Fernando M. Reimers
Francisco J. Marmolejo   *Editors*

University and School Collaborations during a Pandemic

Sustaining Educational Opportunity and Reinventing Education

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Fernando M. Reimers • Francisco J. Marmolejo
Editors

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Editors
Fernando M. Reimers
Harvard Graduate School of Education
Harvard University
Cambridge, MA, USA

Francisco J. Marmolejo
Qatar Foundation
Doha, Qatar

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Chapter 1
Leading Learning During a Time of Crisis. Higher Education Responses to the Global Pandemic of 2020

Fernando M. Reimers and Francisco Marmolejo

Abstract The rapid disruptions caused by the Covid-19 pandemic in multiple sectors and areas of daily life provide a unique opportunity to study the university's capacity to respond to changes in the external environment, to be a *learning organization*, in service of addressing significant social challenges. In this book we study universities' responses to one such challenge: the disruption to educational opportunities caused by the interruption of schooling brought about by the pandemic.

In response to the Covid-19 pandemic, universities innovated on several fronts. Unsurprisingly, some of those innovations focused on internal actions implemented to mitigate the impact of the pandemic by transitioning to online teaching delivery or extension of semester break, etc. (Crawford J et al. J Appl Learning Teaching 3.1:1–20, 2020; Leon-Garcia F, Cherbowski-Lask A, Leadership responses to COVID 19: a global survey of college and university leadership. International Association of Universities – Santander Universities. IAUP. https://www.iaup.org/wp-content/uploads/2020/11/IAUP-Santander_Survey_to_COVID-19_Report2020.pdf, 2020). Beyond the solutions to mitigate the pandemic's impact on their communities of students, faculty, or staff, universities also innovated to mitigate such impact on the larger community. While the contributions of universities to alleviate the pandemic's impact have been most visible in public health (Daniels, R. J. 2020. Universities' Vital Role in the Pandemic Response. Hopkins Bloomberg Public Health Magazine. https://magazine.jhsph.edu/2020/universities-vital-role-pandemic-response), they have extended to other areas of relief and support as well. Almost half of universities participating in a global survey conducted by the International Association of Universities indicated that due to the pandemic, their community engagement had increased (Marinoni G et al. The impact of Covid-19 on higher education around the world. IAU global survey report. International

F. M. Reimers (✉)
Harvard Graduate School of Education, Harvard University, Cambridge, MA, USA
e-mail: Fernando_Reimers@harvard.edu

F. Marmolejo
Quatar Foundation, Doha, Qatar

Association of Universities, Paris. https://www.iau-aiu.net/IMG/pdf/iau_covid19_and_he_survey_report_final_may_2020.pdf, 2020).

This book is a study of one such response of universities to the pandemic which has not yet received sufficient attention: their support of schools at the pre-collegiate level through a variety of innovative approaches to mitigate the impact of the pandemic on opportunity to learn.

In this chapter, we argue that studying such innovations provides insight into the responsiveness of universities to complex societal needs and into their capacity to operate as learning organizations open to their external environment. We introduce the study, explain its value in understanding the role and nature of higher education's outreach, social impact, and capacity to deal with complex challenges, and summarize the chapters of the book and the results of a survey which was administered to over one-hundred universities to study the nature of their collaborations with schools during the first 9 months of the pandemic, between March and December of 2020.

1.1   A High-Impact Global Event

The global pandemic of Covid-19 marked a watershed moment for humanity. This highly impactful event caused many disruptions, directly and indirectly, interrupting the lives of many and altering the lives of many more. The pandemic will be remembered, to be sure, as a milestone, a marker of time, after which many aspects of human life were never the same. There is a serious risk that several of the changes caused by the pandemic will make the world less inclusive, less stable, and less sustainable during the coming years, creating challenges of a new order of complexity. The most recent forecast of global trends from the National Intelligence Council of the United States describes the impact of Covid-19 as having disrupted economies and political dynamics within and between nations, creating new uncertainties about the global economy, governance, geopolitics, and technology. The report concludes that the pandemic accelerated and accentuated pre-existing trends, bringing global health and healthcare into focus, revealing and widening social fissures, and highlighting deficiencies in international coordination. The effects of the pandemic extended into other domains, including disrupting global supply chains, increasing national debt, government intervention in economies, accentuating exclusionary nationalism and polarization, deepening inequality, exposing the digital divide, straining governance, and exacerbating the polarized information that undermines public confidence in government, among other challenges (National Intelligence Council, 2021, 11–13).

This description of the type of difficulties caused by the pandemic corresponds to what have been called "super wicked problems," a term used by MIT president Rafael Reif to describe challenges like climate change: "it means an enormously complex societal problem that has no single right answer and no clear finish line, multiple stakeholders with conflicting priorities, and no central authority empowered to solve it" (Reif, 2021).

On March 11 of 2020, Dr. Tedros Adhanom Ghebreyesus, Director General of the World Health Organization, declared that Covid-19 was a pandemic. At that point in time 118,000 cases had been diagnosed in 114 countries, and 4291 people had lost their lives. Over the next 13 months, those figures would grow to 164 million people infected, and 3,381,774 people having lost their lives (Johns Hopkins University, May 17, 2021).

In response to the pandemic, as a way to contain the velocity of the spread of the virus, segmenting the rate of infection over time to prevent the collapse of the medical infrastructure, many governments put in place measures that restricted physical contact among people, physical distancing measures, as well as restricted travel. The disruption of the ability to congregate, to move, and to travel impacted the functioning of many institutions: workplaces, schools, universities, businesses, houses of worship, and government itself.

The resulting direct impact of the pandemic included effects on people who were infected with Covid-19, in some cases taking their lives or deteriorating their physical or mental health. The direct impact also involved the economic and psychological consequences of having been infected or having had a family member become seriously ill or die. Many more people were impacted indirectly, including all those affected by the disruptions caused by the pandemic through jobs and income loss, mobility restrictions, disruptions to schooling, and severe limitations to other forms of association and interaction as well as the toll on mental health caused by living under stress during such a protracted period.

A considerable burden for governments was the financial toll created by financing the costs of the public health response to the pandemic, as well as the costs of the economic relief to individuals and businesses which some governments provided to mitigate the impact of the disruption to work and business.

The scale of the disruptions caused by the pandemic was unprecedented in recent history, causing a global economic recession not seen since the Great Depression (Reinhart & Reinhart, 2020). An analysis of the global economic effects of the pandemic forecasts multiple financial crises across the world, sovereign debt defaults in the developing world, a contraction in economic activity, decline in global trade, increased unemployment, a disproportionate impact on lower-income households, an additional 60 million people pushed into extreme poverty, and an increase in hunger. What's more, the economic recovery will be slow (Reinhart & Reinhart, 2020).

A disruption of such scale and depth will likely compound many pre-existing challenges. For example, the challenge of reducing poverty will be heightened in a context of economic recession or slow growth. The economic burden of the pandemic will compound pre-existing challenges faced by governments whose economies were already burdened with considerable levels of debt. The challenge of political polarization and challenges to democratic governance will be exacerbated as more people see their economic circumstances decline, and as the resulting marginalization and inequality intensify political competition. The rise of exclusionary nationalism will likely increase in response to growing domestic challenges, causing further retrenchment from globalization (National Intelligence Council, 2021).

Given the scale of these disruptions, the Covid-19 pandemic is a serious course-altering event, one that will change the life trajectories of individuals and the future of institutions and nations, setting them on paths which will make improvement of individual and collective well-being more challenging. Individuals, those who begin their careers in this economic depression, will find it challenging to recover. Those who prematurely end their employment because of the economic depression will experience reduced well-being for a long period. For institutions, whether they are businesses, universities, or hospitals, the economic toll of the pandemic will pose considerable burdens, driving some out of existence. This will hamper the innovation ecosystem. For nations, the burden of the adjustments necessitated by the pandemic will diminish prospects for development.

A United Nations report described these vast implications of the pandemic in this way:

> 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 (UN, 2020, 1).

This UN report explains that the pandemic has exposed and aggravated pre-existing vulnerabilities, and that recovering from its impact requires not just restoring the conditions that existed prior to the pandemic, but "building back better," pursuing the global development agenda, as articulated in the UN Sustainable Development Goals.

> Recovery is an opportunity to address the climate crisis, inequality of all kinds and gaps in our social protection systems. Instead of going back to unsustainable systems and approaches, we need to transition to renewable energy, green infrastructure, sustainable food systems, social inclusion, gender equality, and stronger social safety nets, universal health coverage, better preparedness for health emergencies and multi-hazard risks (UN, 2020, 8).

Of course, "building back better" is no small challenge in the context created by the pandemic, especially because so much of "building back better" involves working on "super wicked problems" that require collective action, not well addressed by market forces and made more difficult by the current democratic politics in contexts of low trust and intense polarization. Further social fragmentation, accelerated by the pandemic, will compound the complexity of addressing these challenges (National Intelligence Council, 2021). Climate change, for instance, is likely to require several changes in government, private industries, and individual behavior that have so far proven elusive (Reif, 2021). Even mitigating the health impact of the pandemic itself has proven especially challenging in the oldest democratic republic in existence, the United States.

For higher education institutions, the financial impact may accelerate the decline of institutions, already severely strained, to the point of closure (Startz, 2020). For reasons that will be articulated in this chapter, universities may be well positioned

to contribute to the structural changes necessitated in society that will allow for the collective action necessary to "build back better." Whether universities would take on the task of leading in imagining and building a better future, while at the same time having to address the impact of the pandemic on their own internal constituencies and possibly having to reimagine their own existence and future, remains to be seen. But it is at least worth considering that in reimagining their purpose, universities may decide to become more intentional in contributing to imagining and building a better future precisely because this crisis has made this need so pressing.

In this book we ask the question of whether and how, amidst the crisis created by the pandemic, universities have stepped up to serve society with respect to a singular impacted domain: education, and not just education within the university, but pre-university education writ large. In what follows, we explain the need to "build back better" in education, why universities might focus on that challenge, and what the answer to such a question could tell us about the nature of the university as a learning organization with the capacity not just to respond to changes in its external environment but to shape that environment in building a better future.

