country.

These factors have led to a deterioration in the quality of learning, with Egypt placed in the bottom 5 per cent of the 2016 TIMSS (Trends in International Mathematics and Science Study) and PIRLS (Progress in International Reading Literacy Study) international assessment surveys (TIMSS, 2015). This motivated the Educate Me Foundation to launch School Transformation Journey (STJ), in an attempt 'to transform public schools into lifelong learning hubs' (EMF, 2018; EMF, 2019; EMF, 2020), combining a humanistic approach with private-public partnership and a blended mode of delivery. This approach aligns with EDU 2.0 reform agenda recently adopted by the Ministry of Education and Technical Education (MOETE) (RDP, 2021).⁴⁷

SCHOOL TRANSFORMATION JOURNEY

STJ is a learning journey composed of technical interventions that begin with classroom training, virtual training, and self-directed learning. It then incorporates follow-up and coaching interventions aimed at bridging the gap between theory and practice. It adopts the Partnership for 21st Century Learning's (P21) 21st Century Skills Framework (P21, 2019) and MOETE's EDU 2.0 educator performance framework in the design, development, implementation and evaluation of the programme. To enable a path of change, as illustrated in Figure 2 (Peakperformancecenter, 2021), learning and change occur in three integrated dimensions, i.e. knowledge, attitude, skills-building. This combination is designed to improve educators' performance, to enable individual and group initiatives, and to motivate educators to continue learning and developing their performances, enabling schools to become lifelong learning hubs.

Figure 1. *School Transformation Journey: Theory of change (EMF, 2018; EMF, 2020)*



47. In 2017, MOETE announced a full-scale transformation of the education system to be completed by 2030, including a move to skills-based learning, an expansion of digital learning and a complete transformation of curriculum.

STJ IMPLEMENTATION

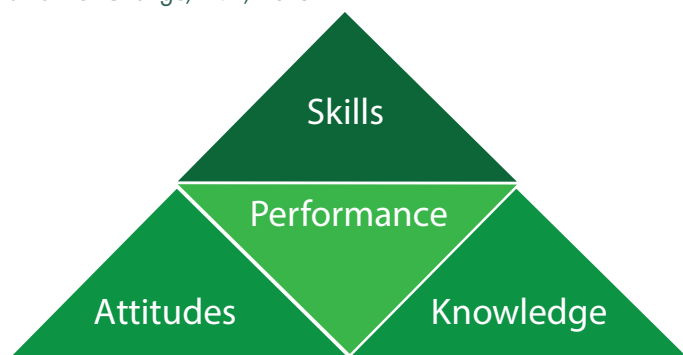
STJ is implemented over a three-year period in three phases:

- **Phase 1:** Building school capacity.
- **Phase 2:** Empowering the school as a unit of change.
- **Phase 3:** Sustaining the change through activating the professional development team inside the school.

The programme is delivered in the form of a learning journey, starting from what teachers know and can do, using a low-cost blended learning model. Each of the school staff groups receives a specialized training programme, catered to their needs and specialties, including a number of technical interventions for professional development to: improve educator (school team) performance; support school leadership that enables change; activate professional development unit/team; and engage community of practice (to share knowledge and best practice across schools).

These technical interventions include learning/training; however, a core component of the programme is the blended and embedded learning that happens after the training. It comprises classroom observation, follow-up, monitoring and evaluation, and on-the-job coaching using various outlets. The total number of programme hours is 100, comprising 18 hours of direct learning, 18 hours of embedded learning, 32 hours of one-to-one coaching, and 32 hours of online support, with twice the amount of time dedicated to coaching and support than is the case for offline learning. To indirectly and directly work on teachers' mindset change and skills development in utilizing technological tools as trainees, teachers, and trainers. The programme covers topics such as project-based learning, teaching positive discipline, socio-emotional learning, community of practice as a self-directed learning community, the 21st Century Skills Framework, constructive theory, behavioral theory and humanistic theory.

Figure 2. *STJ Path of Change, EMF, 2018*



STJ TECHNOLOGY INTEGRATION

Before the COVID-19 pandemic, the STJ programme focused on mindset for change, of which technology usage was one example. In addition, STJ worked with teachers to build basic ICT skills, such as Microsoft Office, to prepare them for using technology in schools. STJ used different online communication channels, such as WhatsApp and email, to encourage mindset shift and to follow up with teachers. It also used an online platform to bring together graduated teachers from different schools that acts as a community of practice, which was established to connect educators. Focusing on self-learning as one of the skills of the twenty-first century, the Educate Me Foundation (EMF) referred and linked teachers to e-learning platforms as a source of learning and professional self-development: at least 300 teachers obtained certificates from Edraak, a platform for massive open online courses (MOOCs) in the MENA region, in different professional subject areas. EMF had various success stories of teachers completing the courses assigned. Some completed multiple courses, and others even completed non-education programmes, such as courses in human resources, for their own self-development.

In response to the COVID-19 crisis, 'synchronous' (live) online training was implemented as part of the STJ programme, to offer an online toolkit to public school educators on how to deal with the implications of the crisis, how to manage themselves and how to support students and parents. Teachers were trained in how to use Edmodo, the online platform allocated by MOETE, and in how to use Zoom, to enable them to connect with each other and with their students. From satisfaction survey feedback, the EMF toolkit was a positive support to teachers, helping them to manage themselves and their emotions during the lockdown.

Moreover, the programme was further customized to a programme called "Blended Learning Journey" (BLJ) to build on the capacities of educators and to equip them with the knowledge, skills and tools required to apply the blended learning approach themselves. The programme focuses on allocating champion teachers to become part of a digital literacy team, to lead change within their schools and support them in the shift towards blended learning. At the same time, they are equipped to support other teachers in the school in the use of technology, thus ensuring sustainability. The programme works on changing prejudices or resistance toward integrating technology in education. This is done by exploring various learning approaches, such as distance learning, blended learning and e-learning, building a solid understanding of the specifications and characteristics of the virtual learning environment, applying basic skills to create the learning environment for entry-level use of technology in teaching, according to international standards such as the Technology Integration Matrix (TIM) matrix, and engaging students in learning, according to the Triple E Framework (Triple E, 2021). Which is founded on the assumption that effective technology use in learning is rooted in effective instructional

strategies for learning, using three Es; Engage, Enhance, Extend. The topics include Bloom's digital taxonomy, blended learning definition and strategies, MoETE digital channels, how to use Zoom, Facebook, WhatsApp and YouTube as channels for teaching, lesson planning and teaching using technology, and student engagement tools in a blended learning environment.

Furthermore, teachers who complete the STJ and achieve a high standard can move on to the more advanced 'Champion Teachers' programme, through which they are trained to become trainers of their peer teachers. They learn to design and deliver online and offline training toolkits so that they can become part of a professional development team for the school.

Finally, the community of practice is used to connect with educators and schools beyond the directed interventions. For example, to ensure collective learning for all schools/educators, five online events have been held with public school teachers, to discuss key topics such as technology integration and wellbeing during school closure, while giving educators the chance to share their own experiences and learn from one another.

STJ RESULTS, LESSONS LEARNED AND LIMITATIONS

Results

The programme started in 2016 and is delivered to more than 6,000 educators in 321 schools, across nine governorates in Egypt, indirectly serving 80,400 students, with a community of practice that consists of 5,500 educators. The programme was awarded the UNESCO-HAMDAN prize for teacher' effectiveness, the first time the prize had been awarded to an organization from an Arab country. It uses a public-private partnership model involving organizations such as Vodafone, Exxon Mobil, the National Bank of Egypt, Alexbank, Raya, Sawiris Foundation and Orascom Construction. As for implementation, school access is achieved through a signed memorandum of understanding (MoU) with MOETE.

During those years, STJ's results, based on EMF impact assessments and measurement tools such as surveys, pre-post assessments, classroom observation, focus groups, showed 91 per cent educator performance improvement and 96 per cent average professional development unit interventions executed (from planned). Five applications demonstrating skills development were delivered per school, with 78 per cent knowledge gained and an 81 per cent enhancement in attitude. There were two principal applications demonstrating skills development per school, and 90 per cent enhancement in supportive management. One professional development unit activated per school, while more than 4,500 educators joined the community of practice, and 98 per cent educator satisfaction was recorded for the programme. Additionally, in technology integration, 24 digital applications were delivered

per school. Also, in the Blended Learning Journey, 91 per cent of teachers designed lesson plans using the technological tools in which they were trained. In total, 360 teachers from 147 schools across three governorates enrolled in the 'Champion Teachers' programme, with 20 per cent knowledge enhancement, 94 per cent educator satisfaction, and 74 per cent application, which meant that 74 per cent of them were able to design and deliver online and offline training to their peer teachers.

Alongside these quantitative achievements, EMF has collected success stories from teachers who were initially resistant to technology and ended up embracing it, in some cases holding weekly online sessions for their class students. One teacher in Upper Egypt, who delivered 12 online sessions to his students after ensuring they had access to the internet through their parents phones, led a campaign to promote digital literacy in his village. Other teachers are now capable of using PowerPoint and Office, and applications such as WhatsApp, Zoom and Microsoft Teams and use them with their students (skills that seemed unachievable pre-pandemic). One teacher said: 'My dream was to one day be able to do PowerPoint presentations'. Some teachers now even have their own YouTube channels. As for the champion teachers who became trainers, some of them have been hired as part of by EMF as official trainers: a level of impact never believed possible.

Lessons learned

EM collected feedback and reflection data from trainers and educators. The main lessons learned from this exercise are briefly presented below:

- **Mindset change intervention is a condition of improving learning quality inside schools:** Using a humanistic approach that focuses on the teacher's wellbeing and on mindset change has led to change of attitude, better-performing educators and better-performing schools.
- **Validation of on-job coaching and the importance of follow up in teacher professional development.**
- **Need to acknowledge teachers' valuable insights and recommendations for any educational reform.** Their buy-in and support for on-ground practice is crucial.
- **Blended learning and network-building might be a way to scale deep transformation programmes:** The main constraint on STJ and other capacity-building programmes that focus on deep transformation is that they involve organizations investing a lot of time and resources in several schools. Blended learning and network-building might be a way to do it.
- **Sustainable change can be attained through developing the ecosystem, and not only through schools and building coalitions/partnerships.** This can be achieved by working with MOETE at various levels and by building on partnerships with other organizations, for example, public-private partnerships and partnerships with non-governmental organizations, universities, etc.

Limitations

The following limitations emerged:

- **Scale is limited without full buy-in from MOETE:** Even though MOETE allows EMF to operate STJ under the signed MoU, lack of investment and a reluctance to count STJ towards teacher PD hours or promotion limits scalability.
- **Limited control over change:** The programme is changing within the limitations of the Egyptian central governance policies and system.
- **No access to school data (learning outcomes):** This limits the ability to monitor and track the relationship between the programme and student learning outcomes.
- **Deep transformation programme trade-off:** Deep transformation programmes require organizations to invest a lot of time and resources; hence the investment required to scale it in large systems represents a limitation.

IMPLICATIONS AND CONCLUSION

These results demonstrate how a humanistic approach is essential for change. Teachers are humans, and change for humans begins with mindset, which consequently changes attitude and practice. Hence, these embedded learning interventions offered online and offline options, including continuous one-on-one coaching, mentoring, and modelling, making change possible. The change in mindset is key to supporting the current EDU 2.0 reform in Egypt and any ambitious reform worldwide. STJ's qualitative and quantitative results show that teachers who took STJ pre-EDU 2.0 were much better prepared and receptive to the reform than their peers.

Moreover, in a country such as Egypt, with a K–12 education system of 54,000 public schools and 22 million students, it is crucial to work both on building the knowledge and skills of teachers and on changing their mindset, using a humanistic approach. Ignoring teacher well-being makes change more difficult. This is an area where civil society and the private sector can contribute by gaining educators' buy-in for the change/reform in order to facilitate and scale such change/reform on the ground, using a blended modality.

To conclude, innovations from civil society, such as STJ, could be a key step in planning for the future of education, supporting programmes that align with ministry's of education reform efforts, especially those on technology integration. It starts from mindset change and attitude modification, gaining educators' trust, followed by putting knowledge, theory and strategies into practice through modelling. In addition, the programme could achieve system-wide scale through its blended learning model and its partnership and network-building approach.

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Chapter 26. GUATEMALA

Leveraging human connection in virtual teacher professional development programmes

María José de León Mazariegos, Francisco Barajas and Pierce Henderson

ABSTRACT

This chapter examines the lessons learned from ProFuturo's COVID-19 response and shift to online learning in Guatemala. In 2020, ProFuturo provided Guatemala's Ministry of Education (MINEDUC) with a digital teacher professional development tool for building competencies in information and communications technologies (ICTs) to assist the education system's shift to online learning. The transition from ProFuturo's original contact-intensive, face-to-face model for professional development to an open-source, online platform created opportunities for the organization to expand access to its services. However, results from ProFuturo's Guatemalan response to COVID-19 highlight the importance of human connection and teacher motivation, and show how these factors may influence the implementation of digital teacher professional development systems.⁴⁸

KEYWORDS

Digital education, information and communications technology, public-private partnerships, teacher professional development, blended learning, teacher motivation, communities of practice, teacher networks.



BIG IDEAS

This chapter provides insights and lessons learned based on ProFuturo's digital platform for teacher professional development in Guatemala. These types of programmes expand access to training in the use of ICTs and twenty-first century skills; however, the effectiveness of such programmes depends on the critical factor of human connection.

48. The research for this chapter was completed with the support of ProFuturo, Fundación DECA and interviews with teachers in Guatemala. The topic of this chapter is a continuation of previous research on Guatemalan teacher training by the authors and Carrah Olive-Hall, published in *An educational calamity: Learning and teaching during the Covid-19 pandemic*, by Reimers et al. (2021).

INTRODUCTION

On Thursday, 16 March 2020, the education system in Guatemala suspended face-to-face learning (MINEDUC, 2020). With COVID-19 causing over 40,000 Guatemalan schools to close, access to face-to-face learning was no longer available to over four million students (MINEDUC, 2021a; MINEDUC, 2021b). To address this crisis, the Ministry of Education of Guatemala (MINEDUC) initiated a range of national and international public-private partnerships, including with ProFuturo, TOMi Digital and FUNSEPA, through a nationwide programme called *Aprendo en Casa* that aimed to sustain education continuity and enable teachers to train themselves remotely (*Aprendo en Casa y en Clase*, 2021). As a partner in this strategy, ProFuturo provided teacher training in the use of ICTs and innovative pedagogies (Barajas et al., 2021).

ProFuturo's theory of action was that, if the digital resources hosted on its online platform were open and available to educators through digital devices, they would be able to access these materials and boost their pedagogical and technical competencies, including in the use of ICTs. This, in turn, could help strengthen a system that has struggled to embrace technology and innovative pedagogical practices in the classroom (Barajas et al., 2021). ProFuturo's efforts to boost the country's digital commons and improve access to online resources was a step towards educational equity. However, as this case exemplifies, digital education programmes meet an impact ceiling where they do not take into account the means by which content is delivered.

THE EDUCATION SYSTEM IN GUATEMALA

Before the pandemic, Guatemala was already struggling to bridge opportunity gaps for its four million students (MINEDUC, 2021a). In 2018, the Programme for International Student Assessment for Development (PISA-D) revealed that only one in ten Guatemalan students reached the minimum achievement level in mathematics, and that one in three reached the minimum achievement level in reading (Centro de Investigaciones Económicas Nacionales, 2019). The largest disparity in human capital can be seen in relation to geographic location and economic status, with rural and economically disadvantaged urban areas facing the highest level of education inequality in Guatemala (Orozco & Valdivia, 2017).

Indeed, for the country's 200,000 teachers, a lack of preparedness, especially in the use of ICTs, was a significant challenge for MINEDUC's effort to implement high-quality distance education during the COVID-19 pandemic. Hence, MINEDUC's pandemic-related teacher professional development was centered around ICTs. The Ministry curated and disseminated professional development resources from leading international and national partners with

the goal of improving the historical lack of ICT experience and exposure among its teachers (Barajas et al., 2021).

PROFUTURO OPERATIONAL STRUCTURE

Based in Spain, and financed by the Telefonica Foundation and the La Caixa Foundation, ProFuturo is a multinational social impact initiative that works across multiple regions of the world, including Europe, Africa, Asia and Latin America. In Guatemala, ProFuturo began operating in 2017 and now serves 13 departments (provinces) through site interventions in schools (ProFuturo, 2021a; Barajas et al., 2021).⁴⁹

ProFuturo's model provides two services in parallel: it champions and disseminates innovative classroom teaching, aimed at revolutionizing the professional development system, and creates a conduit for communities that lack the infrastructure to support twenty-first century digital tools, integrating technological competencies with pedagogical competencies in an intervention-based programme.

According to Gabriela Gaitán, Coordinator of the ProFuturo project at Fundación DECA, for its Guatemala programming before the pandemic, ProFuturo worked closely with MINEDUC to identify the course content and highest-need communities in which to stage its interventions. The work begins with a list of schools that MINEDUC considers ready to receive the programme. ProFuturo evaluates these schools based on the number of teachers and students, access to transportation, access to electricity, internet connectivity, school leadership and a survey of the willingness of teachers to be trained in different subject areas (Gabriela Gaitán, personal communication, 8 July 2021). In identifying the technological and pedagogical progress of the schools, ProFuturo categorizes schools as 'green', 'yellow', or 'red', according to the length of time and the degree to which they have implemented ProFuturo; this is known as ProFuturo's 'traffic light' method (Gabriela Gaitán, personal communication, 8 July 2021; Fundación DECA, 2021).

After assessing the needs of these schools, ProFuturo then implements its pedagogical and technological development courses. Assigning one coach to support between 10 and 12 schools, ProFuturo provides access to technology and increases school exposure to ICTs in low-resource settings through the dissemination of 'mobile labs', which include laptops for teachers and tablets for students (Barajas et al., 2021). Each mobile lab can be used by up

49. Schools that recently implemented ProFuturo are classified as 'red' and receive follow-up visits every five days; ProFuturo focuses on providing initial training on hardware usage and changing attitudes towards the use of ICT. Schools that are already classified as 'green' and are familiar with the programme receive follow-up visits every 18 days; ProFuturo's support is mostly provided to co-create new pedagogical resources with teachers and provide training on evaluation methods (Gabriela Gaitán, personal communication, 14 July, 2021).

to five teachers and their students. The costs are, for the most part, covered by ProFuturo's headquarters in Spain, with the support of the La Caixa and Telefonica foundations (Barajas et al., 2021). This enables easy access to funding in remote areas, yet limits the scale of the operations. Prior to the pandemic, the project life cycle could vary from between 23 and 25 months to almost three years (Gabriela Gaitán, personal communication, 13 July 2021).

PROFUTURO IN THE PANDEMIC

In response to the pandemic, ProFuturo opened its platform, and more than 160 courses in four different languages, to all students and teachers around the world (ProFuturo, 2021 d). In Guatemala, ProFuturo adapted what they already had in place to meet the needs of teachers who were being trained remotely (ProFuturo, 2021 b).

ProFuturo's training system consists of two parts: its Comprehensive Model and its Online Teacher Training Model (ProFuturo, 2021 b). The face-to-face Comprehensive Model works directly with schools and education centres to integrate mobile-lab equipment and support teachers on the ground. The digitized Online Teacher Training Model includes self-paced online courses that were curated by Fundación DECA to fit Guatemala's context (Gabriela Gaitán, personal communication, 8 July 2021; ProFuturo, 2021 b).

To reconfigure its Comprehensive Model for remote learning during the COVID-19 pandemic, the mobile labs and face-to-face follow-up were temporarily discontinued. In their place, Fundación DECA's team built the ProFuturo Access Tunnel (TAP), to execute ProFuturo in the country. TAP allowed schools previously registered with ProFuturo to have access to a local server and continue their courses online with support, evaluation and monitoring by a designated tutor (ProFuturo, 2021 b; Gabriela Gaitán, personal communication, 9 July 2021). ProFuturo's coaches and tutors are Guatemalan and are hired based on their knowledge of the course methodologies, training and platform. Other requirements include possessing a general understanding of online training, technology and pedagogy; the ability to speak the local language; and understanding the Ministry of Education's procedures (Gabriela Gaitán, personal communication, 13 July 2021). Without changing the operational structure, teachers were still able to interact with trainers and receive real-time feedback in an online environment. In addition, WhatsApp groups were created to allow immediate assistance without having to enter the platform (ProFuturo, 2021 b; Gabriela Gaitán, personal communication, 9 July 2021).

To open access for more teachers, ProFuturo expanded, from working only with schools that were officially participating in the programme to opening its programmes to all Guatemalan teachers under the Online Teacher Training Model (Gabriela Gaitán, personal communication, 8 July 2021). This was the organization's primary vehicle in 2020 to expand

teacher knowledge in pedagogical innovation and increase ICT capabilities (Gabriela Gaitán, personal communication, 25 June 2021; ProFuturo, 2021c). With these measures in place during the pandemic, data revealed that ProFuturo trained more than 7,144 teachers and principals by the end 2020. These teachers were also certified by the Ministry of Education (Gabriela Gaitán, personal communication, 8 July 2021).

Yet, ProFuturo's certification pass rate dropped to around 40 per cent in 2020 (Gabriela Gaitán, personal communication, 8 July 2021) compared with 89 per cent before the pandemic. The question this chapter seeks to raise for education scholars and practitioners is this: with tutors and communities of practice to fortify intrinsic motivation, as well as certifications to nudge teachers to persist, why then is there a discrepancy between 2020 and the pre-pandemic pass rates?

LESSONS LEARNED

The delivery means of teacher training may point towards an answer. The Comprehensive Model's contact-intensive programme had to change to comply with Guatemala's public health measures during the pandemic. As such, ProFuturo became almost entirely asynchronous. The system of accountability through face-to-face learning was, in part, continued through the platform's online tutors and communities of practice, though the level of this support was not near its pre-pandemic levels of programming. Open access to digital tools proves necessary, but not sufficient: participants need human contact and support in order to stay motivated.

Guatemalan teachers, Luis Felipe Gameros and Loida de León, were interviewed regarding their experience with ProFuturo trainings, and they stated that ProFuturo's tutors were critical to persistence and completion of the platform's online courses. Described as 'friends', these stakeholders ensured that even the most technology-adverse teachers completed their courses (Luis Felipe Gameros and Loida de León, personal communication, 12 July 2021). 'The human component of ProFuturo is very important', as the personal connection between tutors and teachers enabled ProFuturo's success (Luis Felipe Gameros, personal communication, 12 July 2021). Vital to e-learning, these tutors were points of contact that teachers had to fellow educators, yet informal communities of practice can also support teachers in improving their knowledge, skills and dispositions (Villegas-Reimers, 2003, p. 20; McPherson & Nunes, 2004). The formation of teacher networks, outside the formal connections with the platform's staff, created another layer of accountability and created space for teacher collaboration. With teacher-initiated WhatsApp groups, educators could exchange resources and learning experiences in a decentralized way (Barajas et al., 2021; Loida de León, personal communication, 12 July 2021). ProFuturo's experience in Guatemala suggests that both formal and informal mechanisms create and sustain engagement in virtual settings, thus supporting teacher motivation.

Motivation is essential for the professional success of teachers, yet not all forms of motivation are created equal (Williamson & Blackburn, 2017). During the interviews, teachers mentioned different types of motivation, ranging from personal interest to time for professional growth opportunities (Loida de León and Luis Felipe Gameros, personal communication, 12 July 2021). Extrinsic motivation is stimulated through rewards, such as monetary incentives and promotions or through high-stakes evaluations; intrinsic motivation comes from personal connections to the material. The latter leads to long-term impact (OECD, 2015). Moreover, intrinsic motivation to use ICTs tends to be associated with personal views on teaching and learning and, of course, the use and incorporation of ICTs in the classroom (Goktas et al., 2009; Ertmer et al., 2006). In the case of ProFuturo, while the course certifications, professional recognition and potential for promotion provided some extrinsic motivation, tutors and communities of practice helped teachers to connect with what they were learning.

The findings from ProFuturo's shift to online learning in Guatemala during the COVID-19 pandemic suggest that, while a digital common may expand access to learning opportunities, the means of content delivery is essential to ensuring that the tools are used by teachers and students alike. Inevitably, it is resource intensive to incorporate more human capital, and this can affect the ability to scale up programmes, yet one takeaway from the ProFuturo case is that building a tool does not guarantee that teachers will use it (Barajas et al., 2021). ProFuturo's success shows that contact-intensive supports are associated with higher persistence rates, and the case highlights the importance of connection and community (Gabriela Gaitán, personal communication, 8 July 2021) Thus, moving forward, governments and international organizations should consider ways to create training programmes not only filled with tools, but with people too.

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Pierce Henderson is a recent graduate of the Harvard Graduate School of Education, where he earned his master of education. During his graduate studies, Pierce focused on the intersection of policy, education and workforce development to better understand how the redesign of education-to-employment systems through policy can produce better outcomes for society. Pierce worked as a Harvard Ministerial Leadership Program policy research fellow, consulting for the minister of higher education in Zambia, and authored policy briefs for public sector leaders in North Carolina. Before coming to Harvard, he helped launch a North Carolina-based non-profit organization, overseeing the development and execution of its strategic plan.

Chapter 27. INDIA

Rehnuma programme: School leaders as entrepreneurs

Jonathan Mendoca

ABSTRACT

With an increasing demand for better school achievement and the need to prepare children for the twenty-first century, many countries are reforming their education governance structures, increasing decentralization and school autonomy. The role of school leaders has grown far beyond that of an administrator and has necessitated a change in their professional development. This case study examines an initiative of the Barefoot Edu Foundation in India, that has attempted to build twenty-first century school leadership competencies in principals through an online training programme, Rehnuma, which aims to help them navigate the challenges of the COVID-19 pandemic using a blend of school management and entrepreneurship. The chapter explores key considerations that have made the programme a success, in terms of supporting online learning, securing principal buy-in, transferring knowledge from the learning to the performance context and leveraging the local and contextual knowledge of the principals.

KEYWORDS

School leadership, entrepreneurship.



BIG IDEAS

This case study shows that professional development that is entrepreneurial in nature can help school leaders to overcome twenty-first century challenges, meet the changing demands of their school, and generate contextual and scalable solutions. With adequate scaffolding or support, online learning can be used to promote such professional development

INTRODUCTION

The impact that COVID-19 has had on the education system has rekindled the need to re-examine education systems in context of the twenty-first century and its challenges. With an increasing demand for better school achievement and the need to prepare children to thrive in the current century, many countries are reforming their education governance structures, increasing decentralization and school autonomy (UNESCO, 2016).

The Programme for International Student Assessment (PISA), the triennial global survey conducted by Organisation for Economic Co-operation and Development (OECD) to evaluate education systems worldwide, shows that a substantial proportion of students in OECD countries now attend schools that have a high degree of autonomy in different areas of decision-making (Schleicher, 2012). The evolving role of school leaders has prompted a redefinition of policies regarding their training and professional development (UNESCO, 2016), in recognition of how the role has grown far beyond that of an administrator (Schleicher, 2012). This case study explores how professional development that is entrepreneurial in nature can help school leaders to overcome twenty-first century challenges and encourage decentralized school leadership, while generating contextual and scalable solutions. Additionally, online learning can be used to promote such professional development by providing adequate scaffolding or support.

BAREFOOTEDU FOUNDATION'S REHNUMA PROGRAMME

Barefoot Edu Foundation is a non-profit organization in India, co-founded by the author, with a vision that every child must have a strong foundation to think, feel and dream. Rehnuma was conceived by the foundation in July 2020, to help principals navigate the challenges of COVID-19 and create a movement of educators at grassroots level that could rapidly contribute to transforming education.

Rehnuma is an online training programme for school principals that builds their capacity in entrepreneurship to create twenty-first century schools and contribute local solutions to the ecosystem. Over two years, principals are offered online capacity-building workshops that focus on entrepreneurship and school management, and are provided with various need-based supports, such as tools, mentors and networks to develop scalable best practices. Rehnuma can be thought of as an 'incubator' for school principals. The term 'incubator' is typically associated with organizations that provide start-ups in their early stage with support and resources that help build strong organizations, an approach that Barefoot Edu has applied to school principals.

The intervention was piloted with principals of low-fee private schools, as they have higher degrees of autonomy than government schools in India and best practice that emerged could be scaled to both sectors. Nearly half of all enrolled students in India attend the 450,000 privately managed schools across India (U-DISE, 2019, as cited in CSF, 2020). Unlike well-resourced schools, 90 per cent of Indian private schools charge less than USD 25 per month (MoSPI, 2019). They are often referred to as low-cost private schools, low-fee schools, community schools, or budget/affordable private schools. They face a number of challenges, ranging from erratic fee payment to teacher attrition, and the complexity of COVID-19 has resulted in thousands of such schools permanently shutting down (Alam & Tiwari, 2021).

KEY FEATURES AND IMPLEMENTATION CONSIDERATIONS

The theory of action for Rehnuma incorporates two themes: a] working with school leaders to generate and implement solutions; and b] documenting and scaling these interventions to other school leaders. The premise is that if motivated school leaders are coached in entrepreneurship and school management, and are supported in applying these learnings to a project of their choice, they will create implementable grassroots innovations for school improvement, using their local knowledge and skill sets (i.e. a sustainable intervention). Further, these innovations can be scaled to principals from similar under-resourced contexts through online workshops, research papers and partnerships with non-governmental organizations (NGOs) and the government. Features of the intervention are discussed below.