1.2   Impact of the Pandemic on Educational Opportunity

Institutionalized learning was disrupted by Covid-19 as schools and universities adopted physical distancing measures. On March 3, 2020, UNESCO reported that school closures in 13 countries had interrupted the education of 290 million students around the world (UNESCO, 2020). By the end of March 2020, 3 weeks after the World Health Organization had declared the outbreak, national school closures had impacted 1,581,173,934 learners. All remaining learners, out of a total of 1,712,374,616, had been impacted by localized school closures (UNESCO, 2020). By the end of July 2020, only a very small number of schools and universities had reopened. Soon after, most schools and universities around the world suspended in-person instruction, and many of them adopted alternative modalities of education delivery, including using online learning and relying on radio, television, mobile applications, and printed materials.

Some of these alternative education arrangements represented innovative uses of existing technologies, which was the result of novel forms of collaboration and partnership among various kinds of organizations, including collaborations between schools and school systems and universities (Reimers & Schleicher, 2020).

Early studies of these innovations showed that online learning modalities were not effective in creating comparable opportunities to learn to those provided by school-based instruction and that they were not reaching all students with the same levels of effectiveness (Reimers & Schleicher, 2020). For instance, a study of the education response to Covid-19 conducted between September and December of 2020 in Bangladesh, Belize, Costa Rica, Guatemala, Kenya, Mexico, South Africa, United Arab Emirates, and the United States concludes that "these alternative arrangements produced losses in access to education, consistent access, and

engagement with learning, how they resulted in instruction of limited quality and shorter duration than regular in-person instruction, and how remote learning arrangements devised in this fashion limited opportunities for socio-emotional development" (Reimers et al., 2021, 18).

The resulting limited options available to learn during the pandemic led to a growing concern over the impact of the pandemic on learning loss, student mental health, student disengagement with learning and potential dropout, and over the long-term impact of these conditions on students and societies, as well as concern over growing disparities in opportunity to learn.

A series of World Bank simulations of the global impact of school closures concludes that a 5- month closure with moderately effective alternative forms of education could lead to a loss of 0.6 years, reducing the average number of school years students receive at present from 7.9 years to 7.3 years. This would amount to a loss in $10 trillion in lifetime earnings for the current cohort of students. In addition, close to 7 million students could drop out because of the impact of the pandemic on income for their families (World Bank, 2020, 23).

The magnitude of the shock that the disruption to education, resulting from Covid-19, is expected to cause will likely extend beyond the predicted impact on individual earnings; it would compound the disruptions likely to result from the slow economic recovery that is expected to follow the pandemic. It would also compound many of the other challenges expected to follow, from increased political polarization and governance challenges to the possibility of addressing other development goals, as described in the UN Sustainable Development Goals agenda. In effect, the education consequences of the pandemic could unleash a process of development in reverse, hence the priority of addressing how to "build back better" for education.

1.3   Response of Educational Institutions to the Pandemic and Why Universities Would Want to Help

Educational institutions, from pre-schools to universities, have used a variety of means to provide some form of educational continuity to carry out their instructional mission amidst the challenging conditions caused by the physical distancing requirements. For most institutions, this involved very rapid design and implementation of alternative means of delivery and continuous adaptation based on what they learned about the effectiveness of the approaches deployed.

In effect, schools and universities responded to the disruption caused by the pandemic with an unprecedented global effort in innovation in order to continue to operate and sustain educational opportunity in spite of the distancing requirements (Marinoni et al., 2020). These efforts, many dependent on the use of technology, quickly revealed that not all students had the same access to technology and other supportive conditions that would allow them to learn online (Ali, 2020). Other

students lacked the self-management skills to effectively learn online and to learn more independently than when they attended schools in person. These innovative efforts also revealed skill gaps among teachers for teaching remotely (Reimers & Schleicher, 2020). Finally, not all institutions were prepared to support the new teaching-learning environment, and their regulatory arrangements were not attuned with the new demands.

These challenges also made evident that students and the systems and structures supporting them lacked the skills needed to navigate a volatile and uncertain world, such as capacity to learn independently, resiliency, flexibility, and creativity. As such, they reinvigorated pre-existing interests in helping students develop a range of skills, in educating them holistically, and in significantly improving educational institutions, particularly through the adoption of technology.

The need to meet such ambitious goals with an appropriate level of resources and institutional capacity, at a time when they faced many demands resulting from the crisis, led some education authorities to seek collaborations and institutional partnerships with universities and other organizations. The secretary of education of Sao Paulo, Brazil, for instance, asked some of the most affluent business leaders in the State to partner with the Department of Education in creating a multimedia infrastructure to sustain educational opportunity during the exigency (Dellagnello & Reimers, 2020). He also developed a partnership with the State University of Juiz de Fora, for support in building a formative monitoring system that would help teachers and school leaders assess student engagement and learning as they studied remotely. Similarly, Colombia's Minister of Education built on a pre-existing partnership with a University (EAFIT) to support online learning, creating a robust multimedia platform to support remote instruction.

It is reasonable that some education system leaders should have reached out to universities for assistance in creating alternative means of delivery. Schools share with universities the purpose of educating students and, as such, they have knowledge of how to teach and support teaching. Some had prior experience teaching online and knowledge of digital pedagogies. In addition, because universities are larger and more complex, and have more resources and institutional capacity than schools, they can more easily and quickly develop innovative education approaches in a shifting context such as that created by the pandemic.

In addition to their greater relative capacity and resources, universities are ubiquitous. Today, more than ever before, most school systems, at the national or subnational levels, have access to at least one university. The considerable global expansion of universities during the last two decades made visible that the more than 28,000 universities throughout the world were a significant reservoir of global institutional capacity for rapid innovation in sustaining knowledge creation and dissemination.

Just as it was reasonable for school and system leaders to ask universities for help in sustaining education during the pandemic, it also made sense for universities to undertake such a task, for doing so would simultaneously address important needs while addressing universities' own challenges of relevancy, effectiveness, and sustainability.

Many universities see it as part of their mission to contribute to the development of the communities of which they are a part, through research, education, and outreach (Puukka & Marmolejo, 2008). Universities play a central role as anchor institutions in communities, they are drivers of economic prosperity, and outreach to PreK-12 is one of the ways in which universities advance missions and strategies related to economic development, as well as to support equity and democracy. But supporting schools and school systems within the challenging context created by the pandemic was not just an opportunity for outreach, it was an opportunity to advance knowledge on how to tackle complex challenges. As institutions interested in addressing "super wicked problems," the challenges created by the pandemic, such as the interruption of schooling, provide an opportunity to exercise and develop the capacity to tackle such problems.

During the pandemic, just as universities contributed to providing viable solutions to the development of testing, vaccines, PPE production and distribution, and other technologies and processes to address the health aspects of the pandemic, they also contributed solutions to upholding the continuity of education provision for the education system as a whole.

Sustaining education during the pandemic required more than finding alternative means of education delivery that overcame the physical distancing constraints. The interruption of in-person instruction created, for schools as well as for universities, the occasion to ask again what should be taught and how and to reprioritize the curriculum. Their shared interest with schools in the central questions of teaching and learning made universities a logical partner for schools, school networks and school systems at a time when a rapidly changing context upended the ability to learn and to teach in the way institutions are most accustomed to.

Beyond the opportunity to generate and mobilize knowledge to help sustain education systems, the education crisis created by the pandemic also provided an opportunity to engage students in higher education in the search for such solutions, in ways beneficial to their own education. Prior to the pandemic, many universities were already grappling with the challenges of helping their own students develop the breadth of skills essential to participate in the twenty-first century, including teaching them civic responsibility and leadership (Nghia Tran, 2018; Matsouka & Mihail, 2016). The many challenges created by the pandemic provided a multitude of "teachable moments" from which students could gain essential competencies; helping pre-collegiate institutions continue to educate was one such opportunity.

In addition to their challenges with relevancy and effectiveness, universities have been struggling to identify ways to deepen their effectiveness while remaining sustainable in the face of growing costs and declining revenues. Universities, particularly in high-income countries with aging populations, were already facing challenges of how to find more sustainable ways to educate students, particularly as most of the recent growth in enrollments has taken place in the developing world. The number of students enrolled in higher education grew from 100 million students in 2000, to 250 million in 2020, and is expected to grow to 594 million by 2040 (Calderon, 2012). Most of that growth will take place in middle income
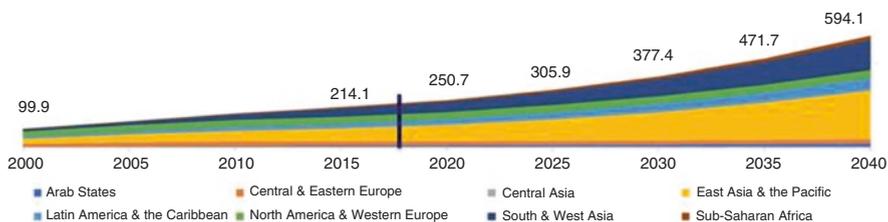
Fig. 1.1 Number of students enrolled, and projected to be enrolled (in millions), in higher education institutions by region from 2000 to 2040. Worldwide higher education enrolment by global region, actual from 2000 to 2015 and projected to 2040. (Source: Calderon, 2012)

countries in the developing world, with very limited growth in North America and Western Europe as shown in Fig. 1.1.

Facing spiraling costs and declining populations of high school graduates, universities in North America and Western Europe had increasingly sought to meet enrollment targets with a growing population of students from the emerging middle classes in the rest of the world. But the travel restrictions imposed by the pandemic prevented universities from relying on those students, leading to a significant loss in total enrollment and of revenue for many universities in Australia, Canada, the United Kingdom, and the United States (Burki, 2020). In Britain, it is expected that the Covid-19 crisis will produce losses ranging from 3 to 19 billion British pounds, most of it as a result of falling international student enrollment (about 2.8 billion British pounds) (Drayton & Waltman, 2020). In 2019/2020, the international student enrollment in US colleges and universities declined almost 2% in comparison with the previous year, resulting in a loss of 1.8 billion dollars from the prior academic year (NAFSA, 2020).