1. Approach that focuses on entrepreneurship: The decentralization of education challenges traditional institutional assumptions of school stability and introduces space for autonomy and entrepreneurship (Yemini et al., 2014). The expectations of principals are becoming similar to those of managers in the corporate sector, making them ‘institutional entrepreneurs’⁵⁰ (Yemini et al., 2014). Almost all successful school leaders draw on the same repertoire of leadership practices, namely: setting directions, building relationships and developing people, redesigning the organization to support desired practices, and improving the instructional programme (Leithwood et al., 2020). An entrepreneurship approach creates a culture of innovation that helps principals acquire these competencies to create, implement and share solutions for building strong organizations.

2. Structure of an incubator: In a survey (N = 40) conducted by Barefoot Edu Foundation during the first wave of the pandemic in India, principals reported challenges in fundraising, the need to launch new programmes relevant to COVID-19, and a limitation in their networks. OECD’s study of innovative leadership development programmes found that those most effective are designed to help leaders build schools with the capacity for high performance, use innovative approaches and adopt a system-wide perspective (Schleicher, 2012). They often include networking, which can help foster collaborative problem-solving and allay the sense of isolation that school leaders feel (Schleicher, 2012). An incubator helps create an overarching structure of enabling support such as assistance with planning, mentoring, networking and documentation, in addition to workshops. This provides support that fosters a culture of innovation and collaboration to help principals institutionalize their interventions and engage with the larger ecosystem.

50. The term ‘institutional entrepreneur’ was coined by Eisenstadt in 1980 to denote individuals who adopted leadership roles in institution building

3. Profile of principals: Incubated principals are expected to transform their school and generate solutions that will be beneficial to others. Therefore, it is important to be selective in assembling the cohort of principals to be incubated. According to Barefoot Edu Foundation:

These school leaders hail from lower income communities, have served as a principal for approximately 5-10 years and have essentially demonstrated exceptional leadership. They have intricate knowledge about the community and understand what drives the people that they work with. They are effective implementers but struggle to plan in the long term or document their learnings (Mendonca, 2019, p. 2-3).

4. Performance assessments: Performance assessments are defined as ‘multistep assignments with clear criteria, expectations, and processes that measure how well a learner transfers knowledge and applies complex skills to create or refine an original product’ (Brown & Mevs, 2012, p. 2). In Rehnuma, principals are granted the autonomy to prioritize and undertake organizational and academic school improvement projects and are assessed on them. Principals have found value in this approach of combining capacity building with their implementation priorities and have dedicated 24 hours per quarter to capacity building.

5. Online learning: The online mode appeared to be effective for training principals in terms of attendance, punctuality, completion of pre- and post-work, sharing of resources among peers, and participation across physical geographies. However, major challenges included inducting principals into new technologies, such as Slack, Google Alerts and Kahoot, and supporting the application of learnings which required additional scaffolding.

6. Scaffolding for online learning: In order to bridge the gap between online learning and the performance context for principals, reflection templates, role play and case studies were included. A key feature of the programme and main scaffolding⁵¹ has been the School Coach who helps incubated principals navigate and make effective use of the other support that Rehnuma provides to an incubator. The School Coach guides school leaders to apply learnings from the capacity-building sessions to the performance-assessment projects by creating an implementation plan and making use of the incubator to achieve it. The School Coach is a role that could analogously be deployed to the public education system by utilizing mentors, volunteers or a permanent position to help school leaders avail themselves of the institutional support structures⁵² established by the government between the district and school level.

51. Scaffolding refers to providing temporary support structures to learners that can be gradually diminished over time as the learners develop new skills or abilities.

52. Block Resource Centres, Cluster Resource Centres, and District Institutes of Education and Training established by the government of India.

7. Articulating best practices for dissemination: Best practices are often documented without the contextual details required to institutionalize or scale them. For instance, the principals attributed their school's success at engaging students during COVID-19 to their 'strong teaching team'. However, further nuances are required for other schools to benefit, such as what led to the assembly and retention of this effective teaching team. In one example, teachers tended to prioritize regularity of payment over magnitude to an extent and, so, some school leaders established small financial buffers to ensure regular payment of teacher salaries despite erratic fee collection. In another, schools had a longstanding culture of continuous professional development of teachers which made them agile in learning during the pandemic

8. Leveraging local and contextual knowledge: In order to facilitate the generation of best practices, the programme has focused on amplifying⁵³ the contextual knowledge and capabilities of principals by creating optimal learning opportunities instead of accelerating learning. For instance, the principals had expressed apprehension in their ability to crowdfund digital devices for their students. Instead of building their capacity to crowdfund for this specific challenge, principals were encouraged to amplify their strong community relations, enabling them to track the general movement of mobile phones in the community (e.g. phones per household, primary users, and when devices left households). With this information, the schools, in partnership with the community, were able to organize a 'mobile sharing schedule' and circulate existing phones around the community to children in need, as per device availability.

DISSEMINATION, SCALE AND IMPACT

All the school leaders directly enrolled in Rehnuma have institutionalized some of their interventions to improve educational continuity during the pandemic, such as implementing a project-based home curriculum, student-led teaching programmes, student trackers for improving attendance online, and an online co-curricular platform to increase student engagement. Best practices such as these have been scaled to other school leaders, primarily through the initiatives of Rehnuma principals. For instance, Rehnuma's support structures have helped one principal fundraise for more than fifty per cent of his teacher's annual salaries in response to erratic fee payment during COVID-19. This principal further united 21 schools from the slums of Mumbai, collectively launching a 'mega-fundraiser' targeting USD 100,000.

Successfully tested practices such as these, which have proven to be within the implementation capacity of school leaders, are being scaled to hundreds of school leaders through capacity-

53. 'Amplification' was first coined by Zaporozhets (1978). While acceleration attempts to speed up development, amplification refers to providing optimal opportunity for learners to reach their full potential (Bodrova & Leong, 2007).

building webinars, workshops, and partner organizations. As is evident from the crowdfunding example, the innovations generated through Rehnuma have the vocabulary of the community, which makes these interventions scalable to other school leaders of a similar profile with significantly less capacity building. In a survey of 74 principals across India, nearly all found Rehnuma interventions to be practical and relevant to their context and over 90 per cent believed that their team had the capacity to implement them. Nearly two-thirds (61 per cent) intended to implement between five and ten such practices within their school, and more than 70 per cent reported feeling more confident that they could improve student attendance online after encountering Rehnuma practices.

The various interventions generated because of Rehnuma have been scaled to approximately 200 school leaders of private and government schools, accounting for more than 200,000 students.

CONCLUDING THOUGHTS

In the context of school leadership, entrepreneurship has profound implications for shaping education during and after COVID-19. School leaders can benefit from this approach and guide their schools to build back better through the pandemic and become resilient to twenty-first century challenges such as economic depression, political instability and climate change. Entrepreneurship can help schools promote equity by generating alternate sources of income (e.g. providing community services), making fee structures more equitable. Entrepreneurial principals are also likely to increase student exposure and access to twenty-first century learning opportunities, since school leaders account for 25 per cent of student outcomes (McKinsey & Company, n.d.).

Most research and programmes on school leadership have, thus far, been based on the context of the Global North (GSL, 2020). In this regard, Rehnuma – a leadership programme focusing on entrepreneurship and school management, designed as an incubator – has proven to be an effective structure for articulating, implementing and scaling local practices within the capacity of school leadership. In addition to the direct impact on schools, this structure contributes to documentation and literature on leadership in the Global South, thus creating a democratic platform for the voice, values and goals of principals at grassroots level to shape education.

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Chapter 28. KENYA

Multipronged approach to promote educational continuity

.....Michael Ryan Pakebusch

ABSTRACT

This chapter explores how technology can enable better collaboration, accountability and efficacy among various stakeholders directly involved in a learner’s education. The foci of this chapter are adaptations of distance professional development and at-home learning that consider various digital contexts in Kenya. This case study demonstrates that digital tools provide opportunities to centralize data collection and allow for multiple feedback loops on teaching practices and transformation from school leaders, curriculum support officers and peer teachers. Digital tools also allow for a transparent display of information for all school stakeholders to aggregate information, analyse trends and reflect on school and teaching practices in order to catalyze the improvement of service delivery. Additionally, this case shows us that digital tools, even those as deceptively simple as WhatsApp Messenger, can be utilized during disruptive periods, such as during the COVID-19 pandemic, or beyond school hours, to cultivate meaningful relationships between families and schools to sustain educational opportunities and provide encouragement to caregivers and learners.

KEYWORDS

Teacher professional development, school leadership, digital education, guides for learning at home, school community partnerships, literacy.



BIG IDEAS

Digital tools can extend quality professional and at-home learning by providing stakeholders – at each level of interaction with young learners (e.g. home, school and system) – a platform, with an accessible user interface, that facilitates real-time data collection, collaboration and continuous pedagogical support.scaffolding or support, online learning can be used to promote such professional development

SUMMARY

The COVID-19 pandemic severely affected Kenya’s education system, with all government schools fully closed from March to October 2020, followed by a partial reopening in

October 2020, and a full reopening in January 2021. The Aga Khan Development Network (AKDN), which operates a variety of agencies across the thematic areas of social, cultural and economic development, implemented several emergency COVID-19 educational interventions from the early months of the pandemic to the present day. Two interventions implemented in Kenya, Foundations for Education and Empowerment (F4EE) and ABRA @ Home, are the focus of this case study.

Among other project activities, F4EE combines a multimodal distance professional learning programme on leadership, with pedagogical support in English, science and mathematics. The programme will operate over the next five years to offer a scalable solution to democratizing the professional learning of school leaders and teachers in East Africa (AKFC, 2021 a). F4EE has already reached more than 1,000 teachers, hundreds of schools and, subsequently, at least 200,000 learners in Eastern and Southern African countries, including Uganda, Tanzania, Mozambique and Madagascar (M. WaGioko⁵⁴, personal communication, 18 June 2021). The Kenyan version of this intervention is supported by an adapted early-grade literacy tool ABRA @ Home (now branded as ABRA Offline),⁵⁵ which offers a no-tech, experience-based pedagogy that is appropriately adaptable for the diverse home environments of students in rural, remote and urban settings across Western and Coastal Kenya.

In the first iteration of F4EE during the pandemic, school leaders of every primary school in the county of Mombasa benefited from training in social and emotional learning, value-based education and instructional leadership. The professional learning also included 20 senior education officers from the Ministry of Education (AKDN, 2020). Participants connected the principles and ideas shared during each session with their work and professional experiences and channeled their learning to identify adaptable and adoptable innovations in their own contexts. The last module enabled school leaders to utilize the back-to-school manual, co-developed by the Aga Khan Foundation and the Kenyan Ministry of Education, in order to best prepare their school communities from an education and public health perspective. As for ABRA @ Home, the small pilot was able to officially reach 60 teachers and over 600 students across dozens of schools. Evidence from end-of-project analysis estimates organic growth of the programme during and after the project cycle due to large community demand (AKFC, 2021 b).

54. Dr. Maina WaGioko current serves as the Head of the Professional Development Center at the Aga Khan Academy Mombasa and a primary implementer of Foundations for Education and Empowerment (F4EE)

55. ABRA Offline offers teacher resources [available for download](#).

ENABLING CONDITIONS AND IMPLEMENTATION CONTEXT

The F4EE and ABRA @ Home programmes were created out of pre-existing outreach efforts at the Professional Development Center (PDC) of the Aga Khan Academy Mombasa to enhance the transfer and adaptation of best teaching practices to government-supported schools in both urban and rural communities (AKA, n.d.).

In its official capacity, the Aga Khan Academy Mombasa advises the government on policy and strategy through the Technical Working Group established by the Ministry of Education. The Kenyan Government is expected to scale up professional learning efforts to meet the needs of educators, during and post-COVID, and to continue successful implementation of the competency-based curriculum (CBC).⁵⁶

The education authorities in Kenya have also encouraged innovation and improvement in service delivery. This is demonstrated in its investment in integrating information and communications technology (ICT) in education and partnering with development partners to launch initiatives such as Tusome,⁵⁷ the national early-grade literacy programme that features electronic tablets as a tool for teacher coaching support to improve literacy outcomes for learners from Class 1 to Class 3 (Myers, Kaye & Khalayeh, 2021). Moreover, the Kenyan Teachers Service Commission introduced the position of curriculum support officer (CSO) to be deployed across every county in Kenya; these individuals have been instrumental in supporting teachers with pedagogical improvements (Miricho, 2019).

While the scale-up of programmes such as Tusome has been successful, student-centered digital interventions in countries such as Kenya can nevertheless prove difficult. In a survey administered by Uwezo⁵⁸ during the first months of school closures in 2020, families cited lack of devices, money to buy internet bundles, and electricity challenges to access digital learning, which was the encouraged modality for continuity of learning during school closures (Uwezo, 2020). Overall, it was estimated that roughly 80 per cent of learners were not accessing digital learning in those early months; parental knowledge of educational continuity efforts was also cited as a significant barrier to accessing digital learning, particularly in rural areas (Uwezo, 2020). Interventions introduced during the pandemic had to grapple with the digital realities learners and families from disadvantaged backgrounds faced.

56. The seven competencies of this curriculum reform are: communication and collaboration, critical thinking and problem solving, imagination and creativity, citizenship, learning to learn, self-efficacy and digital literacy.

57. Tusome comes from the Kiswahili word for 'let's read'; the intervention is primarily supported by USAID, FCDO, and RTI International

58. Uwezo is a non-governmental organization that conducts large-scale household assessments in Kenya, Tanzania and Uganda that primarily measure children's literacy and numeracy.

KEY FEATURES AND THEORIES OF ACTION

As previously mentioned, two concurrent interventions began during the pandemic to address the learning challenges caused by the unprecedented disruption of basic service delivery and professional learning opportunities. The first, F4EE, is centered on the practices of teachers and school leaders, while the second, ABRA @ Home, focuses on building more robust connections between families and schools for collaborative learning at home. Both interventions are aided by digital tools to increase communication across stakeholders and improve accountability to changes in pedagogy and student learning support.

F4EE theory of action and key features

The theory of action of the F4EE program is that if school leaders and teachers are offered:

- 1) evidence-based, contextually relevant professional learning and coaching in several modalities focused on addressing the educational impact on students during school disruption;
- 2) scaffolding to develop a critical awareness of the socio-emotional challenges students have faced during the pandemic; and
- 3) opportunities to collaboratively create appropriate school-level support.