A further motivation for universities to help school systems mitigate learning loss and the interruption of learning is that the enrollment intake of universities draws from graduates of high schools. Any serious knowledge and skill gaps in a generation of learners would have ripple effects in their subsequent learning at the university level. Universities understand that the undergraduate experience can be greatly enriched and maximized if incoming students are more adequately prepared to cope with the academic and social demands of colleges and universities, and that the increased sophistication of the knowledge and skills necessary to participate in society make the typical 4–5 years of university life insufficient to develop the prerequisite technical and socioemotional skills. The teaching mission of the university builds on the work of teachers in primary and secondary schools. Any significant loss in knowledge and skills among high school graduates would, in time, affect teaching and learning at the tertiary level.

This obvious need for alignment across various institutions supporting the educational trajectories of students has in the past caused universities to seek ways to increase the coherence in that continuum. Some universities have established their own senior high schools, as part of the same university system. Others have engaged in various ways to influence the curriculum and instruction at pre-collegiate levels.

For instance, through rules governing college admissions, universities have influenced the high school curriculum as Harvard's president Charles Eliot did in the late nineteenth century with the creation of a contact hour standard for secondary education in what would eventually become the "Carnegie Unit" after it was endorsed by the Carnegie Foundation to define a standard of 120 h of academic work in a subject. University engagement in pre-collegiate education is also illustrated by James Bryant Conant, Harvard president and chemistry professor, who wrote about how the lack of a solid pre-collegiate foundation in mathematics would deter students from pursuing calculus in college, an essential subject to pursue advanced careers in the sciences. Conant also wrote about the necessity to learn to read German early on, to enable access to research in the field of chemistry (Conant, 1970, 189). The review of Harvard's undergraduate curriculum led by Conant, published in 1945 with the title "General Education in a Free Society," would have considerable influence in high school curricula. His involvement in the expanded use of the Scholastic Aptitude Test in college admissions would support access to college for students from public high schools, influencing the opportunities those schools would provide students to prepare for college. The books Conant wrote at the end of his life on the American high school and on teacher preparation influenced those two institutions.

Government policies have occasionally sought to foster greater collaboration between universities and schools, as did the National Defense Education Act of 1958 in the United States, a response to the soviet launch of Sputnik, that funded the involvement of research universities, such as Harvard and MIT, in designing pre-collegiate science, math, foreign language curriculum, and teacher preparation programs.

Another reason for universities to become interested in collaborating with schools, to continue functioning during the pandemic, is that they represent one of the few institutions with which most members of a society have contact, and they carry out a function that has long-term and high-value consequences for society. At a time when there are questions regarding the contributions that universities make to society, many of them would see it as aligned to their mission: as socially embedded institutions, to contribute to the communities of which they are a part. As such, universities would want to engage in efforts that mitigate the harm caused by the pandemic because it poses such a serious risk to development and well-being of society as a whole.

Universities have good reason to attend to their reputation in the eyes of the public, as public trust in them is declining. In the United States, for example, even though most people still hold a positive view and have more confidence in universities than in most other institutions, with the exception of the military, small businesses, and the police, the percentage of the population with a negative view of the contributions of colleges and universities to society has been increasing significantly in recent years. In surveys conducted by the Pew Research Center in 2019 asking people to evaluate whether colleges and universities had a positive or a negative effect on how things are going in the country, 38% responded they had a negative effect, a 50% increase from 26% who held the same view in 2012 (Parker, 2019). The Gallup organization found a similar decline in confidence in colleges

and universities, from 57% who expressed a great deal or quite a lot of confidence in higher education in 2015 down to 48% in 2019 (Jones, 2018).

The public has less confidence in colleges and universities than in the military (74% have a great deal or quite a lot of confidence), small business (67%), or the police (54%). However, there is more confidence in universities than in the church or organized religion (38%), the presidency (37%), the US Supreme Court (37%), the medical system (36%), banks (30%), the public schools (29%), organized labor (26%), big business (25%), newspapers (23%), the criminal justice system (22%), television news (20%), and Congress (11%) (Parker, 2019).

The disruptions caused by the pandemic provided, therefore, an opportunity for universities to demonstrate that they create value for society, beyond the students they educate directly and in addition to the knowledge they advance. Those contributions of universities to the greater social good were clearly visible during the pandemic through the role played by teaching hospitals, and by their faculty and staff involved in the health sciences and public health, as those professionals engaged with the larger health ecosystem in providing a response to the public health emergency.

For similar reasons to those that drove universities to assist in mitigating the health impact of the pandemic, given the significance of the educational impact of the pandemic and the great salience of its consequences to multiple dimensions of future development, it is reasonable that universities would seek to partner with school systems to sustain educational opportunity during the education crisis of Covid-19. The pandemic provided the university with "A Sputnik moment" to influence school education.

1.4 Why Study How Universities Collaborated with Schools During the Pandemic

The reasons to study whether and how universities engaged with schools to sustain educational opportunity during the pandemic include the insights that such a study could provide about the evolving nature of higher education and its mission, and in particular about the nature of universities as learning organizations capable of learning from and with their external environment. The pandemic is just one instance of a larger class of unpredictable events, and it provides an opportunity to understand how universities respond during an unexpected crisis. On a more practical level, this study might help universities keen to collaborate with schools learn from global experience and perhaps even inspire those in the university community to pursue collaborations along the lines of those examined in this book.

In a world rapidly changing, there is continued interest in ensuring that what students learn in college and what they learn at all levels is indeed relevant and prepares them for the demands of this volatile and uncertain world. Doing this requires that educational institutions be adaptive and in good communication with their

external environment, and that they are able to adjust what they teach and how they operate in response to those changes—that they are, in effect, organizations that can learn. This comparative study will help answer two fundamental questions: Did the high-impact disruptions in the external environment caused by the pandemic show the university is a learning organization? Did the response of universities to the pandemic in fact support the idea that they are institutions open to their external environment, capable of learning from and with their environment?

Arguably, as learning organizations, universities are very much open systems, that is, systems in interaction with their environment, with the capacity to identify changes that can influence them and adapt in response to those changes, in their external environment (von Bertalanffy, 1938; Senior & Swailes, 2010; Argyris & Schön, 1978; Senge et al., 1990). The characteristics of open systems are their relations to and interactions with the environment as well as their ability to scan and discover changes in that environment (Birnbaum, 1988; O'Connor & McDermott, 1997). Universities have not just the capacity to adjust to changes in the external environment, but also to create alternative futures. Through their functions in teaching, research, and outreach, universities can very much imagine and build imagined futures. They are singularly positioned to contribute to "building back better," to use the exhortation of the United Nations in response to the pandemic, particularly in domains that involve collective action challenges, as mentioned by MIT's president with respect to climate change (Reif, 2021).

The literature on educational institutions as learning organizations highlights seven features that define them as such:

1. Developing and sharing a vision centered on the learning of all students.
2. Creating and supporting continuous learning opportunities for all staff.
3. Promoting team learning and collaboration among staff.
4. Establishing a culture of inquiry, innovation, and exploration.
5. Establishing embedded systems for collecting and exchanging knowledge and learning.
6. Learning with and from the external environment and larger learning system.
7. Modelling and growing learning leadership (Kools & Stoll, 2016, 3).

Studying how universities engaged with pre-collegiate educational institutions to support educational continuity during the pandemic will help us understand how socially connected the university is to its surrounding context, and how it interprets its responsibility to be an engine of social innovation at a time of great unexpected need. We will also be able to ascertain whether such involvement builds on pre-existing institutional relationships or creates new partnerships.

Such study will also illuminate how such outreach is aligned with the university's mission and how it relates to the research and teaching missions.

Recent studies of the university argue that, as a result of the growing complexity of roles that the university has taken on, along with how society defines the contemporary university, universities are operating in a context of "super complexity" (Scott, 2020, p. 27). As a result of such super complexity, the onset of the pandemic met universities in a stage of searching for more sustainable ways to advance their mission, perhaps for some even in search of renewal of such a mission.

Examining how universities collaborated with schools to sustain learning during a time of crisis might shed light on how the university interprets its mission during a time of great volatility and interest in accountability and emerging questions about its social role and value. A pandemic is undoubtedly, thankfully, a rare event with high impact on society. It is in fact rarer an event than a solar eclipse, a major earthquake, in most countries rarer than a breakdown of democratic rule, or a civil war. High-impact events of this sort have in the past influenced how universities interpreted, and re-created, their mission. For instance, the second global wave of democratization after World War II and the third wave beginning in the mid-1970s (Huntingon, 1993) led universities to embrace the goal of expanding access with unprecedented vigor.

Clearly, there are multifaceted ways in which universities could respond to the pandemic, ranging from how they themselves adapted teaching and learning to the conditions created to the pandemic, to how they managed to carry out other aspects of their mission, including extension and outreach. As part of their outreach mission, the role of universities in attending to the public health aspects of the pandemic is an immediate and obvious area of response. But, as institutions where learning and teaching are core to their mission and that have historically played a significant role defining how learning and teaching should take place, not just while students are enrolled in university but also before, examining whether and how universities focused on the larger social enterprise of teaching and learning, when the enterprise was threatened by a major global disruption, makes sense as well. After all if, as some have predicted, the pandemic accelerated the transformation of teaching and learning at all levels, it is reasonable to ask what role universities have played in that process, not just for their own students but beyond, for the larger teaching and learning ecosystem.

The engagement of universities in the redesign of learning and teaching systems in response to the context of socially distancing created by the pandemic fits squarely within the contemporary interest in more effective and open learning systems within universities, and outside of them (Scott, 2020).

At the root of the study of how universities responded to a significant disruption in their context is the question of how socially embedded universities are. A century ago, the idea that research in universities was carried out by researchers working in the isolation of the ivory tower was replaced by the argument that research was the product of researchers interacting with society; the related argument of the "Triple Helix" explained research as the result of close collaboration between universities, industry, and government (Engwall, 2020, 5). The concept of the "Triple Helix" is the foundation of the idea of the "entrepreneurial university," the university that serves as an engine of societal improvement. In fact, as universities more formally engage in supporting social entrepreneurship, they are, in reality, relying on a "quadruple helix" framework (Garcia-Gonzalez & Ramirez-Montoya, 2019).

This entrepreneurial, socially embedded university is the idealized model of the American university, which contemporary discourse on "world class" universities propagates as desirable: a university with porous borders with society, open to social change and its impact (Ramirez, 2020, 131).