Then this will:

- 1) encourage wider-spread participation among educators who traditionally lack access to professional learning;
- 2) enhance the preparedness of school leaders for reopening; and
- 3) augment the capacity of teachers to appropriately adapt classroom practices to meet the needs of re-enrolled students, while empowering their learners to engage in student-centered and socio-emotional learning.

The instructional leadership training modules for school leaders and curriculum support officers (CSOs) from the Ministry of Education were delivered twice a week over three weeks live on Microsoft Teams and asynchronous on Edmodo. Assignments were uploaded in Edmodo for both peer and facilitator feedback. Similarly, the socio-emotional and ethical learning (SEEL) training for teachers was offered through three training modules via Zoom.

Other modalities for implementing this professional learning were used, such as paper-based assignments sent to remote locations via boda boda (motorbike) or two-way communication on WhatsApp. Moreover, the project provided data bundles to educators who requested them and facilitated a short-term agreement with Safaricom, the largest telecommunications

company in Kenya, to provide a zero-rating (i.e. no data usage) for certain websites and resources used for training. The low-tech, low-connectivity context many educators face across Kenya led to creative solutions to education continuity for students as well, one of which was explored for continuing literacy education for young learners in classes 1–3.

ABRA @ Home theory of action and key features

Concurrent with the educational continuity efforts of the F4EE, the ABRA @ Home intervention, derived from a pre-existing web-based early-grade literacy tool designed at Concordia University called ABRACADABRA (A Balanced Reading Approach for Children Always Designed to Achieve Best Results for All), operated as a comparatively small pilot adapted for technology-constrained communities. The digital version of this intervention was previously found to have positive effects on learners' reading skills and pedagogy (Lysenko et al., 2019).

This intervention's theory of action is that if teachers and parents are supported with:

- no-tech, home-based literacy learning tools and approaches; and
- pedagogical support on differentiation, multilevel teaching and experience-based and student-centered learning

Then students will:

- have unconstrained access to continued education opportunities that can be appropriately supported by parents, peers and older siblings and that are flexible to the time-constrained home schedules of students, particularly the most vulnerable students who are expected to do significant house chores or outside labour to support the family.

This pilot project ran for 20 weeks, beginning with a two-day online workshop for teachers. Teachers visited the homes of their students, which served as meeting points for learners and collection points for completed bundles; in some cases, student work (paper-based and tactile activities) were sent back via WhatsApp. Pedagogical-related questions were answered by timely tutorials delivered on WhatsApp over the course of the project. Additionally, the print-based ABRA @ Home allowed for a revision of the materials to include extension activities led by parents that addressed life skills (e.g. science, health and citizenship), building on the content of the stories (AKFC, 2021b).

PROGRAMME IMPACT AND LESSONS LEARNED

From interviews with school leaders and teachers, there were clear capacity gaps that had to be addressed by interventions from both a policy and practice perspective to ensure appropriate preparation for the full reopening of schools and a continuation of education

for vulnerable early-grade learners who were experiencing noticeable learning loss during school closure (AKDN, 2020).

Programme impact and lessons learned from F4EE

The adaptation of professional learning to a virtual setting has been successful in providing access to extended opportunities with an appropriate positive feedback loop from peers and support from government staff. It compares favourably to trainings that are typically described as centralized, disjointed and/or cascaded. Moreover, the virtual format is also flexible enough to fit with the scheduling demands of a typical public-school teacher in Kenya. A recognized, necessary first step with new teacher participants in virtual professional learning in this context was taking time to build virtual learning skills so they could actively engage throughout the programme.

Programme impact and lessons learned from ABRA @ Home

Early in the programme, teachers expressed discouragement when they noted that learners were significantly lacking foundational literacy skills such as phonological awareness. Over time, they noted how learners' enthusiasm for the lessons increased, as well as their proficiency in literacy skills (AKDN, 2020). The research team for this project also observed a growth in teachers' understanding of specific literacy sub-skills and their deployment of several CBC tenets, such as creativity, critical thinking, problem-solving and values in executing lesson activities (AKFC, 2021b). Even after the first phase of reopening of schools in October, local Ministry of Education staff encouraged the continuation of the programme in recognition of its impact.

Energizing and engaging the parents of students was noted as critical to the successful implementation and sustainability of the intervention. The support team for the project sent weekly suggestions in English and Kiswahili via WhatsApp to facilitate this engagement (AKFC, 2021b). For parents who may have limited literacy skills, digital tools are especially useful, as they can enable communication through pre-recorded audio instructions in the spoken language of parents as opposed to written instructions in either English or a local language that are more typical of software programs and print materials.

Moreover, parents and teachers were jointly responsible for ensuring the materials and lessons were portable to fit the needs of individual students. For instance, locally available materials were used to complete daily lessons such as putting letters on seashells, coconut shells and bottlecaps. Students connected lessons to their daily experiences at home and teachers incorporated those environments into the activities (e.g. connecting science readings to students who help cultivate crops) (AKFC, 2021b).

LIMITATIONS TO IMPACTFUL IMPLEMENTATION

Limitations of F4EE

The reported lack of connectivity severely impeded access to professional learning opportunities; missing one session meant teachers would be underprepared for subsequent sessions, creating a cumulative effect. Local adaptations have provided insights as to how WhatsApp can overcome some of these issues and be a legitimate tool for professional learning sessions, such as collaborating in breakout rooms. Given that connectivity issues limited the effectiveness of these opportunities, future implementers should consider how to create accessible asynchronous materials/resources for users to rely on in the case of technology issues. An area of future development of this programme currently being explored is an online, self-paced virtual learning platform that can be continuously accessed by teachers and school leaders across Kenya.

Overall, quantitative data played a limited role in understanding the impact of this intervention, which is partly due to the communication challenges caused by remote data collection. Modelling data collection for school leaders in particular could be a useful exercise to increase adoption of this practice.

Limitations of ABRA @ Home

Assessing the scalability of this programme is difficult since it had significant institutional and financial support from a multitude of partners (e.g. coordinators, trainers and researchers in Kenya and Canada; curriculum support officers from the Ministry of Education). For future implementation, a localized digital mapping of the stakeholders who could reasonably support robust at-home learning would be an appropriate measure for sustainable implementation beyond the project cycle that can be replicable across contexts.

Moreover, although this adaptation appropriately reduced the reliance on digital tools for implementation, low-quality information devices (e.g. audio and video evidence of student work) sent by students via WhatsApp impeded the analysis of actual learning gained. Addressing the cost of data packs, the lack of devices and limited connectivity is critical to any successful digital intervention to improve the interdependency of the various stakeholders in a child's learning.

IMPLICATIONS FOR DESIGNING COLLABORATIVE TEACHING AND LEARNING

Across many contexts at the beginning of the pandemic, caregivers were not appropriately leveraged or empowered as stakeholders jointly responsible for the continued delivery of education during school closures. The interventions that were introduced during the pandemic allow us to reconfigure the roles and responsibilities of all stakeholders in the education sector. Based on prior experiences in digital innovations in education, before and during the pandemic, the clear establishment of these roles and responsibilities, in addition to targeted use of technology, is critical to the success and harmonization of global education reforms to increase the integration of a holistic approach to supporting young learners.

This case demonstrated that digital communication and technology are tools that can improve relationships between families and schools, reinforce mutual accountability for learning outcomes, and lead to collaborations for pedagogical innovation. Additionally, we saw in this case that digital tools can improve accessibility to professional learning and support for teachers and school leaders, which is critical to embracing the pedagogical sophistication learning technology requires and harmonizing the reform of education practices in school and at home. Curriculum reforms, such as CBC in Kenya, offer ample opportunities for early learners to have relevant learning experiences at home, with parental guidance that can be digitally mediated.

To design effective system-wide learning opportunities, governments should consider a model of learning support that allows for more intentional communication between families and schools that recognizes the value caregivers can bring to extending learning beyond classrooms. This case also allows us to reexamine the level of collaboration needed between public schools, private schools and the private sector. Governments should empower school leaders to encourage better integration and leveraging of digital professional learning between private and public K–12 education, as demonstrated by the role that facilitators based at the Aga Khan Academy Mombasa played in the implementation of F4EE and ABRA @ Home. Lastly, coordinating private-sector support, particularly with telecommunications companies such as Safaricom, to expand access to affordable internet and free educational content to marginalized communities can help increase the adoption of digital devices as tools for holistic support of young learners.

TOWARD A FUTURES OF EDUCATION VISION

The underlying strength of the aforementioned programmes is the level of collaboration at all levels that led to a positive impact on students' wellbeing and learning. These projects both

represent a reimagining of the social contract between education and society, as outlined in the International Commission on the Futures of Education March 2021 progress update (UNESCO, 2021). In this case, that meant a closer relationship between school leaders, teachers and parents as they learn to collaborate to guide students through lesson plans and activities.

Since the beginning of the twenty-first century, we have been reminded that attending school does not always mean learning and that learning can occur in a multitude of ways outside of the classroom. Today, we must also remind ourselves that creative solutions to the challenges of the education system lie in the community that surrounds the school, from the insights of traditional leaders and parents to the experiences of school leaders and civil servants.

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Chapter 29. PERU

Teacher professional development in rural areas

..... Franco Mosso Cobián

ABSTRACT

Prior to COVID-19, teachers in rural areas of Peru were systematically given less professional development than their peers in urban areas. This case study presents an innovation that used technology to expand professional development to teachers in rural areas while also transforming the way professional development is designed, implemented and scaled. This innovation was aimed at evolving teacher mindsets about how to exercise leadership in times of COVID-19 and how to lead twenty-first century competencies. There were two defining characteristics: the combination of bottom-up and top-down leadership, and the intensive use of collaboration between teachers as core to their growth. Initial results show promising evidence of changing practices that promote complex thinking in students, student agency and teacher collaboration.

KEYWORDS

Teacher professional development, teacher agency, public-private partnerships, teacher collaboration, bottom-up, teacher mindsets, collective leadership, teacher motivation, communities of practice, teacher networks, rural education, hybrid learning, adult learning.



BIG IDEAS

This case study shows how technology can help expand professional development to teachers in rural areas. It also helps us draw lessons about how top-down and bottom-up leadership can contribute to the implementation of such initiatives, and how teacher collaboration is an enabler of teacher agency and satisfaction with their own learning experience. Finally, the case study also draws lessons regarding three main challenges in implementation. The first is about how to navigate groups with unequal internet access. The second concerns how to help teachers navigate changing and loaded schedules. The third is about how to use technology to expand knowledge-sharing and skill-building among teachers from different locations.

THE PROBLEM AND THE OPPORTUNITY

Teachers in Peru, especially in rural areas, lack professional development. There is poor state capacity to help teachers continuously improve, a phenomenon not unusual in developing countries (Pritchett et al., 2013). According to the Ministry of Education in Peru, in 2018, 63 per cent of teachers did not receive any kind of pedagogical coaching (MINEDU, 2018). Of those who did, typically a teacher experiences only one-on-one interactions with a teacher coach from the district, and almost no collaborative work between peers (MINEDU, 2018). Teacher professional development prior to the pandemic was mostly face-to-face and, in rural areas, implemented mainly by the government.

In this context, two regions used technology to reach more teachers in rural areas with professional development based on teacher collaboration. In both regions, there was collaboration of top-down and bottom-up leadership, and at least one public and private partner.

The theory of action of this initiative is that if a region gathers a core group of top-down and bottom-up educational leaders, and if those leaders benefit from a flexible distance learning system which maximizes teacher collaboration, integration of knowledge and skills, multiple opportunities for application, and collective feedback, and maintains momentum and engagement, then teachers will start changing mindsets about their pedagogical practices and start planning and collaborating in a way which reflects greater agency, thus driving twenty-first century competencies.

THE ORIGIN OF THE INITIATIVE

The initiative took place in Ancash, a mostly Andean region on the coastline of Peru, and Cajamarca, an Andean region in the central north of the country. Ancash employs 19,000 public teachers, while Cajamarca employs 28,000 public teachers. Ancash serves more than 320,000 students, with 30 per cent of them in rural areas, while Cajamarca serves 440,000 students, with 60 per cent of them in rural areas (MINEDU, 2021).

In both cases, the teams from each region collaborated chiefly with Enseña Peru. Enseña Peru is a national non-profit organization that seeks to build a movement of educational leadership at all levels of society, offering leadership and pedagogical development programmes in a variety of modalities. One of them is a flexible programme of modules on twenty-first century competency-based education, formative evaluation, and leadership and change management.

The initiative originated differently in each region. In the case of Ancash, there is a public-private coalition called Efecto Ancash. Enseña Peru – a member of this coalition – the regional education team and one of the 20 districts built a core team of 23 professionals to take two initial modules: ‘How to lead competency-based education’ and ‘How to manage change through adaptive leadership’. Due to its success, the leaders of the regional team decided to make these modules a formal element of Ancash’s education strategy, and scale it through the whole region. In the case of Cajamarca, Enseña Peru worked for four weeks with a team from the region and its 13 districts to design a new system of in-service teacher development, called Programa SER. This new system would later become one of the pillars of their new regional educational strategy, DECO (Desarrollo para la Comunidad) schools – “schools that bring community development”.

In both cases, the planning effort involved leaders from regional and local offices of education, as well as teachers and principals. These individuals participated in gathering information from the field through surveys or focus groups, co-creating and iterating the sessions for teachers, and evaluating progress.

There were three main factors that supported this re-shaping of policy. The first was a strong degree of relational trust (Bryk et al., 2002) between leaders across organizations and levels, built over two years. This led to a willingness to combine organizational capabilities to adapt the system’s capacity to serve their teachers. The second was that both regional and district departments of education as well as Enseña Peru had a core of financial and human resources devoted to developing this new system. The third was that both regional and district departments of education as well as Enseña Peru shared a nuanced understanding of the problems teachers faced in the field.

IMPLEMENTATION AND KEY FEATURES

Phase 1: A multi-level core group

The first stage of implementation was the selection and empowerment of a core group of approximately 250 master teachers in each region. This task was the responsibility of the regional and district departments of education. In the case of Ancash, the core group was entirely composed of the teams that worked in the 20 districts – approximately 13 participants per district. Cajamarca selected its leaders based on professional references. For each of its 13 districts, the regional team selected approximately 20 to 25 leaders, each group comprising a district leaders, principals and classroom teachers, a mixed cohort approach. In both regions, the regional team was also included and attended all the training sessions.

Both groups were set to take three initial modules: How to lead twenty-first century competency based education; formative evaluation; and leadership and change management. In both cases, the core group attended the modules for a period between three and four months. The modules were created by Enseña Peru and further adapted with a team of local and regional leaders.

Each module was created as a learning ecosystem, with multiple ways of learning: The virtual portion was comprised of four to six core sessions, two or three optional sessions for collective reflection, three ‘laboratories’ exclusively dedicated to peer and expert feedback, an personalized line for consultation with module experts through WhatsApp, a Google Docs forum, a repository of videos and readings, and asynchronous group work. The face-to-face section was driven autonomously by educators, who sometimes met online and sometimes in person to create products, applying knowledge and skills from the modules.

The design characteristics of the learning experience bear a resemblance to the research-based characteristics of teacher professional development introduced by UNESCO, all of which contribute to a more impactful experience (Timperley, 2008):

- ***Student-valued outcomes were at the center of the discussion:*** The training emphasized the link between teachers’ actions and twenty-first century competencies present in the national curriculum, such as leadership for the common good, agency in learning, collaboration and complex thinking.
- ***Helping teachers to translate content and skills from modules to their contexts:*** No new formats or worksheets were introduced. All the training promoted the implementation of core principles and worked within the state formats that teachers already used. Bottom-up leadership was key because the teachers’ role was to use the skills and knowledge of the modules to contextualize their work and then receive expert feedback to improve how they were contextualizing.
- ***Meaningful integration of knowledge of curriculum, how to teach it and how to evaluate it:*** The topics covered in the modules were presented as a whole system of principles that integrated deep knowledge of the nature of competencies, how to evaluate them and how to create learning environments for their development. Furthermore, the leadership module was integrated to support understanding of the challenges participants would face when scaling this training throughout the whole region, and to bolster their effectiveness in driving change in teachers’ mindsets and practice.
- ***Multiple opportunities to apply and receive feedback in an environment of trust:*** The modules were facilitated to emphasize a combination of psychological safety and gradual challenges so that the participants would continuously share their personal experience and challenge themselves to consider and apply emerging ideas. Careful consideration was taken to build a culture of inclusive language, ‘errors as

opportunities, critical friendship, acceptance of different views, cultural awareness and celebration of progress.

- **Connecting new mindsets with previous knowledge and mindsets:** In each session, teachers experienced a combination of personal storytelling from the facilitator, related to each of the theoretical concepts developed, multiple interactions with instant online polling, small group practical challenges, direct explanation of concepts, and deep reflection on participants' personal stories of when they themselves were students at school. This combination was intended to support the revision of paradigms in pedagogical practice and not just the transmission of new techniques.
- **Maintaining momentum with leadership and organizational support:** Leaders from Enseña Peru, the regional department of education, district leaders, and groups of teachers and principals held regular meetings to discuss progress, analyse data together, and plan adaptations to the training. They also tried to create the organizational setting to allow teachers to follow the programme. This included formalizing it as a part of the region's policy, leaders from the government advocating for teachers to embrace new paradigms, and creating inspirational conferences where teachers could gather and gain further motivation.

It is worthwhile emphasizing that there was a system of continuous collaborative improvement. The Regional Department and teams of districts organized themselves (sometimes virtually, and sometimes in person) to produce improved curriculum or to solve change-management cases, as evidence of their progress. Each team then presented their work and received peer and expert feedback. In the case of Cajamarca, the core group held over 60 meetings in addition to the modules to continuously improve and receive feedback on the creation of units of learning which promoted agency and complex thinking in students.

Phase 2: Scaling together

Following the core groups' preparation, both regions planned and led the scaling of the training. In both regions, the team of 250 master teachers drove the effort by:

- further contextualizing the modules to the realities of each region;
- producing complementary regional and local guides for teachers;
- delivering the training module to all teachers in their region;
- gathering further data from all participants.

Through the scaling, Enseña Peru effectively used the data gathered from teachers and actively contributed to securing quality, by continuously supporting the 250 master teachers from each region.

RESULTS, LESSONS AND IMPLICATIONS

The evaluation of this initiative was based on the triangulation of three sources of information: surveys of teachers who benefited from this system (either master teachers or teachers from the scaling phase), reviews of units of learning to observe if they reflected changes in educational practices, and focus groups with the core group. The following changes were observed:

- The units created by teachers improved by creating opportunities for complex and unstructured thinking, fostering agency by inviting students to shape their own learning projects, and integrating formative evaluation practices such as constructive feedback.
- Over 90 per cent of participants reported satisfaction or high satisfaction with the modules, with over 90 per cent reporting that they were partially or completely using the principles they had learned to lead twenty-first century competency-based education in their classrooms. In addition, more than 75 per cent reported feeling more confident in developing competencies through distance education.
- Teachers who gathered in multiple focus groups three months after ending the modules reported implementing practices of: integrating planning and formative evaluation as a joint process, building planning that allows for constant learning at different student paces, increased collaboration between teachers, creatively adapting the curriculum from the government, and fostering student agency.

There are two lessons and implications that can be drawn on in envisioning the future of professional development for teachers in rural areas:

- ***Technology can accelerate the collaboration between bottom-up and top-down leadership at all phases of planning and implementation:*** The core group must include a mix of teachers, principals, district leaders and regional leaders, who should build a shared language of how to implement the modules. This enables regions and districts to become better learning organizations (Senge, 2014).
- ***Technology and hybrid programmes can catalyze collaboration among teachers:*** A key to the initiative was the role of participants collaborating among themselves beyond their direct networks. Whereas face-to-face systems provided limited opportunities for exchanging with other colleagues, technology now provides an opportunity to maximize the exchange of feedback, knowledge and motivation. Building local coalitions of practice enabled by technology might be especially relevant for rural areas.

There were some challenges that have important implications for the future of such initiatives:

- Some teachers had difficulty with the internet connection, and that made it difficult for them to engage live in the sessions. To mitigate this, all sessions were recorded and distributed, but some teachers missed the chance to experience a trusting and challenging environment, as recommended in academic literature.

- Sometimes teachers had overlapping meetings (from school or from the district), and that created difficulties in engaging properly. This was addressed later through improving scheduling for teachers to ensure they had a more organized experience, and through opening asynchronous channels to solve questions.
- The knowledge and products created by teachers had limited channels for dissemination across the whole group. Perhaps investing in better technological systems that give adaptive and prompt access to the best ideas of their peers – beyond Facebook, WhatsApp groups and group sessions – might be an option for the future.

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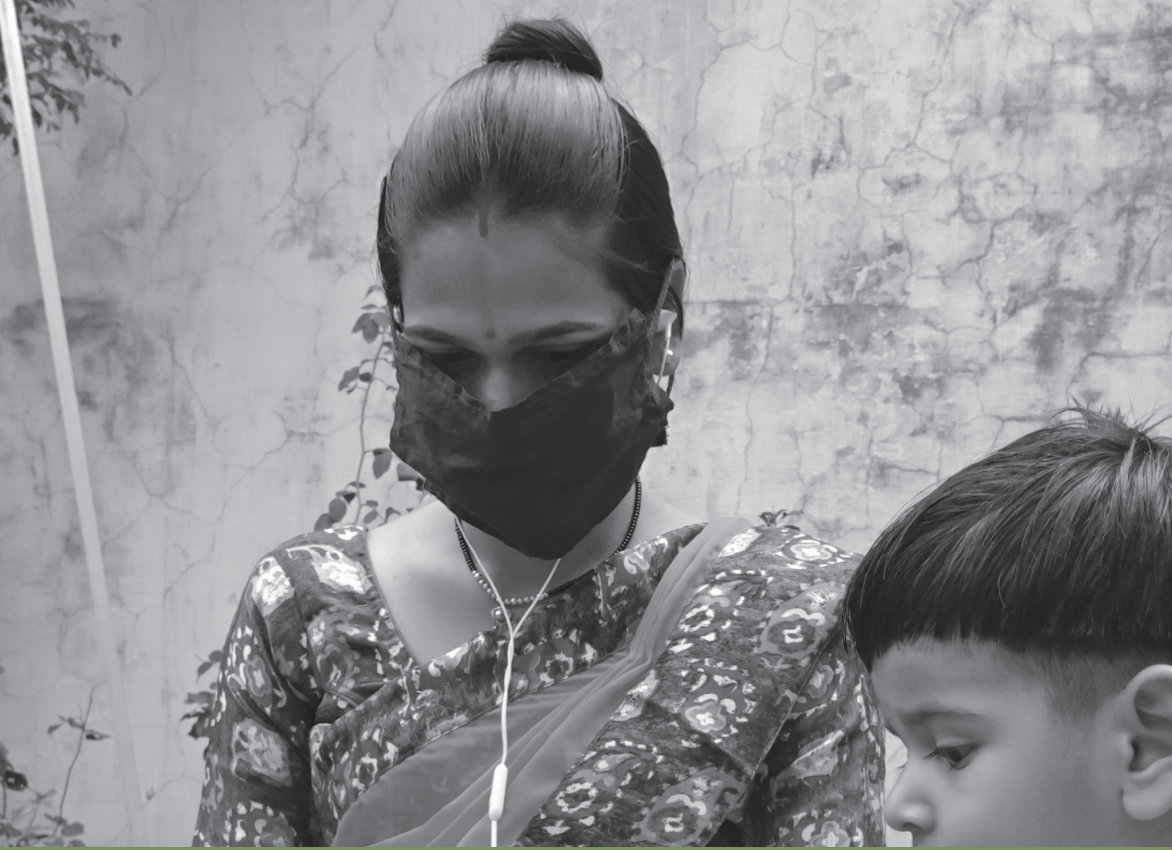
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Disclaimer of positionality The author was a part of the case, as CEO of Enseña Peru at the time, and participated directly in the creation of the modules discussed.





INNOVATIONS SUPPORTING
FAMILY ENGAGEMENT



Chapter 30. INDIA**Rocket Learning: Leveraging technology to improve parent engagement for early learning**

Aditi Nangia and Revanth Voothaluru

ABSTRACT

Education delivery in India was severely disrupted by the COVID-19 pandemic. In most states, remote learning programmes adopted by governments delivered instructional content through WhatsApp using mobile phones, television or radio, all of which rely on independent self-paced learning and parental support. Rocket Learning is a student-centric, WhatsApp-based early childhood education programme that enables parents to ensure learning continuity for their children. It is operated by a non-governmental organization that focuses on strengthening foundational learning in India by partnering with state governments and working with teachers, block officers (local officials) and Anganwadi workers (community based, frontline workers) in the government system. Rocket Learning uses WhatsApp-based teacher-parent groups to share activity-based learning content for numeracy, language and socio-emotional skills, aligned to an age-appropriate early learning curriculum. Peer support from other parents in an online community combines with social incentives to drive participation increased parent engagement. Even with limited early evidence on the effectiveness of the programme in improving outcomes for the user-group, the product has demonstrated potential for improving parent engagement for at-home early learning. The product leverages WhatsApp, a free and popular social media platform (ASER, 2021), and uses non-financial incentives to sustain engagement, making this a scalable model for parent-led early education during COVID-19. This is one of the few learning initiatives available to low-income communities in India that focuses on facilitating two-way communication between teachers and parents. The organization's theory of change focuses on leveraging the government's push and then creating social and technological pull to facilitate parental behaviour change and action. The programme was launched in Chandigarh, Haryana, Maharashtra and Uttar Pradesh in 2020/21 across 20 districts, impacting 200,000 students. Though the model outlined below was implemented in response to the pandemic, it can be adapted to a blended learning model to improve access to early learning opportunities and strengthen parent-school partnerships once schools reopen.

KEYWORDS

Parenting education/parenting support, at-home learning, early childhood education, digital education.



BIG IDEAS

The partnership of teachers and parents is crucial for strengthening learning at home. Parents from low-income households can actively support and lead at-home educational activities for children in their early years. Rocket Learning is a scalable, AI-powered edtech programme delivering engaging material for children ages 3–8 years in the home language through parent-teacher WhatsApp groups. Activity-based content and regular report cards, coupled with non-financial incentives to reward consistency, help ensure continued engagement.

IMPACT OF COVID-19 ON EDUCATION IN INDIA

Education delivery in India was severely disrupted by COVID-19. Prolonged school closures between March 2020 and June 2021 resulted in the loss of over 200 face-to-face school days in the 2019/20 and 2020/21 academic years. Students in grades 1 to 5 did not have the opportunity to go to school for almost 16 months. While some states re-opened schools for grades 8 to 12 in January 2021, the devastating second wave in April and May 2021 resulted in further school closures (Indian Express, 2021). A study conducted in 2020 suggests that, on average, 92 per cent of children in class 2 and 89 per cent in class 3 had lost at least one specific language ability (such abilities include describing a picture or an experience orally; reading familiar words; reading with comprehension; writing simple sentences based on a picture), while 82 per cent of children had lost at least one specific mathematical ability compared to the previous year (APU Research Group, 2021).

Most state governments invested in remote learning strategies that delivered educational content through television, radio and WhatsApp (Ministry of Education, 2021). More than 62 per cent of rural households in India have a smartphone and that number is expected to continue to increase every year (ASER, 2020). Remote learning requires students to demonstrate a degree of self-directedness which younger children may not naturally demonstrate (Mathewson, 2020). The role of a parent or guardian in supporting the process of learning is crucial to the success of remote early-learning programmes (Desforges, 2003).

In pre-pandemic India, there were limited large-scale systematic efforts to engage with parents to teach children at home. Global examples of programmes that engaged with parents to advance early learning include the Read@Home programme in Macedonia that aimed to take the reading, learning and play materials into homes, targeting children aged between 3 and 12 years and supporting parents to engage in children's learning. In India, Rocket Learning launched a large-scale, not-for-profit initiative in 2020, which linked the government system with parents and communities, using technology, media and social influence to improve access to early childhood education.

ROCKET LEARNING'S THEORY OF ACTION

More than 85 per cent of brain development occurs by the age of 8, yet low-income children in India do not have access to any sort of quality learning, either through institutions or through their parents. Public schooling in India starts at the age of 5 in Grade 1. Prior to this, the department for women and child development coordinates with households for early childhood care and education, through *anganwadis* (centres providing care for mothers and young children). *Anganwadi* workers are community based, frontline workers promoting maternal and child nutrition, health and early education, with limited qualifications and training in teaching. Rocket Learning is a non-profit organization that seeks to change the inequality faced by students in poverty by leveraging technology, media, and age-appropriate, stimulating content, and strengthening parent-teacher partnerships, in collaboration with state and district government education departments and the department for women and child development in Chandigarh, Uttar Pradesh, Maharashtra and Haryana. Some 200,000 students are enrolled in the programme. WhatsApp enables a wider reach and a two-way communication channel between parents and teachers through government-anchored groups (classroom communities).⁵⁹ The technology, media and content are designed for parents who own a smartphone or a feature phone, with limited network or WiFi access, and who lack the motivation or know-how to curate learning experiences for their child. The programme focuses on improving parents' capabilities, confidence and beliefs in their role as active contributors to their child's learning (Mapp and Kuttner, 2013).⁶⁰ Continuous engagement with the content is ensured through 'AIM': Aspiration, Information and Motivation/Measurement.