However, at the same time that universities are lured to pursue the "world class" aspiration, they are also being requested to connect their work more effectively to local needs and realities. In fact, engagement has become so prominent that it is now considered a key component of national or state policymaking, a tool of institutional profiling, and an indicator of performance as part of the broader accountability and system-steering agendas (Goddard et al., 2016).

A related theme, which begets interest in how universities have engaged with pre-collegiate institutions to support education during the global pandemic, concerns the democratic imperative which some authors argue is part of the university mission in our times:

> Put most simply, the urgent task before us to reinforce, and maybe reforge, the links between higher education and democracy which, perhaps too complacently, was taken for granted in the twentieth century in the age of mass higher education, now drawing to the close. The twenty-first century university needs to be an open institution –spatially, by opening up closed-off, policed corporate-like academic precincts; scientifically and academically, by embracing open knowledge systems and welcoming new (and challenging) knowledge traditions (and rejecting the exclusionary and hierarchical tendencies of performance and raking regimes- and, maybe, the seductive discourses of 'excellent' and 'world-class'); and socially, by meeting the needs of everyone, not just of enlarged elites. (Scott, 2020, page 111)

1.5   The Current Study

To conduct this study, we identified 20 universities around the world that had become involved with pre-collegiate institutions during the pandemic. To identify them, we drew on our institutional networks and created an intentional sample of universities that reflected a variety of institutional types—teaching, research, more recent, more established—in a variety of countries. Our aim was to reflect the wide diversity that characterizes higher education globally. We then invited colleagues in those institutions to write case studies, using a common protocol we developed based on a virtual meeting of all participants. The case study was not meant to address all forms of engagement of the university with K-12 education, but rather to examine in particular and in some depth collaborations that were responsive to the challenges created by the pandemic. The purpose of such a strategy was to help understand with some nuance how universities engaged with pre-collegiate education in response to a significant disruption to society, as was the case with the disruption caused by the pandemic, rather than ascertain the full extent of what they had done in response to the crisis.

We discussed drafts of those cases at a virtual conference attended by all authors of the case studies, and then revised them based on feedback obtained from peers at the conference.

The authors of the case studies were asked to write cases that answered the following questions:

Provide a brief profile of your university, including general information about its scale, type (public/private), focus, longevity, geographic location and scope, profile of students, paths followed by graduates, links with industry and other employers, etc. Please include a brief idea of the focus of the current strategic plan.

Describe briefly what the university is doing to support elementary and secondary schools in their efforts aimed at ensuring educational continuity during the Covid-19 pandemic. What is the scale of those efforts? How many elementary and secondary schools are involved? How many students are impacted? How long have these efforts been going on?

What units or departments in the university have been involved in this initiative? Who is funding these efforts? What is the total cost of those efforts?

What was the motivation for the university to undertake this initiative? Was this building on prior efforts engaging the university with K-12 schools, or was this a new initiative?

How are these efforts perceived to be aligned with the mission of the university? How are they aligned with the research and teaching efforts and approach of the university?

What kind of support do these efforts have from the governing boards of the university? From the President's office? From Deans?

What is the rationale of these efforts? What is the hypothesis on which these efforts are based? Its theory of action? Why were these particular efforts initiated and not others?

How did schools participate in designing these efforts described in this case study? How did education authorities participate? Was there any involvement of parents of students?

Is there a monitoring system of these efforts? What is being monitored? How is this information used?

What have these efforts achieved to date? What has been learned from these efforts? How have they been modified over time?

What are some unexpected results of these efforts, positive or negative?

What have been some failures or shortcomings of these efforts? What was more difficult to achieve than you had imagined?

What is the likely future of these efforts? Are there plans to make those efforts more permanent? Or to transition them into a new initiative? Or to close them under certain future circumstances?

The resulting case studies follow a common set of goals and analytic framework, although they differ in that some examine in greater depth a single collaboration with schools, whereas others provide a more comprehensive view of the variety of engagements the university had with schools. Accordingly, there are different emphases in the research questions each case study answers. Collectively, however, the case studies provide a broad overview of the variety and extent of the collaborations that these universities orchestrated with schools during the pandemic.

These in-depth case studies were then supplemented with a survey that we administered to a larger number of universities around the world. The survey was designed to cover a range of the same questions that guided the case studies. The survey was administered throughout our networks, to a larger list of senior administrators in universities. We received 101 responses to the survey (see Map 1.1).

These methods were not designed to answer the question of what proportion of universities had engaged in school collaborations (given the way in which respondents were selected), but rather, to describe and analyze what it was that universities, who had developed such collaborations, did. It should be clear that our evidence originates in a convenience sample, not on a probabilistic sample intended to represent a known population. Given the way in which we recruited the institutions for the case studies and administered the survey, relying on our own professional networks, there are at least two possible sources of bias in the study. The first is that our reach was limited by our respective professional contacts and networks. The second that the respondents are primarily those in our networks who had actually engaged in collaborations of some sort. In other words, if this study shows that universities engaged with schools during the pandemic, it is because those are the institutions we sought out and those that agreed to participate. Finally, this is a study of the immediate response of universities to the pandemic, in the months immediately following the suspension of face-to-face instruction in most countries. It is possible that these efforts will evolve, and change, over time, and that some of these efforts may stop or other forms of collaboration might develop as universities and schools continue to respond to the pandemic.

Map 1.1 Countries participating in the study with case studies and with responses to institutional survey

1.6 Summary of the Cases

1.6.1 *Brazil: Fundação Getulio Vargas*

In Brazil, the Getulio Vargas Foundation (FGV) has focused its support for the continuation of education by providing policymakers with access to reliable information to navigate the crisis, and by making high-quality, online educational resources available to secondary students and education professionals. A distinctive collaboration has been FVG's High School program, whose main objective is carrying out analysis that contributes to the improvement of the quality and provision of upper secondary. Established in 2003, this initiative has worked with state and local governments by providing technical assistance, and it has developed online resources to support teachers and students. Most notably, FVG created a web site that allows students to practice for the National High School Examination (ENEM), which is used by prestigious higher education institutions as an admission test for enrollment. The government decision to transition to an online version of ENEM due to the pandemic triggered a massive increase in the use of FGV's High School practice-test platform. In addition, it opened the door for the establishment of further partnerships with state education offices and schools, with the goal of establishing trustworthy online platforms that can assist teachers in the application of exams and mock tests remotely. FGV's online tool is suited to address capacity gaps at the local level to evaluate and assess students. Other initiatives conducted by FGV in support of school education include the offering of free online courses and a significant effort disseminating best practices and establishing policy dialogue with local governments. The pandemic has enabled an increased level of collaboration among different areas of FGV that focus on elementary and secondary education.

1.6.2 *Chile: Pontifical Catholic University of Chile (PUC)*

In response to a request from the Chilean government to support efforts in coping with the pandemic, an advisory committee was established under the leadership of the Presidents of the Catholic University of Chile (PUC) and the University of Chile (UCh). One of the tasks of this ad hoc committee has been to work on proposals and specific guidelines to help the school system with the necessary measures to provide socioemotional and academic support to elementary and secondary students and their parents. Since PUC and UCh are the oldest, most prestigious, and most selective higher education institutions in Chile, collaboration among them, in general, is relatively limited. However, the pandemic provided a unique opportunity to establish a successful partnership with the hopes that future collaboration may emerge in the post-pandemic world. One of the results of the partnership is the development of specific and adaptive guidelines to implement a prioritized curriculum in schools that will be implemented for the 2020 and 2021 academic years. Also, in

conjunction with other universities, two documents with guidelines for adequate management of schools during the pandemic, and policies for curriculum adjustments, were drafted and disseminated. Finally, at PUC, the system of practical training for students at the Faculty of Education was rapidly adapted into a virtual education environment allowing the design of new materials, coaching of students in schools, etc.

1.6.3   Chile: University of Chile (UCh)

During the pandemic, the University of Chile (UCh) redesigned and maintained an ongoing public-private alliance between the Arauco Educational Foundation, the Center for Advanced Research in Education (CIAE-Universidad de Chile), and Andalien Sur Local Public Education Service (SLEP) with the goal of preventing school exclusion (repetition and dropout) in public schools. The program has been supporting education in a group of 12 schools through pilots, with the ultimate goal of further implementing successful practices in a larger number of public schools in the country. Although UCh has participated in several initiatives in support of continuation of education in elementary and secondary schools, the program "Desafío TEP" was of particular interest, considering the risk that the pandemic would increase drop-out rates in public schools. Within the first 2 weeks after schools were closed, the team organized online meetings, resulting in adapting the program, adjusting the work cycle, establishing more efficient communication mechanisms with school representatives, and further refining the gathering of information on school engagement. Key lessons learned by UCh from the adaptation of the program include the need for ensuring that students feel satisfied and motivated to keep learning, strengthening the communication with families, supporting teachers to make them feel competent and safe, using all technological resources available, and making visible the achievements of students and schools.

1.6.4   China: Tsinghua University (TU)

Tsinghua University is a public university in Beijing, China, with more than 50,000 students, a number of hosts within its main campus, and a network of schools, including Tsinghua University High School (TUHS), International School, Primary School, and Kindergarten, covering all pre-K to Grade 12 for both national curriculum and AP courses. The fact that TUHS implemented a blended learning approach in 2016 supported the transition to online learning due to the pandemic, and it helped to accelerate the restructuring of the curriculum. Another initiative, the Innovative Talent Cultivation Open Forum (ITCOF) hosted by K-16 Technology and Engineering Education Alliance (K-16 Alliance)—a collaborative partnership of TU and the Ministry of Education with the goal of building a stronger tie between K-12 and higher education—involved the participation of educators, researchers,

and practitioners from universities, schools, and governments to share insights into education for innovative talents. ITCOF hosted 18 online public talks in 6 weeks, with speakers from TU, Beijing Normal University, high schools, and ed-tech companies. The talks covered a variety of topics, including education research, policy review, education outlook, learning and teaching strategies, and best practice review. Also, the Student Development Center of TUHS hosted the Minds of Youth (MoY), a learning camp designed during the pandemic with the goal of creating online collaborative learning communities for students from different parts of China, from 6th graders up to undergraduate students. MoY is a 5-day online learning camp aimed at providing opportunities for participating students to learn how to stay positive while learning at home, away from friends and teachers. As indicated in preliminary responses, participants expressed having acquired new perspectives.