- **Aspiration.** Parents need to be aware that foundational learning is key to long-term achievement and that they can aspire to support the learning process of their children, as much as their high-income counterparts.
- **Information.** Parents are informed about activities and content for facilitating learning using the resources available at home and receive feedback on their support through teachers.

59. Note: More than 50 per cent of rural households in rural India have access to smartphones with WhatsApp and more than 70 per cent in urban/semi-urban areas.

60. A Dual Capacity-Building Framework for Family-School Partnerships by Karen L. Mapp and Paul J. Kuttner identifies 4 Cs for capacity building to improve parent-school partnerships: Capabilities, Connections, Confidence and Cognition.

- *Motivation and measurement.* Consistent measurement of student learning progress, coupled with non-monetary social rewards for parent participation, ensures that motivation is sustained continuously.

Rocket Learning works with district- and block-level (smaller administrative units within a district) officials in the state government to engage them in the WhatsApp groups. The parent-teacher WhatsApp groups in this programme have the Rocket Learning interface phone number added in the group. This connects the groups to an artificial intelligence backed technology stack, which regularly sends out learning material, report cards, rewards and reminders. Digital training sessions and step-by-step videos with instructions for using WhatsApp groups help teachers familiarize themselves with the platform and their roles as anchors of the classroom community. Easy-to-understand, curriculum-aligned activity-based content, and quizzes in the local language, are shared in the groups. Active parents respond by sending videos of their child performing the activity (e.g. arranging commonly found household items in patterns, identifying shapes in their surroundings, reading texts, describing pictures, reflecting on their own experiences using a stimulus, etc.).⁶¹ The momentum of parent engagement is retained through media campaigns, regular quizzes and group compilations.

Figure 1. Examples of student engagement certificates

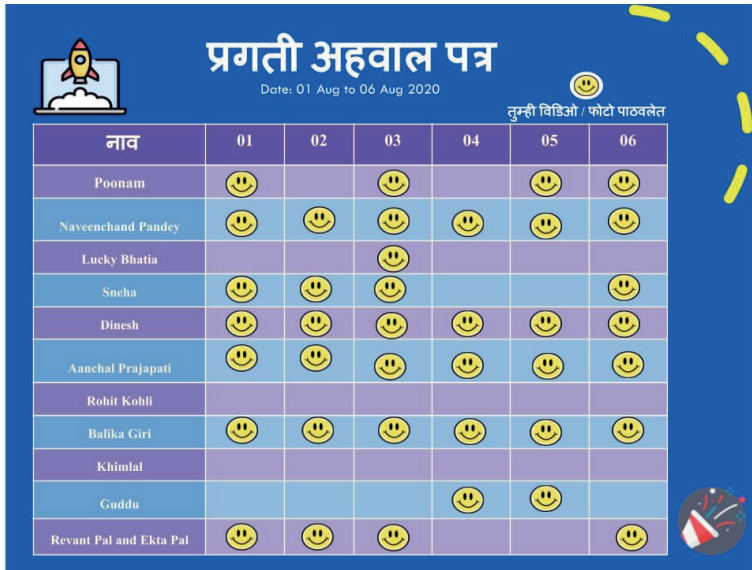


The programme motivates teachers, parents and administrators, both as individuals and groups, through social incentives, non-monetary rewards and incentives, theme-based campaigns, progress report cards, and certificates. For example, families receive an 'activation certificate' the first time they respond in the groups. They receive a 'challenge certificate' when they respond to a challenge shared with them and a 'monthly champion certificate' if they respond to the group every week of the month. There are also weekly report cards with smileys and monthly badges that are shared with parents. Most importantly, in these digital communities, there are significant peer effects: the 'early adopters' on the group

⁶¹. An illustration of Rocket learning's parent-teacher engagement using WhatsApp can be [accessed here](#)

inspire other parents to also undertake learning activities and share the outcomes, while the presence of community members leads to social validation and recognition much as self-help groups do in the physical world).

Figure 2 - An incentive report in Marathi summarizing student progress throughout the week



Teachers, supervisors and other officials can access the data about student participation, student responses and parent engagement through the data analytics presented by the technology stack. This can help the stakeholders make informed decisions in further supporting student learning.

Figure 3. Dashboard for teachers, supervisors and officers

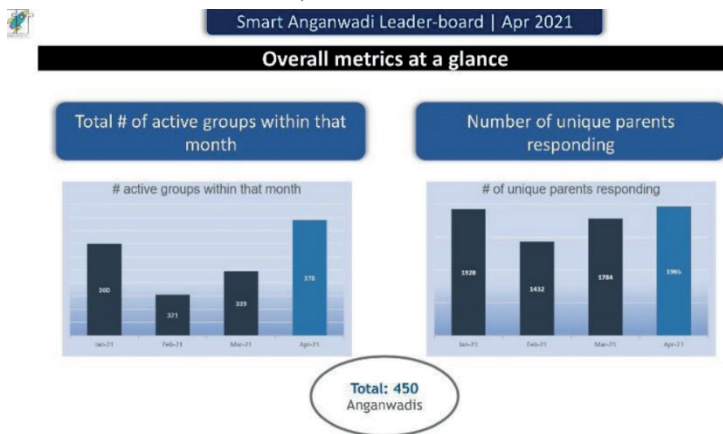
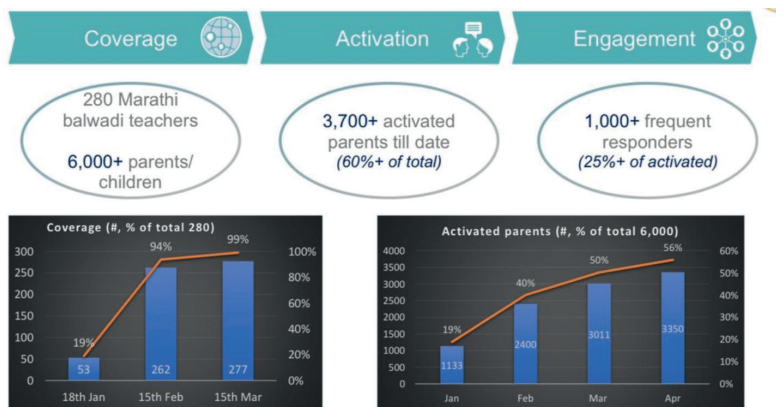


Figure 4. Dashboard for teachers, supervisors and officers



IMPACT

Rocket Learning works with 20,000 government schools across four regions in India, with more than 200,000 students enrolled in the programme. Between 40 per cent and 50 per cent of parents are active users who regularly respond to teachers’ prompts on the WhatsApp group. A research study in select blocks in the districts of Lucknow and Varanasi, in Uttar Pradesh, found that treatment groups with the Rocket Learning programme had between seven and 10 times as much parental engagement (in terms of homework responses on WhatsApp groups) as the control groups in March and April 2021. These data on parent engagement in low-literacy environments are encouraging for large-scale programmes in early learning. Rocket Learning is partnering with the Massachusetts Institute of Technology’s – Abdul Latif Jameel -Poverty Action Lab to conduct learning outcome evaluations.

As a part of the monitoring and evaluation of the programme, user testimonials were collected from parents. Parent Aman Kumar said: ‘My daughter used to go to Anganwadis before but right now they are learning through WhatsApp. I am grateful for this programme.’ Other parent testimonials included: ‘The activities that are sent are very engaging. As parents, we also enjoy facilitating these activities for the students’ and ‘Children were getting restless at home, and we were unable to engage them in any way. From the time these WhatsApp groups started, there has been engagement and learning happening for the students.’

To measure the impact of the intervention on learning outcomes, a sample study was conducted between September 2020 and January 2021 in Chandigarh. In total, 212 students were assessed using the World Bank/Centre for Early Childhood Education and Development (CECED) assessment tool which measures pre-literacy, pre-numeracy and cognitive development. The data suggest that students enrolled in the programme scored

eight percentage points higher than those who were not enrolled. It was also noticed that the local average treatment effect (determined by subtracting the average potential outcome for compliers when they receive and do not receive the treatment) was significant ($p < 0.0000549$), with a standard deviation of 0.544 units.⁶² Further research studies are underway to determine the impact of blended learning and gains in student learning, and to understand teachers' and parents' behaviour patterns in the programme.

IMPLICATIONS OF THIS MODEL FOR THE FUTURE OF EDUCATION

With increasing reliance on technology for education, WhatsApp provides an opportunity to strengthen parent engagement through two-way communication and this channel will continue to be a powerful idea for the future.

Addressing gaps in foundational learning: Post-COVID-19, learning loss for students in elementary grades is predicted to be high (APU Research Group, 2021). Strengthening foundational concepts and accelerating the process of learning is of utmost importance in reducing learning poverty (World Bank Group, 2020). Though the role of schools is indispensable in student learning, children spend more time at home with their parents. Supporting the parents to facilitate students' foundational learning can help reduce learning loss. Parents can be equipped with easy-to-implement activities that improve basic numeracy, literacy and socio-emotional skills. When schools reopen, this model could be effective in supplementing learning in the classroom by providing students with additional opportunities to learn/practice at home.

Partnering with parents: In the past, the channels to facilitate teacher-parent partnerships were both time- and resource-intensive. In many schools, parent engagement is facilitated through periodic parent-teacher conferences or school management committee meetings. Often, these interactions offer limited space and time to educate low-literacy parents on their role in facilitating learning. While educators recommend that parents support student learning at home, in the absence of specific methods, activities and instructions these interactions may be less than adequate when it comes to improving children's learning outcomes. Parent-teacher communication on Rocket Learning's WhatsApp groups is fast and simple. Interactive content, frequent nudges and feedback loops address the lack of clarity which prevents

⁶². Rocket Learning's data on learning outcomes suggest that 92 per cent of children involved in the programme have achieved age-appropriate numeracy outcomes (which include outcomes such as identifying 'less vs more', recognizing and matching numbers, etc.). Ninety per cent of students achieve age-level literacy outcomes (on learning outcomes such as describing a picture in sentences) and 61 per cent are able to complete complex cognitive tasks (such as completing a difficult pattern). However, the data doesn't represent the isolated impact of the programme on learning outcomes.

parents from engaging in their children's learning through targeted, specific messages with a call to action. Parents can access the teacher's instructions at their convenience, from their homes. Frequent incentives for active parents motivate them to be consistent. This eliminates the need for any additional digital literacy skills among both stakeholders, which could otherwise hamper the use of such a digital learning programme.

Collective action for facilitating learning: A wide range of stakeholders influence student learning, either directly and indirectly. For scaling an innovation that bridges gaps in the education system, all the major stakeholders involved need to understand their role in addressing the problem (Cohen & Mehta, 2017). Rocket Learning drives a collective action in all these stakeholders (parents, teachers, block officers, etc.) by creating school-home digital connections. The push from district-level officials is followed by implementation through teachers to nudge parents to respond to the online learning community.

CONCLUSION

In the twenty-first century, technology provides instant access to a wealth of knowledge and facilitates easy communication through mobile devices. While technology has been integrated into classroom instruction over the last decade, it presents numerous opportunities to facilitate at-home learning, especially for children in low-income communities. Parents' lack of know-how and confidence in their ability to support student learning, limited access to mobile data, and the absence of digital literacy skills continue to be challenges which need urgent attention. Scaling this model to other contexts will involve addressing these challenges. Strengthening parent-teacher partnerships is key to effective learning at home and effective blended learning programmes when schools reopen can help decrease the widened learning gap caused by COVID-19. Before the pandemic, parental engagement in education for the vast majority in low-resource settings was incidental. This model has the potential to engage parents and make them active stakeholders in student learning in the future.

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The authors believe in empowering parents to become active participants in improving education in low-income communities. Our representation of Rocket Learning's work is in line with this belief and we have no conflict of interest.

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Chapter 31. SOUTH AFRICA**Schools as learning hubs for family support**

Shirley Eadie

ABSTRACT

Together In My Education (TIME) is an intervention conceived of and delivered during the COVID-19 pandemic in South Africa. The TIME project supports the development of skills, knowledge, confidence and belief systems (Mapp & Kuttner, 2013) of both schools and families, so that they are empowered to work in partnership and share responsibility for young children's learning to achieve improved learning outcomes. It demonstrates the potential for system take-up and policies that prioritize community involvement and use schools as learning hubs. This case study shows that, in contexts characterized by digital exclusion and poorly resourced schools, highly structured at-home approaches that foster caregiver involvement in early-grade learning are achievable via targeted professional development, building networks of collaboration and scaffolded family engagement.

KEYWORDS

At-home learning, early childhood education, guides for learning at home, school-community relations, parenting education/parenting support, teacher mindsets.

**BIG IDEAS**

What is the future of remote and digital learning for early-grade learners, in education systems battling significant digital exclusion and poorly resourced school and home environments? Here we explore the potential of highly structured home-school learning programmes - that equip caregivers, educators and learners with the tools for learning at school and at home – and how home-school partnerships can centralize student learning and enable schools as learning hubs.

INTRODUCTION

Prior to the onset of COVID-19, the South African basic education sector was known as 'bi-modal', a term used to describe two parallel, yet distinct, schooling systems. One is functional, wealthy, and equips learners with globally competitive skills. The other, made up of over 75 per cent of schools, is dysfunctional, poorly resourced, and unable to equip learners

with the skills they need (Spaull, 2013). The 2016 Progress in International Reading Literacy Study (PIRLS) found that 78 per cent of fourth-grade learners cannot read for meaning in their home language (Howie et al., 2017). Less than half of children who start school in kindergarten, go on to complete twelfth grade (Spaull & Jansen, 2019). In a country battling the highest levels of inequality in the world, this schooling system is replicating and deepening the poverty and privilege divide.

Like the world over, these inequities have been exacerbated by COVID-19. Children attending fee-paying public or private schools were largely able to continue their learning remotely, thanks to digital access, adequate levels of digital literacy, and a home environment conducive to learning. Most students, however, were not so fortunate, and learning came to an abrupt halt. Children in non-fee schools learned 50–75 per cent less in 2020 relative to normal learning (Spaull et al., 2021).

Providing a continuation of learning opportunity across this vast economic and social spectrum of 13 million learners and 25, 000 schools was, understandably, a significant challenge. COVID-19 response measures ranged from online learning for the minority of learners with access to devices and connectivity, to national free-to-air lesson broadcasting for learners reliant on TV and radio access, or WhatsApp and SMS ‘classrooms’ with teachers engaging learners remotely. One segment of learners, however, fell outside of the range of these efforts. Poorer, younger learners were in a triple bind – unable to lead their own learning, in home contexts with severe structural barriers to digital learning, and at the age where learning loss matters most.

In this case study, we will explore one innovation that delivers remote learning opportunities for this vulnerable group, unpacking why this approach matters now and how it might shape the way we reconsider education in the future.