1.6.5 Colombia: EAFIT University

EAFIT, a private university based in Medellin, Colombia, illustrates how long-standing capacity-building support, provided by the institution to local governments and schools as part of an ongoing collaboration with the National Ministry of Education (MoE), and with the city government of the national capital, was quickly expanded and adapted in the Covid-19 pandemic. This collaborative work between a university and government is derived from the 2012 EAFIT's development of the UbiTAG model, a holistic approach to digital maturity and change management in schools that has been implemented through ongoing long-term projects in more than 400 schools. Based on this experience, right before the pandemic, EAFIT supported the MoE on the development of *Aprender Digital*, a strategy that became highly useful in response to the Covid-19 emergency. The collaboration of EAFIT with the government is focusing on collectively defining the actions needed for the successful continuation of academic activities in schools, which is in its early stages of implementation. The role of EAFIT has consisted of providing orientation in the creative adaptation of traditional learning methodologies, and transferring the lessons and strategies provided by the UbiTAG model, in order to enhance the continuity of the educational processes of students from their homes. The involvement of EAFIT in support of the government has fostered increased communication and collaboration among different units and schools at EAFIT, although still the connection of the project with the teaching-learning side of the university remains to be enhanced.

1.6.6 India: Symbiosis International University

In the case of India, Symbiosis International University (SIU) illustrates the involvement of a higher education institution with elementary and secondary schools to ensure continuity of teaching and learning during the pandemic for which

experience using remote means to interact with teachers and parents became very useful. Symbiosis Society is a trust that encompasses Symbiosis Schools and Symbiosis International (Deemed University). Symbiosis Schools includes elementary and secondary schools with which SIU has worked during the pandemic. In addition, 23 public rural schools established in Lavale village, the neighborhood surrounding the main campus of SIU, have been "adopted" by SIU even before the pandemic. This occurred through offering training programs for schoolteachers, making technological platforms for the remote delivery of teaching available to schools, and installing solar panels to make possible the use of electronic equipment in cases where no regular electricity is available. During the pandemic, most efforts were devoted to training teachers on how to integrate the Collaborative Online International Learning (COIL) approach into their curriculum. Efforts have been easier to implement in urban schools, with serious difficulties remaining in rural schools. A key element of SIU's related work is to systematically monitor these efforts through hosting regular meetings with the heads of the schools, attending online sessions to review the quality of implementation, receiving feedback from students and sharing it with teachers, and processing feedback from parents.

1.6.7   Japan: Keio University

Based on research and practice, Keio University developed expertise in implementing distance learning. This know-how was mobilized to support Japanese K-12 education's efforts with distance learning for education continuity. In addition, a pre-existing partnership between the Ministry of Education and university had the power of changing old regulations and defining the technical specification to carry out a new ICT system to support distance learning. Building on a pre-existing partnership with the Ministry of Education, Keio University developed a model that enables K-12 schools to implement distance education in ways which are socially acceptable and economically feasible.

1.6.8   Mexico: Autonomous University of Puebla (BUAP)

The Autonomous University of Puebla (BUAP) is a comprehensive public university in Mexico at which almost 20% of the 96,409 students are enrolled in 24 high schools located in different cities in the state of Puebla. Prior to the pandemic, BUAP defined an academic model in which entrepreneurship is one of the skills to be prioritized among its students, resulting in the offering of "EmprendeBUAP," a six-semester face-to-face program which, since its inception, has benefited 16,400 students. As the pandemic forced the closure of facilities, BUAP's team rapidly transitioned the training program into an online format to guarantee educational continuity. In its new format, "EmprendeBUAP" has reached 18,000 beneficiaries

including not only students but also faculty members and parents, and it is planned to reach an additional 10,000 students by the end of the year. The redesigned online program was developed after extensive consultation with faculty members and school principals, and with participation of instructional design specialists and entrepreneurial consultants. In addition, in observing the challenges faced by students, parents, and faculty members, the team decided to develop another initiative named "Sal de la Curva" (Spanish for "Get out of the curve"). This initiative consists of a series of mentoring sessions with the goal of supporting students in the development of self-knowledge, resilience, and family well-being. To increase its impact, a partnership with universities in Central and South America was established, and it is offered to BUAP's students as well as to a group of 120 elementary and middle schools in the state of Puebla.

1.6.9   Mexico: Tecnológico de Monterrey University

The case of the Tecnológico de Monterrey University in Mexico illustrates the advantages of having in place an academic model based on the concepts of flexibility and digital pedagogies, which allowed the multi-campus institution to quickly support academic continuity during the pandemic. Specifically, the case describes the experience of two Tecnológico de Monterrey middle schools as they implemented the Flexible-Digital Model (FDM). Since FDM was originally designed to support teaching-learning during the pandemic at the higher education level, some concerns about its applicability in lower secondary education were present among teachers and institutional administrators. Evaluations conducted during the implementation processes helped to identify challenges by teachers (need for training, access to platforms, security, modified assessment, etc.), students (Internet access failures, emotional attention, distraction at home, etc.), and parents (lack of experience with and training on the use of platforms, frustration and anxiety, flexibility, etc.) Preliminary evaluations indicate that a majority of students have been either satisfied or very satisfied with the modified learning experience.

1.6.10   Mexico: University of Guadalajara (UdeG)

The University of Guadalajara (UdeG) is the second largest public university in Mexico, which includes 71 upper-secondary schools, accounting for 50% of the total enrollment at this level in the state of Jalisco. Before the pandemic, academic collaboration between upper-secondary and higher education institutions within UdeG was not systematically monitored and supported, mostly due to the internal governance of the university. However, the pandemic opened opportunities to address the problem and led to a series of actions, including the massive training of around 6000 full-time faculty, 1400 of whom are upper-secondary teachers, on the

use of technology and active-learning approaches by faculty members from the higher education side of the university (professors). In addition, related teacher's training programs, aimed at discussing and rethinking the academic model of the university, were designed for the first time without separating the upper-secondary and higher education levels, engaging all in discussions and joint solutions by faculty members from both levels to address the challenges of the pandemic. This collaborative approach resulted in a series of recommendations for the university leadership, including the need to build common teaching capacities for the entire academic community (an approach defended mainly by the professors of upper-secondary schools but supported by the higher education faculty members) and the need to make the transition between upper-secondary and higher education levels more effective and easier for students.

1.6.11 Morocco: Al Akhawayn University

Al Akhawayn University in Ifrane (AUI), Morocco, located in a low-income, mountainous, and rural area, implemented several student and faculty-led projects aimed at alleviating poverty and exclusion, especially in K-12 education. Many of these projects have benefited primary schools in the area, and some have even had a national impact, some of which occurred in the context of the Covid-19 pandemic. For instance, the CITI (Center for Information Technology Innovation) project developed a platform that houses middle school science teaching materials, which is available nationwide to students and teachers and continues to update the materials with mediated contributions from teachers. This platform with the digital materials proved to be a strong resource for online education during the pandemic.

1.6.12 New Zealand: Massey University

At Massey University in New Zealand, as part of a pre-existing research program on mathematics education, faculty members have been providing support during the pandemic to school leaders and teachers to engage them in a range of new and different ways to teach mathematics to traditionally underserved Māori and Pāsifika students in Aotearoa. The pandemic provided a unique opportunity to mitigate traditional inequity in education for indigenous and Pacific Islanders by involving not only students but also members of their families. While supporting teaching, Massey University researchers examined and explored opportunities to develop a richer understanding of students' funds of knowledge. While recognizing the clear digital divide in access to devices and connectivity, educators participating in the project ensured that families were provided with culturally sustaining mathematics activities at home. The teaching of mathematics using online modalities allowed researchers to observe how engaged family members were in the learning of students, and

how beneficial this involvement was for the improvement of the educational experience of the students. The whole process enabled teachers to gain a better appreciation of family members' involvement in the learning of students. As the lockdown has ended, and schools are in the process of reopening, educators are attempting to find ways to continue the positive relationships they had across their students' communities, which, ultimately, will result in a more equitable mathematics education for underserved populations.

1.6.13   Portugal: University of Lisbon

The Institute of Education of the University of Lisbon (IE-ULisbon) adapted its research and outreach efforts with schools during the pandemic. With a long history of participation in partnerships with elementary and secondary schools, IE-ULisbon continued working with schools during the pandemic with positive results, as indicated in interviews conducted with school principals, teachers, and partnership coordinators. IE-ULisbon implemented a pre-pandemic training on digital competencies provided to teachers from a school cluster in the Lisbon district, which resulted in a Digital Action Plan that was recently developed with teachers. Due to the lockdown, work on this topic transitioned from face-to-face to remote. Thanks to the continuous guidance and involvement of IE-ULisbon, the process was concluded successfully, resulting in an easy adaptation of the use of digital technologies by teachers, students, and parents. Another related experience at IE-ULisbon was the "Let's GoSTEM" project involving 60 teachers and 800 elementary and secondary students with the aim of assessing the impact of a STEM approach on learning, motivation, and interest in further STEM careers. The training phase of the project was scheduled to be held in a face-to-face format as well as the related interaction with students. Both activities were quickly adapted to a remote format. Preliminary findings signal a successful transition and implementation.

1.6.14   Qatar: Qatar Foundation (QF)

Due to its unique role as the primary driver for innovation and educational development at national level, the Qatar Foundation (QF) became involved in supporting education continuity in all levels of the educational system. Universities established at QF's Education City rapidly set up activities aimed at transitioning their existing outreach programs into a virtual delivery mode. At the same time, QF entities supporting the government on the professional development of schoolteachers, developed and conducted massive training programs on the use of technological platforms. The main support efforts from QF consisted of online delivery of teaching, development of online resources, professional development of teachers and principals, research efforts in connection with the continuation of education, and supporting

policy at the national level. In addition, a significant number of activities aimed at supporting delivery of education among the K-12 schools established at Qatar Foundation were made available to outside schools and the public writ large. The whole experience led QF to develop a framework for analysis of actions, which is being used to evaluate effectiveness of interventions, lessons learned, and ways to sustain efforts in the post-pandemic new "normal."

1.6.15 Russia: HSE-National Research University Higher School of Economics

The case of the National Research University Higher School of Economics (HSE) in Russia underscores the importance that previously established relationships with secondary schools played in supporting the continuation of activities during the pandemic. The different units at HSE have in the past worked at promoting the development of the Russian education system, providing methodological support for education and working with high school students and schools across the country on the use of digital technologies, among other activities. The latest work involved conducting research and analysis and disseminating knowledge, promoting best practices, enabling discussions on experiences and training practices in the pandemic, training schoolteachers and principals, providing online instruction and assistance to students, and helping parents to support education at home. Such work was made possible by the ongoing cooperation of HSE with schools in Moscow and other Russian regions through initiatives, such as the "HSE School District" project, the HSE Distributed Lyceum School, a distance-teaching web site created *ex-professo* during the pandemic, YouTube, and other social media-based educational resources. Additionally, HSE conducted a variety of monitoring and research activities aimed at learning from teachers, students, and authorities on their perspectives about the transition to remote education. The leading role of HSE supporting pre-university education during the pandemic prompted the Russian Ministry of Education to request HSE to prepare a report on the status and context of the education system during the pandemic. Also, an interesting development described in the case is the involvement of HSE students who were recruited to support teaching and provide tutoring to secondary school students.

1.6.16 Spain: Universidad José Camilo Cela

The Camilo José Cela University (UCJC), a private university located in Madrid, is part of the larger organization, SEK Education Group, which administers elementary and secondary schools in several countries. While the collaborative involvement of UCJC with those schools has been in place for a while, due to the pandemic,

several related activities were either adapted or developed to guarantee the continuation of education. One of those activities was the involvement of a group of UCJC university education students as Teacher Assistants supporting the online teaching of primary and secondary teachers. This effort helped high school students directly, but also served as an opportunity for further training and awareness of participating university students. A related activity was the offering of personalized online teacher training programs for schoolteachers, with active involvement of the Teacher Assistants. Additionally, UCJC has been able to continue supporting vulnerable refugees residing in Spain during the pandemic through a network of volunteers, providing counseling, online tutoring, and online socioemotional or mental health support to students and teachers. UCJC has also partnered with local NGOs to support parents and students from vulnerable sectors, and it is remotely supporting the provision of education to refugees in Kenya, especially through female teachers. The whole experience of UCJC's involvement during the pandemic has helped foster innovation and entrepreneurship among students and faculty members, and it has also strengthened the social commitment of the academic community.

1.6.17 Turkey: Bahçeşehir University (BAU)

Bahçeşehir University (BAU), a private higher education institution with six campuses in Istanbul, is part of BAU Global Education Network, which includes two chains of K-12 schools with 180,000 students and 21,000 teachers in about 280 campuses around Turkey. The Faculty of Education at BAU has worked with these schools before the pandemic, through the program "University within School." This earlier engagement made it easier to collaborate with schools during the lockdown providing training to mitigate the anxiety of parents, students, and teachers. Because of the magnitude of the task, the instructors teamed up with master's and PhD students and supervised the counselling of students voluntarily provided in individual and group sessions. Also, a massive dissemination effort was held using social media to share good practices and recommendations. In addition, as a result of a survey conducted in schools, BAU's Faculty of Education set up a wide array of virtual dissemination sessions for parents, teachers, and students focusing on psychological resilience and coping with anxiety. Other activities included leadership skills training for school principals, showcasing technological applications and methodologies to enrich online learning, and an online training on computer technologies for teaching, offered to teachers working in state schools with the collaboration of the Ministry of Education. The overall volunteer work of faculty members from BAU supporting elementary and secondary schools has helped to strengthen the collaboration between the university and schools, and also helped to refine collaboration between different departments of the university.

1.6.18 USA: Arizona State University

The case shared by Arizona State University (ASU) describes how different units at ASU mounted rapid responses to the pandemic that provided elementary- and secondary-level students resources and learning opportunities to which they would otherwise not have had access. Those units include ASU Preparatory Academy (a tuition-free school serving students in grades K-12 chartered by ASU), ASU Prep Digital (a flexible online school offering a path toward college admission), the Gary K. Herberger Young Scholars Academy (a learning environment for intellectually gifted students), and ASU's Mary Lou Fulton Teachers College. Actions focused on assuring a direct provision of education to K-12 learners; supporting schools with human and intellectual capital resources; and curating and making available free educational resources to learners, families, and schools. As ASU has a long-standing experience of partnerships with elementary and secondary schools, many of the existing long-term commitments helped the university develop capabilities that could be quickly applied to help elementary and secondary learners during the pandemic. A key enabler of collaboration with K-12 schools is that ASU has in place a formal institutional vision to universal learning that demands a university be ready and able to deliver instruction in many modalities to all learners.

1.6.19 USA: Massachusetts Institute of Technology

The case study of the Massachusetts Institute of Technology (MIT) describes the efforts and impact of an initiative aimed at supporting remote collaborative learning for K-12 students, parents, and educators. Known as Full STEAM Ahead (FSA), the program was implemented in response to the pandemic and included the offering of weekly themed packages with developmentally appropriate activities for students, and the development of a summer program for middle school students. Both initiatives were established targeting at-risk students with the assumption that MIT can contribute to improving K-12 remote collaborative learning experiences through developing and sharing meaningful curriculum, and by leveraging existing structures and projects within MIT in support of partnerships with the community. FSA's activities have demonstrated that such a collaborative approach has helped to fulfill existing goals and that interaction and community-building are fundamental. It is expected that the resources already developed and the expertise gained in implementing the project will support more effective future outreach efforts of MIT.

1.6.20 Vietnam: University of Education (UEd)

The Department of Educational Sciences at the University of Education (UEd) in Vietnam has a history of ongoing support to K-12 education with a variety of collaborative teaching and research activities; it also has the role of training teachers,

educational specialists, and managers of educational institutions. During the pandemic, due to such involvement with the sector, the UEd immediately started collaborating with the Ministry of Education and Training (MOET) and UNICEF to provide digitally based mental and socioemotional support for K-12 teachers and students, through webinars, social network channels, and TV shows, and by disseminating printed materials. Faculty members from UEd participated in this effort on a voluntary basis. The entire set of initiatives has been well-received by beneficiaries leading to the further development of other training and counseling materials aimed at supporting students through Covid-19. Further monitoring of the different interventions shows that demand for counseling among students during times of crisis is significant, that parents should be involved, and that teachers' demand for psychological and mental health support is as high as the support requested from students. The success of the support in response to the emergency has reinforced the need to develop plans, drafted from experiences and lessons learned, for a sustained effort beyond the pandemic.

1.7 The Results from the Survey[1]

Relying on our institutional networks, we administered a survey to university senior administrators (the survey is available in Appendix A). We received 101 responses to the survey, half of them from public and half from private institutions, from 21 different countries, as shown in Table 1.1. The survey was administered in June of 2020, just 3 months since the pandemic had been declared.

Table 1.1 Universities that answered the survey by type and country

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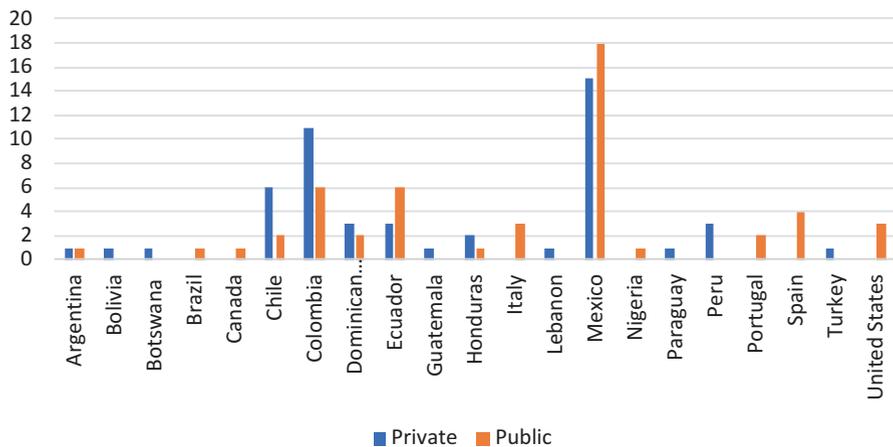
[1]This section draws on a previously published article by Reimers, 2021.

Given the way the survey was administered, to an intentional sample of colleagues, it cannot be considered representative of any known population of institutions. The respondents seem to represent primarily teaching institutions. Only a third of the universities which responded indicated that research is the highest institutional priority in the university, a key criterion to hire and tenure faculty. An additional third indicated that it is a priority to some extent. In contrast, 76% of the respondents indicated that teaching represents the highest institutional priority.

Most respondents see engagement with pre-collegiate education a part of their mission. When asked whether they agreed with this statement, "This university does not see engagement with elementary and secondary schools as part of its mission," only 20% of the respondents expressed total or partial agreement, with 50% expressing total disagreement and 14% expressing some disagreement. Consistent with this, 69% of the respondents report that there is a tradition in the university of partnering with primary and secondary schools for research or extension. To be sure, that they tend to see such engagement as part of their mission does not mean that they see it as an easy endeavor. The respondents report a variety of experiences developing collaborations with pre-collegiate institutions. Two in five respondents indicated that elementary and secondary schools are not particularly receptive to collaborating with universities, while a third of the respondents disagreed with that idea.

One of the ways in which universities engage with schools is through programs of teacher education and maintaining a department of education. Fifty-nine percent of the universities offer a program of pre-service education of teachers, and 74% of them have a department or school of education.

The pandemic did cause most university leaders to reach out to schools. Sixty-four percent of the respondents report that after the COVID-19 pandemic broke out, university leaders or faculty engaged in conversations with institutions involved in elementary and secondary education to explore whether they would welcome or require support from universities to continue to educate during the pandemic, and 61% indicate that the university is engaged with elementary and secondary schools during the Covid-19 pandemic to support those schools in continuing to teach during the pandemic.

The type of school with which universities have developed partnerships to support instruction during the pandemic are presented in Table 1.2. Most university school partnerships involve schools which are part of the same "system" as the university, or schools with which universities had partnerships predating the pandemic. Less frequent are partnerships with schools with which no prior relationships existed as well as supporting governments at the local, state, or national level.

The majority of these schools are located in the same State in which the university is located, with 18 cases where the schools are located in a different State in the same country and 4 located in another country.