A HYBRID HOME-SCHOOL EARLY-GRADE LEARNING MODEL

Together In My Education (TIME) is a high-quality, structured home learning programme used by parents and caregivers⁶³ with kindergarten and first grade learners. It aims to develop a culture of learning at home, to improve relationships between schools and homes and, ultimately, to close early learning gaps by advancing learners’ language, literacy, mathematics and socio-emotional skills.

The TIME intervention, endorsed by the Western Cape Education Department (WCED), was designed and delivered by Wordworks, a non-profit organization that focuses on early

⁶³. Given the high incidence of households with neither parent available to the child, the term ‘caregiver’ will be used rather than ‘parent’ throughout the case study.

language and literacy development in the first eight years of children's lives. Costing 50 ZAR (approximately 3.50 USD) per year per learner, for the weekly provision of hard-copy materials for 32 weeks, this initiative shows potential for scale.

Families receive hard-copy materials via their school, organized in weekly activity cycles, each based on a story theme. Each week consists of five 20- to 30-minute activities that develop language, mathematics and socio-emotional skills, while promoting engagement via games, physical play, contextual learning and creative expression. Teachers are equipped to support caregivers to guide the learning process via weekly broadcast messages using WhatsApp and Moya (a data-free messaging platform), linking to text, audio and video on a data-free website. A physical activity record helps learners develop metacognition by tracking their learning progress and builds connections between home and school by sharing regular updates with teachers. Packs are provided in the three major languages for the Western Cape: English, Afrikaans and isiXhosa.

A network of non-governmental organizations (NGO's) plays an important partnership role in programme delivery, bringing local expertise to support school leadership, community development, materials development⁶⁴ and early learning⁶⁵.

While this intervention addressed a critical need during learning disruption in South Africa, the longer-term transformative potential of such an approach must be considered as rebuilding education post-pandemic begins. After all, what is innovative about distributing hard-copy materials? The innovation here lies in establishing a highly structured approach to creating the conditions for reimagining schools as learning hubs, where home-school partnerships prioritize student learning.

Looking at the initial learnings emerging from TIME, in the second half of 2020 more than 40,000 learners were reached monthly, increasing to 47,682 learners per month in 2021, across 219 schools (Together In My Education report, 2021). While it is too early to understand the impact of the TIME intervention on child learning and development, a comprehensive exploratory field study has provided insight into programme effectiveness. The following learning emanates from research conducted from July to September 2020, where 548 teachers from 159 schools provided feedback (Wordworks, 2021). Teachers estimated that 82 per cent of participating homes received the materials - 57 per cent of which collected from schools, and 32 per cent sent home with children. Most teachers (81 per cent) rated the home learning materials as an effective way of teaching early literacy and mathematics skills, as outlined in the annual teaching plans. Nearly all teachers (92

64. REDINK is a key partner in early-grade resource development

65. Updated list of TIME partner NGOs is [available here](#)

per cent) felt the materials were accessible, rating them as very easy, easy (60 per cent) or somewhat easy (32 per cent) for caregivers to understand. Acknowledging the complexity in understanding the take-up of materials at home, teachers were asked to use their professional judgement on the matter. Teachers felt that over half the class was using the materials at home (70 per cent), with a 37 per cent return rate of the activity records.

Turning to support provided to teachers and caregivers, 84 per cent of teachers said they found the weekly messages very helpful or helpful, with a further 15 per cent saying they were moderately helpful. Teachers expressed a slight preference for video and text format over voice notes. More than half of teachers (63 per cent) said they always passed the messages on to parents, while 26 per cent said they sometimes did. Almost 60 per cent of teachers reported relying solely on WhatsApp to share messages with caregivers. In summary, these survey results indicate that teachers assess the TIME materials as being accessible and pitched at the right level for learners and caregivers, with an appropriate level of teacher support.

There are several challenges and limitations of the TIME intervention to consider (personal interview with S. O'Carroll, founder of Wordworks, 2021). For example, caregivers whose home language differs from the language of schooling are likely to find their ability to support learning at home limited. Another issue concerns assessment of impact. Many of the schools participating in TIME were involved in preexisting programmes to support parental involvement, it is not clear the extent to which take-up of TIME depends on previous cultivation of this 'fertile ground'. It also become clear that programme success depends on teacher motivation, as they are primary mediators of materials and messaging. Furthermore, the at-home approach of TIME makes quantifying learner outcome gains challenging. Finally, and critically, the most vulnerable learners and families are less likely to have time and resources to bring to this programme. To ensure equity, these families require additional resourcing and support.

UNDERSTANDING WHY THE TIME PROGRAMME MATTERS NOW

At a time when education has been disrupted to the extent that it has, governments and communities the world over are rethinking how, where and why we educate. Here we consider how the TIME programme has contributed to laying the foundation for a transformational and sustainable approach to building back better, and why it matters at this juncture in our educational evolution:

- ***Reshaping the social contract between schools and communities:*** Significant change in society requires planned and coordinated adjustments in the implicit agreement between members of a society to cooperate (Deming, 2020). Central to the TIME model

is the formation of a social contract between schools and communities, that sets the expectation that learning can happen from home, requiring mindset and behaviour shifts by all involved.

- **Providing appropriate scaffolding in the midst of change:** Careful consideration was given to the provision of appropriate levels of support for teachers and caregivers, as all embarked on a format of learning that was entirely new and uncharted.
- **Expanding the notion of the educator:** Increasing caregiver involvement in active learning requires that both teachers and caregivers rethink their roles. The teacher's role extends beyond the classroom to reach the home, and caregivers are called to acknowledge the significant contribution they can and must make to support their child's learning journey (Mapp & Kuttner, 2013).
- **Centring relationships in learning:** The TIME model centralizes relationships in the learning process, acknowledging that learning is, at its core, a social process (UIL, 2020). TIME encourages affirming interaction between caregivers and children, discouraging punitive responses to mistakes and creating positive learning routines in homes.
- **Prioritizing engagement:** It was widely acknowledged that children who felt disengaged from school during the pandemic were more likely to drop out of school. One key goal of TIME was to keep learners and families engaged in learning.

AT-HOME LEARNING BEYOND A PANDEMIC

The TIME programme has taken an approach to innovation that starts where the South African education system is and opens the door for increasingly rapid and sustainable change over time, thanks to the school-community ties established at the heart of the intervention.

Perhaps though, prior to considering future possibilities, it is worth pausing to consider the argument for at-home learning beyond the pandemic. Why, if schools are open, should education systems consider continuing home learning approaches with early grade students? At the heart of the argument is the potential to influence early childhood development through active caregiver involvement, as well as the opportunity to dilute the overreliance on resource constrained school environments, where increasingly overcrowded classrooms limit the teacher's ability to provide quality individualized learner attention. Finally, there is an opportunity to embrace inherent cultural capital and honour families' funds of knowledge (Mapp & Kuttner, 2013) in the home by supporting caregivers – many of whom might not have completed high-quality education themselves – to confidently involve themselves in the child's learning.

FUTURE IMPLICATIONS AND POSSIBILITIES

As we look forward, and in the spirit of the Futures of Education initiative, we allow ourselves to imagine several implications of, and possibilities arising from, the foundation laid by TIME and similar programmes, and how this might contribute to building education back better, with the goal of producing lifelong learners who are equipped to actively and purposefully participate in society (Dede & Richards, 2020).

- **Schools as learning hubs:** As the lines between school and home become increasingly porous, so the idea of schools evolving into hubs of learning becomes a possibility (McShane et al., 2012). Such a school would be a place where learning hours are extended, and students of all ages can learn anytime, in various hybrid formats; a place where the notion of an educator is expanded to include community members and caregivers, and where valuable knowledge and skills are exchanged amongst lifelong learners. To house such reconfigurations to our concept of schooling, the school itself needs to become a learning organization. Schools must move from rigid, bureaucratic and hierarchical to spaces that embody collaboration, adaptability and autonomy. These spaces should take cues from, and interact with, their evolving environments and modify behavior to reflect new knowledge or insights (Kools & Stoll, 2016).
- **Augmentation of teacher effectiveness:** Teachers' effectiveness will be augmented by their ability to embrace blended learning methodologies that enable and enhance learning at school and at home. The pedagogical repertoire of teachers will expand to weave asynchronous instruction with synchronous and face-to-face learning, supplementing how teachers operate and how information is shared with caregivers and children (Kimmons et al., 2020).
- **Developing a breadth of competencies:** By deliberately and systematically infusing the development of socio-emotional skills and twenty-first century competencies (e.g. creativity, critical thinking, communication, curiosity) into mathematics and literacy learning at school and at home, students are better prepared for a fast-changing world (Fadel et al., 2015). This acknowledges, at this early age, the importance of developing our learners not simply to be, but to become (UNESCO, 2019).
- **Problem-based, contextualized education:** As the education ecosystem broadens to include at-home learning, so the opportunity for relevant, context-specific, problem-based education becomes increasingly accessible. Students engage in real-world problem recognition and solving in their surrounding context (Resnik, 2017), developing competencies that are crucial for a more equitable and sustainable world, as envisaged by the UN Sustainable Development Goals.

CONCLUSION

As the global community reflects on a profound opportunity to reconsider an outdated education system, education leaders are presented with the choice of remaining rooted in traditional policies and practices, or taking a leap into uncharted territory. Reconsidering schools as learning hubs to enhance learning opportunity for children in the early grades, is just one such opportunity. To make this possible, decision-makers will need to systematize these approaches into school, district and provincial workplans and key performance indicators. As transition occurs, feedback mechanisms for continued refinement will be critical to success. May this case study provide food for thought, and opportunities for ideation and implementation, as we collectively 'build back better'.

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Chapter 32. UNITED STATES OF AMERICA**Family, community and school engagement**

Andrea Parker and Cambria Russell

ABSTRACT

This chapter addresses inequities in traditional family, school and community engagement practices, by sharing a cross-sector (education, human and social services) state framework, where and how it has been applied and how dual-capacity partnerships and two-way communication are developing. The case study also shares how technology may be used in the future to address the barriers to and motivation for family engagement.

KEYWORDS

Systemic change, cultural brokering, mobile applications, digital divide, dual capacity, two-way communication, barriers and motivation, linked to learning, cognition, collaboration, capabilities, connections, equitable and effective practices, continuous school improvement, family, community and school engagement, framework.

**BIG IDEAS**

Through a conceptual framework that is applied to family, school and community engagement in the state of Massachusetts, across the sectors of prenatal care, early childhood development, education, health, housing and human-services, readers will consider how to adjust and apply this theory of change to their own contexts for greater educational equity and social justice.

INTRODUCTION

This chapter focuses on the work of the Massachusetts Statewide Family⁶⁶ Engagement Center (MASFEC), one of 12 SFECs, launched in 2018 across the United States, through a competitive grant with the Federal Department of Education (DOE). The three main goals are: 1) Building state capacity, systems and infrastructures for family engagement; 2) Building the capacity of families to support student achievement; 3) Building the family engagement

⁶⁶. Family and caregiver are used interchangeably and refer to all diverse family structures including biological and adoptive parents, foster and surrogate parents, aunts and uncles, grandparents, neighbours, religious/spiritual figures, and all significant community members who provide care for minors.

capacity of local educational agencies, including school and district administrators and educators, and community-based organizations. When the COVID-19 pandemic took hold, SFECs were in year two of the five-year grant cycle. The four Government Performance Act Measures (GPRAs)⁶⁷ for SFECs had already been established but the context had changed completely. The nature of the emergency and remote (home-based) learning created an opportunity to examine systems, structures and support for family engagement.

The pandemic required shifts in times and places for family engagement, moving from the brick-and-mortar building to the online platform, outdoor spaces, home visits, text messaging, access to regular phone contact with teachers, and social media. The work underway to develop equitable and effective systemic family engagement practices across the state of Massachusetts (MA), and in the other 12 SFECs nationwide, is an innovative practice that has been further developed during the pandemic not only to sustain education but also to advance, accelerate and replicate (scale) natural learning environments (the home). This mitigates the impact of the pandemic on education because 1) families are a child's first and best advocate; 2) schools and educators have become more aware of the need to engage and partner *with* families, in order to understand their realities and respond to them; 3) families have become more aware of and engaged in literacy and social and emotional learning (SEL) and how to grow these skills in the home; and 4) the Department of Education, state education agencies (SEAs) and local education agencies (LEAs) have become increasingly aware of the need for culturally and linguistically sustaining practices, focused and trained family engagement specialists and cultural brokers who understand the needs of each community in every district.

MASFEC's theory of change is: During the COVID-19 Pandemic and recovery, if MASFEC centres equity to partner with families and family leaders, educators, SEAs, LEAs community organizations and departments of health and human services, to determine needs and respond to them by co-generating materials and trainings, practices and policies that are linked to learning, then family engagement capability, cognition, collaboration and connections amongst families, educators and decision makers, will lead to authentic shared partnerships and, ultimately, a greater sense of belonging and significantly improved family well-being and student outcomes.

⁶⁷ 1) The number of parents who are participating in SFEC activities designed to provide them with the information necessary to understand their annual school report cards 2) The number of high-impact activities or services provided to build a statewide infrastructure for systemic family engagement that includes support for state and local leadership and capacity-building; 3) The number of high-impact activities or services implemented to ensure that parents are trained and can effectively engage in activities that will improve student academic achievement, to include an understanding of how they can support learning in the classroom with activities at home or outside the school generally, as well as how they can participate in state and local decision-making processes; 4) The percentage of parents and families receiving SFEC services who report having enhanced capacity to work with schools and service providers effectively in meeting the academic and developmental needs of their children.

CONTEXT

The state of MA serves more than 404 public school districts, 954,773 students (Approximately 28,900 Kindergarten students in SY 20-21 were identified as high needs, 21,900 reported household incomes which are economically disadvantaged, 9,700 were identified as English Language Learners and 7,400 qualified as students with disabilities). Prior to the pandemic, districts had varying levels of family engagement leadership and staff to support the needs of these and all families. Some districts had a district-wide coordinator, while others had family liaisons at some school buildings, and other districts delegated this responsibility to principals, assistant superintendents. In some cases this responsibility fell informally on counsellors, social workers, bilingual teachers of English language learners (ELL), directors of ELL, and teachers competent in developing trusting relationships with students and families, permitting them to become aware of families' personal circumstances that are not readily disclosed to the district, such as immigration status and living circumstances. The extent of training, education and experience vary greatly across the realm of family engagement professionals. Prior to the pandemic, a state coalition for family engagement had been established and over a three year period, a framework entitled "Strengthening Partnerships: A Framework for Prenatal through Young Adulthood Family Engagement in Massachusetts" in support of practitioners across healthcare, early childhood, education, and human and public services was developed, published and distributed.