Most of these collaborations were initiated by the university, or jointly by the university and the schools. Very few of them were initiated by the schools themselves or by governments.

The efforts during the pandemic were an opportunity to integrate pre-existing collaborations across units in the university and schools, according to 60% of the

Table 1.2 If the university has been engaged with elementary and secondary schools during the Covid-19 pandemic, which type of schools did this include? (more than one response is possible per university)

	Frequencies		
	Total dataset	Private universities	Public universities
A. Schools which are part of the university or of the same "system." These schools and the university are under the same governance	36	19	17
B. Elementary and/or secondary schools with which it had robust prior partnerships but that are not part of the same "system"	47	26	21
C. Elementary and/or secondary schools with which it had no significant prior relationships	21	13	8
D. Local governments to support them in the development and implementation of strategies for elementary and secondary schools during the pandemic	24	15	9
E. State governments to support them in the development and implementation of strategies for elementary and secondary schools during the pandemic	22	13	9
F. National governments to support them in the development and implementation of strategies for elementary and secondary schools during the pandemic	16	13	3
G. Other intermediary organizations—Networks of schools, organizations that provide support to schools, and foundations—To support them in the development and implementation of strategies to educate during the pandemic	26	16	10
No answer	20	7	13

respondents. Half of the respondents see the collaborations between schools and the university as opportunities to help students in the university gain valuable skills. More than half of the respondents see the collaborations with schools as opportunities to foster connections across various departments in the university.

The collaborations, focused primarily on designing products or making available resources and training teachers or staff to support educational continuity during the pandemic, are shown in Table 1.3.

Over half of the respondents report that there were many challenges in establishing these collaborations with schools. While the decision to initiate the collaborations involved principally senior university leadership (presidents and deans) and faculty, the implementation of the collaboration involves a broader range of constituents, including faculty, staff, and students. The initiative involves, to a similar extent, the office of the president and provost, the office of outreach and extension, the school of education, and other departments or faculties. In most cases, these efforts are funded by the university. The primary motivation to undertake the collaboration was to be of service to society (66% of the cases). In a great majority of cases, this collaboration is aligned with the university's strategic plan.

Table 1.3 What was the focus of the collaborations of the university with primary and secondary schools included (more than one responsible is possible per university)?

	Frequencies		
	Total dataset	Private universities	Public universities
a. Designing solutions and products that would support learning and teaching during the pandemic	49	27	22
b. Translating research so that it could be used by schools, or others in support of schools so they could continue to teach during the pandemic	21	8	13
c. Conducting research directly relevant to those schools as they continued to teach during the pandemic	13	6	7
d. Transferring practices to schools that allowed them to continue teaching during the pandemic —For instance, sharing lessons learned in teaching online	47	30	17
e. Making available educational, technological, and logistical resources that would support the teaching efforts of schools	37	21	16
f. Training elementary and secondary schools, teachers, staff, and/or principals	48	29	19
g. Other, specify	15	6	9
No answer	20	6	14

Table 1.4 Is there a strategy, or a "theory of action," or "logical framework" guiding these collaborations of the university with elementary and secondary schools?

	Frequencies		
	Total dataset	Private universities	Public universities
These are efforts without an integrated university wide "theory of action" or "logical framework"	30	15	15
There is an emerging "theory of action," evolving as we embark on these efforts	25	15	10
There is a clear "theory of action" or strategy guiding these efforts	30	15	15
No answer	16	5	11
Total	101	50	51

When asked if there is a clear strategy or theory of action guiding these collaborations, the responses are equally divided between those where there is a clear strategy (about a third of the cases), those where there is an emerging strategy, and those where there is not a strategy as shown in Table 1.4.

In most cases (60%) the collaborations were designed as rapid prototypes that are being improved on the basis of experience. In a similar proportion of cases, there is a monitoring system that allows continuous improvement. While there are monitoring and formative evaluations in three quarters of the cases, impact evaluations or

Table 1.5 Have these efforts been evaluated in any way? (more than one responsible per university is possible)

	Frequencies		
	Total dataset	Private universities	Public universities
a. We have collected evidence that has been used to manage and improve those collaborations	56	30	26
b. We have conducted formative evaluations of those collaborations	22	13	9
c. We have evaluated the impact of those collaborations	15	10	5
d. These collaborations are the basis of applied or academic research carried out by academics at the university	20	9	11
	21	8	13

academic research based on those collaborations are less frequent, as seen in Table 1.5.

In about half of the cases, the collaboration is visible or highly visible within the university and outside the university.

1.8   Conclusion

The Covid-19 pandemic upended life as we knew it, causing disruptions in many areas of life. Facing those disruptions, universities sought not just to make adjustments so they could continue to carry out their teaching mission, while attending to the restrictions caused by the pandemic and measures to mitigate it, including the restrictions to in-person instruction; instead, universities reached out to schools to support teaching and learning. They did so in a variety of ways, in most cases building on pre-existing relationships with schools, school networks, and school systems. They did this in the spirit of rapid prototyping, prioritizing timeliness in the response, and gradually refining and improving their engagement.

While universities engaged with schools because they saw service to society as part of their mission, such engagement also served to advance knowledge, outreach, and the education of university students, in effect promoting greater integration among these three goals. It also served to connect various efforts across the university. While it is too early to determine the effectiveness of those efforts, or whether they will be sustained in the long term, they illustrate the university's capacity to respond quickly to changes in the external environment and to not only adjust to the global crisis caused by Covid-19 but to participate in creating a better future. The following chapters present in detail how 20 universities engaged in these efforts and what those efforts mean about the evolving role of the university's purpose in a world made more challenging and uncertain by the pandemic.

Appendix A: Survey Administered to an Intentional Sample of Universities in June 2020

GEII_HigherEducation_K12

Q1 This is an invitation to participate in a study on the role of higher education institutions supporting educational continuity at the elementary and secondary school levels during the Covid-19 pandemic. The purpose of this survey is to examine whether, to what extent, and in what ways, universities have supported elementary and secondary schools [1] in the delivery of education during the Covid-19 pandemic. Please complete the survey before August 7, 2020. This study is conducted by the Global Education Innovation Initiative at the Harvard Graduate School of Education with participation from colleagues in the Qatar Foundation for Education, Science and Community Development, and 25 universities around the world. **The survey should be filled out by a person who has information on the overall engagements of the university with elementary and secondary schools. This could be a senior administrator with a broad overview of university engagements, or a faculty member involved in such efforts**. If you do not have information about those broad efforts, please do not fill out the survey, and forward it to the person in the institution that has such knowledge. The results of this survey will be presented in an academic book that examines whether the Covid-19 pandemic created and/or strengthened collaborations among schools and universities around the world. The results will be reported in aggregate form, with categories that group universities by type (public-private, research-teaching), size, and geography. No individual level results for any participating university will be reported. Names of universities participating in the survey may be identified in the description of the methodology, only if they so authorize this in this survey. Participation in this survey is voluntary. The survey includes 50 multiple option questions and should take about 30 min to complete. Your results will only be transmitted once you press submit at the end of the survey; you can suspend participation at any time.

[1] Our definition of "elementary and secondary schools" includes all formal levels of education before the ones offered at the undergraduate level in colleges and universities. ISCED Levels 0, 1, 2, and 3.

Q2 Your name:

Q3 Email address where we may contact you?

Q5 Name of the university

Q6 May we contact you with follow-up questions, if we have them?

○ Yes (1)
○ No (2)

Q7 Would you be interested in receiving a copy of the report based on this survey?

    ○ Yes (1)
    ○ No (2)

Q8 This university is …

    ○ It is a Public university, a State institution (1)
    ○ It is a Private university (2)

Q9 Country

Q10 In what year was the university established?

Q11 Total undergraduate enrollment (these are students in degree granting programs at the bachelors or equivalent level ISCED level 6)

Q12 Total graduate enrollment (these are students enrolled in masters or doctoral programs ISCED level 7)

Q13 Total enrollment in community, junior college, or associate degree (ISCED level 5)

Q14 Total enrollment in secondary, primary, or preprimary school (ISCED levels 4 and below)

Q15 Approximately what percentage of the university budget comes from tuition revenues?

Q16 Approximately what percentage of the university budget comes from research?

Q17 Approximately what percentage of the university budget comes from donations or returns on investments of donations?

Q18 Approximately what percentage of the university budget is a public subsidy or appropriations?

Q19 Focus on research. To what extent is this university one in which carrying out research is the highest institutional priority, a key criterion to hire and tenure faculty members, and a significant part of the university budget?

    ○ To a great extent (1)
    ○ To some extent (2)
    ○ Neutral (3)
    ○ Not much (4)
    ○ Not at all (5)

Q20 Focus on teaching. To what extent is this university one in which teaching is the highest institutional priority and a key criterion to hire and tenure faculty members?

    ○ To a great extent (1)
    ○ To some extent (2)
    ○ Neutral (3)
    ○ Not much (4)
    ○ Not at all (5)

Q21 To what extent do you agree with this statement: "In this country or region, elementary and secondary schools are not particularly receptive to collaborations with universities"?

    ○ To a great extent (1)
    ○ To some extent (2)
    ○ Neutral (3)
    ○ Not much (4)
    ○ Not at all (5)

Q22 To what extent do you agree with this statement: "This university does not see engagement with elementary and secondary schools as part of its mission"?

    ○ To a great extent (1)
    ○ To some extent (2)
    ○ Neutral (3)
    ○ Not much (4)
    ○ Not at all (5)

Q23 To what extent do you agree with this statement: "In this university we have a tradition of partnering with primary and secondary schools for research or extension"?

    ○ To a great extent (1)
    ○ To some extent (2)
    ○ Neutral (3)
    ○ Not much (4)
    ○ Not at all (5)

Q24 Does the university have a program that offers pre-service education of teachers?

    ○ Yes (1)
    ○ No (2)

Q25 Does the university have a department or school of education?

    ○ Yes (1)
    ○ No (2)

Q26 After the Covid-19 pandemic broke out, did university leaders or faculty engage in conversations with institutions involved in elementary and secondary education to explore whether they would welcome or require support from universities to continue to educate during the pandemic?

    ○ Yes (1)
    ○ No (2)
    ○ Don't know (3)

Q27 To what extent did this university engage with elementary and secondary schools during the Covid-19 pandemic to support those schools in continuing to teach during the pandemic?