One of the first steps taken within the education sector to implement this framework, was to promote a bilingual, Spanish speaking family and community engagement specialist and leader, to lead family engagement at the state education agency (DESE) to coordinate and build capacity of the state and the 404 districts it serves. One particular strategy that came out of this role was that of 'cultural or power brokering', which has proven particularly useful during the pandemic, in particular to encourage enrolment, vaccination and return to in person learning.

CULTURAL BROKERING

Cultural or power brokering is a research-based practice (emerging from health care) which seeks to intervene and dismantle the power dynamic that families experience when interacting with educators, schools and districts. Cultural brokers are particularly helpful to schools and districts, so that they can communicate critical information, such as school enrolment, attendance policies and the role of families in culturally relevant ways that are sensitive to the needs of diverse families. For families of diverse cultural backgrounds, cultural brokers are called upon to communicate the unique needs and values of their family/culture to the school/educational system and to understand the benefits of/request special

education eligibility evaluations and revisions to individual education plans. The process for cultural brokering consists of recruiting and identifying individuals who serve as leaders in their specific communities (racial, linguistic and/or cultural/religious group). When an equal partnership is created, cultural brokers learn how to serve as a liaison or bridge between the school or education system and the diverse families it serves. The ultimate goals are focused on dual capacity building: 1) for the broker to connect and build relationships with all members of their particular community; 2) for schools and systems to better understand and truly respect the values and beliefs of each community; and 3) to strengthen the asset-based and funds of knowledge approach (Mapp & Bergman, 2021), which values families as equal partners who feel welcomed at their child's school and understand their roles, rights and responsibilities.

STEPS AND INITIATIVES TAKEN DURING THE PANDEMIC

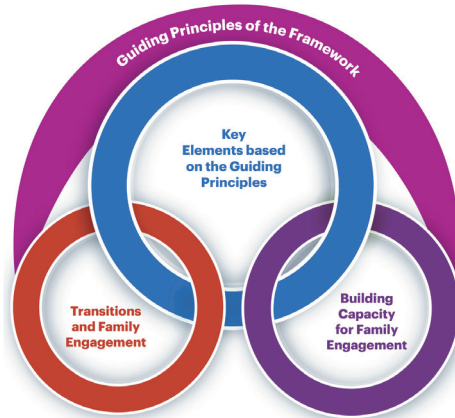
In order to establish a common understanding of family engagement and to scale and expand equitable practices across the state, a 'training of the trainers' model for the statewide framework was implemented and subsequently attended, remotely and synchronously, by 150 participants from education, health and human services. Those trained then implement the training with thousands of employees across these regional and statewide agencies. The framework was designed over a three-year period and across 11 state agencies. It is built on four main elements and five principles, and focuses on strengthening capacity and supporting transitions. Through specific scenarios, relevant to all sectors, participants developed their practice and application of two-way communication, dual capacity, culturally relevant practices and cultural brokering.

Figure 1. *Images from Strengthening Partnerships: A Framework for Prenatal through Young Adulthood Family Engagement in Massachusetts*⁶⁸

These sequential elements provide the foundation for the Framework. Each element builds on the one before. The Elements are:



⁶⁸ Images from *Strengthening Partnerships: A Framework for Prenatal through young adulthood Family Engagement in Massachusetts*



LISTENING SESSIONS AND AFFINITY GROUPS

The Coalition for Family Engagement in MA, formed to create the statewide framework for family engagement, conducted listening sessions and affinity groups for families during the spring of 2021 to gather qualitative data through multiple virtual gatherings. The affinity groups were: Spanish, Chinese, Vietnamese, Portuguese, Regional Family Engagement, LGBTQ, Special Needs and Communities of Color. The questions spanned the following topics: accessing schools, early education and care programmes, health and mental health services, community support, challenges, bright spots, and worries moving forward. This data is currently being analysed and prepared for reporting.

TECHNOLOGY IMPLEMENTATION/MOBILE APPS FOR COMMUNICATION, LITERACY AND SOCIAL AND EMOTIONAL LEARNING

English language learner (ELL) educators and programme directors reported social media being a more effective way to connect with (hear back from and build relationships with) families than phone calls, letters, emails or text messages. As the school closures were extended, home visits were useful in some communities. The following apps were recommended to families and schools, based on their ability to connect educators with families and to promote literacy and social and emotional learning (SEL) at home. Class Dojo and Remind App were mostly used to practice two-way communication with families; through them teachers communicated tasks and activities, while caregivers could communicate directly with their child's teacher. Other apps, such as Early Family Literacy, Animal Antics and Small Wonders, were also shared as ways for families to engage in literacy learning. A research based SEL

tool and card deck, 52 Essential Questions, Conversations and Coping Skills (MindBrain Parenting and MindBrain Emotion), was shared with educators across the state. There is still a need to collect and analyse data from these apps and tools, on their usefulness, relevance and impact on student and family success, as well as their capacity to move the needle on the cognition, connections, collaboration and capability of all stakeholders to engage in effective and equitable family engagement.

ANNUAL NEEDS ASSESSMENT

MASFEC and its partners worked with their external evaluator, WestEd, to develop a comprehensive needs assessment, based on the statewide framework. This survey gathered approximately 2,000 responses, in various languages, from both families and educators, over a period of three months. The data collected will be analysed and used, together with other data, to plan for next steps in family engagement across the state.

EVALUATION FOR CONTINUOUS IMPROVEMENT

The National Center for Families Learning sponsored a webinar in order to build capacity for evaluation as an ongoing process. Theories of change and logic models were used to consider the resources, inputs and outputs and to understand to what extent practices have been effective and/or need to change to address the needs of families and schools during the pandemic and throughout recovery.

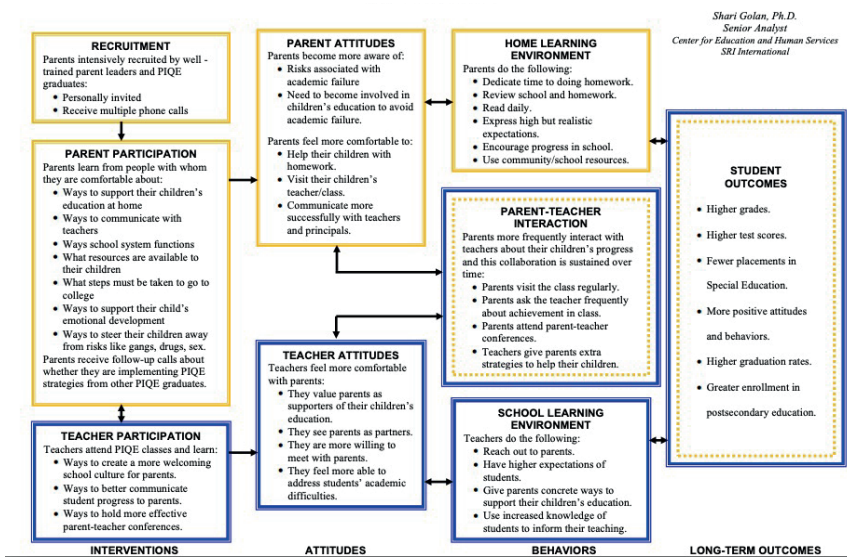
BUILDING CAPACITY THROUGH TEACHER PREPARATION PROGRAMMES AND CONTINUING PROFESSIONAL DEVELOPMENT

As the length of school closures was extended, due to the pandemic, there were far greater numbers of requests for technical assistance to reach families, gather data and design courses and workshops that meet the specific needs of professionals and candidates. Current educators did not necessarily have training in family and community engagement as a part of their programme and teacher preparation programmes, and while they recognized the need for this component, there were not always faculty equipped to deliver this content/guide research on the topic. MASFEC was able to support seven districts and one post-secondary institution during the pandemic. This is a growing area of need and one that must be addressed by the state, MASFEC and its partners.

A FOCUS ON PIQE AND FISS (DUAL CAPACITY AND TWO-WAY COMMUNICATION)

The Parent Institute for Quality Education (PIQE) implements specific dual-capacity and two-way communication interventions and practices through the Family Institutes for Success (FISS). FISS has been implemented across seven school districts, including Brockton, New Bedford and Lawrence Public Schools. It is a nine-week caregiver training/development programme, focused on participation, attitudes and the home and school learning environment. PIQE-trained personnel and alumni train families on ways to support their child's education, communicate with teachers, the steps needed for their child to access college, support emotional development and to steer their children away from risks such as gangs and drug use. On the family side, the main purpose is to shift caregiver attitudes so they become more aware of the risks associated with academic failure and, hence, the positive outcomes that result from academic success. At the same time, PIQE and PIQE alumni work with teachers to learn ways to communicate more effectively with families, shift teacher attitudes towards families, so as to envision and include families as equal partners who feel welcomed and invited into the school and classroom, and to offer specific strategies to help their individual child. PIQE has worked with thousands of families and educators across the state and there has been significant impact, directly related to the programme, on student outcomes (attendance, engagement, graduation, post-secondary and career success) and family wellbeing.

Figure 2. Parent Institute for Quality Education (PIQE): Theory of Change



THE COMMUNITY OF BROCKTON, MA: COALITION AND PARTNERSHIP

Brockton is a large, underserved community to the south of Boston. At the onset of the pandemic, The Collaborative Parent Leadership Action Network (CPLAN) revived the Parent Action Committee and, together, they drafted a statement outlining families' needs for the district. CPLAN has since partnered with Brockton Public Schools to bring the voices of those most affected to be included in the planning process as the district plans out the remainder of the school year in the midst of the pandemic. Parents, community members and Brockton Public Schools staff are all working in solidarity with the superintendent to ensure that all of the holistic needs of the school community are met while following CDC guidelines to remain safe. As the significance of family engagement became more apparent, the Brockton Family Engagement Coalition emerged.

When the COVID-19 pandemic hit and we suddenly needed to re-engage 15,500 students with different technological challenges and language abilities, Ivelisse Caraballo and the team at CPLAN rolled up their sleeves and got to work. We at the Brockton Public Schools are extremely fortunate to have such a strong community partner that can rapidly mobilize to support our students and families. Their parent-led, student focused approach would be an asset to any community. I am so proud to work alongside them. Michael Thomas, Superintendent of Brockton Public Schools.

The creation of the Brockton Family Engagement Coalition includes many families who were PIQE participants. After learning more about their role and the education system, they gained the capacity to influence policy and enact change.

LESSONS LEARNED: THE APPLICATION OF MULTI-TIERED SYSTEMS OF SUPPORT (MTSS) AND UNIVERSAL DESIGN FOR FAMILY ENGAGEMENT

Experience during the pandemic has shown that family engagement, similar to academic support, must be planned for by thinking in terms of multi-tiered systems of support (MTSS) and universal design for learning (UDL). Interventions must be designed with community voice at the forefront. What are their needs? What are their assets, roles and values? How can planning be done co-generatively and with intentionality, so as to assure the voices of the most vulnerable populations are involved in the planning, decision making and evaluation process? Within the concept of MTSS, It is important to know that families are not assigned tiers, rather their needs are categorized and planned for, with responses that are adaptive and supportive, based on what is actually requested by the families themselves. For example,

the family engagement practices for justice-involved youth and incarcerated caregivers would be targeted, while practices for the homeless require more individual, 1-:1 support with a case manager, food access and home visits, that are not required by all families. We must also note that these needs evolve in the short and long term.

THE FUTURE OF LEARNING AND FAMILY, SCHOOL AND COMMUNITY ENGAGEMENT

The UNESCO Futures of Education Vision establishes the need for redefined relationships between schools and communities and the crucial role of parents (families/caregivers) (ICFE, 2020). Not only does research on family engagement align with this thinking, family engagement practice throughout the pandemic has demonstrated the significant impact that authentic school/community/family partnerships have. If the borders of the traditional classroom and school building are extended permanently, to include home and community spaces, then child, youth and adult learning needs can be identified and resources can be distributed in ways that meet the needs of each community. Through this process, community and family leaders emerge, expanding capacity to scale workforce development, while families gain greater financial stability and are better able to support their children's education.

THE PATH FORWARD: CAPABILITY, COGNITION, CONNECTIONS AND COLLABORATION

In order for these innovations to be scaled and to pave the way for hybrid modes of education and learning, there must be a clear commitment from all stakeholders, especially those with the capacity to innovate, design and build mobile applications (apps) that collect resources, strategies and connect people, to truly invest in and have a clear concept of high-impact family engagement and, in particular, how to measure and scale it. This requires narrowing inequities in the digital divide (universal internet and device access), and sustaining and evolving learning in diverse and adaptive environments: learning will take place outside the walls of school, in homes, outdoors, in virtual spaces and through apprenticeships and shifts in concepts of learning space and time (where, how often and when structured learning occurs). This might also come in the form of model programmes, funding and planning for state, district, school and community family engagement that honors and celebrates all that hybrid learning has to offer. More families were able to attend and engage in virtual school events, FISS, parent-teacher conferences, as many of the barriers to engaging, such as transportation, work schedules, childcare and time, were removed by online and video conferencing opportunities. Family engagement requires a holistic, whole-child, whole-family and education/human-and-social-services ecosystem approach that includes more access to social workers, counsellors, psychologists and community resources, and a coordinated logic model/theory of change that drives measurement, impact and equity.

The road ahead requires more rigorous research to determine which practices are most impactful and to scale these and obtain funding for SFECs in all 50 states. Research and expansion require solid plans and significant budgets, grounded in theories of change specific to each state and logic models that are living documents, updated regularly and aligned to the needs of each community.

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The COVID-19 pandemic caused serious disruptions to education around the world. On short notice, and without a playbook to draw on, teachers, schools, and education systems had to quickly create alternative education arrangements to sustain the right of education during the crisis created by the rapidly spreading plague. While the shortcomings of these quickly improved arrangements to educate remotely are becoming increasingly obvious, less attention has been given to the ways in which these novel ways to educate represent an innovation with implications for the efforts to build a more relevant and effective education system.

The goal of this book is to examine the potential of the innovations generated during the pandemic. Drawing on a systematic analysis of 31 educational innovations that emerged during the pandemic, we examine their value not just to mitigate the impact of the crisis, but to build back better.

The result of a collaborative effort of UNESCO's International Bureau of Education and of the Global Education Innovation Initiative at the Harvard Graduate School of Education, this book makes visible some of the innovation dividend generated by educators during the pandemic while offering a methodology for others to advance knowledge about what education systems learned during the pandemic.

The new report of UNESCO's International Commission on the Futures of Education Reimagining our Futures Together: A new social contract for education calls for broad based and inclusive social dialogue on how to transform education to address the most significant challenges of our times. This book is a contribution to that dialogue that shows that the transformation of education environments that address such challenges began amidst the deep disruptions caused by the greatest education calamity in the history of public education.

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