○ To a great extent (1)
○ To some extent (2)
○ Neutral (3)
○ Not much (4)
○ Not at all (5)

Q28 If the university has been engaged with elementary and secondary schools during the Covid-19 pandemic, which type of schools did this include? (select all that apply)

a. Schools which are part of the university or of the same "system." These schools and the university are under the same governance. (1)
b. Elementary and/or secondary schools with which it had robust prior partnerships but that are not part of the same "system." (2)
c. Elementary and/or secondary schools with which it had no significant prior relationships. (3)
d. Local governments to support them in the development and implementation of strategies for elementary and secondary schools during the pandemic. (4)
e. State governments to support them in the development and implementation of strategies for elementary and secondary schools during the pandemic. (5)
f. National governments to support them in the development and implementation of strategies for elementary and secondary schools during the pandemic. (6)
g. Other intermediary organizations—networks of schools, organizations that provide support to schools, and foundations—to support them in the development and implementation of strategies to educate during the pandemic. (7)

Q29 If the university engaged in collaboration with primary and secondary schools, where were those schools located? (select all that apply)

a. Within 10 kilometers of the university (1)
b. In the same State where the university is located (2)
c. In other States in the same country where the university is located (3)
d. In other countries (4)

Q30 What was the focus of the collaborations of the university with primary and secondary schools included? (select all that apply)

a. Designing solutions and products that would support learning and teaching during the pandemic. (1)
b. Translating research so that it could be used by schools, or others in support of schools so they could continue to teach during the pandemic. (2)

c. Conducting research directly relevant to those schools as they continued to teach during the pandemic. (3)

d. Transferring practices to schools that allowed them to continue teaching during the pandemic—for instance, sharing lessons learned in teaching online. (4)

e. Making available educational, technological, and logistical resources that would support the teaching efforts of schools. (5)

f. Training elementary and secondary schools, teachers, staff and/or principals. (6)

g. Other, specify (7) _____

_____

Q31 How many elementary schools were reached by these efforts?

Q32 How many secondary schools were reached by these efforts?

Q33 How were those collaborations initiated? (select all that apply)

a. They were initiated by the government (1)

b. They were initiated by schools (2)

c. They were initiated by the university (3)

d. They were initiated jointly by schools and the university (4)

e. Other, specify (5) _____

_____

Q34 To what extent do you agree with this statement: "the engagement of the University with elementary and secondary schools during the pandemic created an opportunity to integrate a number of collaborations with elementary and secondary schools taking place in various units across the university into a more coherent effort"?

○ To a great extent (1)
○ To some extent (2)
○ Neutral (3)
○ Not much (4)
○ Not at all (5)

Q35 To what extent do you agree with this statement: "the collaborations with elementary and secondary schools provided new opportunities to help students in the university gain valuable skills"?

○ To a great extent (1)
○ To some extent (2)
○ Neutral (3)
○ Not much (4)
○ Not at all (5)

Q36 To what extent do you agree with this statement: "the collaborations with elementary and secondary schools created opportunities for collaboration across departments in the University"?

○ To a great extent (1)
○ To some extent (2)
○ Neutral (3)
○ Not much (4)
○ Not at all (5)

Q37 To what extent do you agree with this statement: "there were many challenges in establishing and implementing collaborations between elementary and secondary schools and the university"?

○ To a great extent (1)
○ To some extent (2)
○ Neutral (3)
○ Not much (4)
○ Not at all (5)

Q38 Who was involved in the institutional decision to collaborate with schools? (select all that apply)

a. Senior university leadership (President and Deans level) (1)
b. Faculty members (2)
c. University trustees (3)
d. Heads of non-academic departments (4)
e. Students (5)

Q39 Who is involved in the implementation of the collaboration? (select all that apply)

a. Administrators of the university (1)
b. Professors (2)
c. Institutional support staff (3)
d. Students (4)

Q40 What units or departments in the university have been involved in this initiative? (select all that apply)

a. Office of the President or the Provost (1)
b. Office of Outreach or Extension (2)
c. School or Department of Education (3)
d. Other Schools or Departments (specify) (4)

Q41 Who is funding these efforts? (select all that apply)

a. Funded by the University (1)
b. Funded by the beneficiary Schools (2)
c. Funded by the Government (3)
d. Funded by Foundations or Donors (4)
e. Other, specify (5) _____
_____

Q42 What was the primary motivation for the university to undertake this initiative?

○ a. It was an opportunity to be of service to society (1)
○ b. It represented a research opportunity (2)
○ c. It was an opportunity to enhance the education of students in the university (3)

Q43 To what extent is this collaboration with schools aligned with the University strategic plan?

○ To a great extent (1)
○ To some extent (2)
○ Neutral (3)
○ Not much (4)
○ Not at all (5)

Q44 Is there a strategy, or a "theory of action," or "logical framework" guiding these collaborations of the University with elementary and secondary schools?

○ a. These are efforts without an integrated university wide "theory of action" or "logical framework." (1)
○ b. There is an emerging "theory of action," evolving as we embark on these efforts. (2)
○ c. There is a clear "theory of action" or strategy guiding these efforts. (3)

Q45 To what extent do you agree with this statement: These collaborations were designed as rapid prototypes which are being improved as the result of what is being learned during implementation?

○ To a great extent (1)
○ To some extent (2)
○ Neutral (3)
○ Not much (4)
○ Not at all (5)

Q46 Is there a monitoring system of these efforts that is used for improvement of those efforts?

○ Yes (1)
○ No (2)

Q47 Have these efforts been evaluated in any way? (select all that apply)

a. We have collected evidence that has been used to manage and improve those collaborations. (1)
b. We have conducted formative evaluations of those collaborations. (2)
c. We have evaluated the impact of those collaborations. (3)
d. These collaborations are the basis of applied or academic research carried out by academics at the university. (4)

Q48 How visible is this collaboration within the university?

    ○ Highly visible (1)
    ○ Visible (2)
    ○ Not very visible (3)
    ○ Largely unknown (4)

Q49 How visible is this collaboration outside the university?

    ○ Highly visible (1)
    ○ Visible (2)
    ○ Not very visible (3)
    ○ Largely unknown (4)

Q50 By what name is the initiative recognized among those who are involved?
Q51 Can we include the name of the university in the list of institutions acknowledged in the methodology section of the report?

    ○ Yes (1)
    ○ No (2)

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Fernando M. Reimers is the Ford Foundation Professor of the Practice of International Education and Director of the Global Education Innovation Initiative and of the International Education Policy Master's Program at the Harvard Graduate School of Education. An expert in the field of Global Education, his research and teaching focus on understanding how to educate children and youth, so they can thrive in the twenty-first century. He is a member of UNESCO's high-level commission on the Futures of Education.

He has written or edited forty academic books, and since the onset of the Covid-19 pandemic steered the Global Education Innovation Initiative to carry out research that can sustain educational opportunity or contribute to building back better. With his graduate students, he has developed three curriculum resources aligned with the UN Sustainable Development Goals, which are translated into multiple languages and widely used by schools and school systems around the world.

Francisco Marmolejo is Higher Education President at Qatar Foundation (QF), where he leads QF's support and coordination activities to the unique ecosystem of eight prestigious universities offering in Education City in Doha, Qatar, more than 70 undergraduate and graduate programs to students from 60 countries. Previously (2012–2020), he worked at the World Bank, where he served as the Global Higher Education Coordinator, based in Washington, DC., and more recently as Lead Higher Education Specialist for India and South Asia, based in New Delhi. From 1995 to 2012, he served as founding Executive Director of the Consortium for North American Higher Education Collaboration, a network of more than 160 universities mainly from Canada, the United States, and Mexico, based at the University of Arizona, where he also worked as Assistant Vice President, Affiliated Researcher at the Center for the Study of Higher Education, and Affiliate Faculty at the Center for Latin American Studies. Previously, he has been American Council on Education Fellow at the University of Massachusetts, Academic Vice President of the University of the Americas in Mexico, and International Consultant at OECD in Paris. He has received honorary doctorate degrees from his Alma Mater, the University of San Luis Potosi, and the University of Guadalajara in Mexico.

Chapter 2
Fundação Getulio Vargas' Efforts to Improve Basic Education Before, During, and After the Pandemic

Claudia Costin, João Lins, José Henrique Paim, Marieta de Moraes Ferreira, Raquel de Oliveira, Teresa Pontual, and Vinicius Farias Santos

Abstract This chapter details FGV's contributions to basic education during the pandemic. FGV created in 2003 an accessible tool that addresses the managerial gaps that schools and education departments face to evaluate and assess its students, called FGV High School. Since March 2020, when school closures took place, the rapid demand for digital education tools placed FGV High School in an advantageous position to establish partnerships with education departments across Brazil, benefiting millions of high school students. In the state of São Paulo alone, the FGV High School platform gives access to approximately 3.5 million students. In 2008, FGV became a member of Open Education Global (OEG), a consortium of educational institutions from different countries that provide online content and teaching materials free of charge. Since the beginning of the Covid-19 pandemic, the demand for FGV's online courses has substantially increased. In March 2020 alone, the program's website registered more than 1.6 million hits, and the number has since then consistently increased. Additionally, FGV has recently created two policy centers that focus on basic education: The Center for Excellence and Innovation in Education Policy (CEIPE), created in 2016, and the Center for the Development of Public Management and Educational Policy (DGPE), in 2018. Since the beginning of the pandemic, both centers have organized a series of webinars and publications to support policymakers in the education sector to make better decisions regarding reopening of schools, online and digital education options, curriculum, etc. The high number of views and engagement that the FGV webinars attract reflects the desire for reliable information that education professionals have been seeking, despite the overwhelming number of online events that have surfaced with the pandemic.

C. Costin (✉) · J. Lins · J. H. Paim · M. de Moraes Ferreira · R. de Oliveira · T. Pontual · V. F. Santos
Fundacao Getulio Vargas, Sao Paulo, Brazil
e-mail: claudia.costin@fgv.br

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2.1   Introduction

The Covid-19 pandemic reached Brazil in February, and its K-12 schools were closed by the end of March, leaving about 45 million students at home. As a result, Fundação Getulio Vargas (FGV), a Brazilian higher education institution and think tank, leveraged its resources to provide policymakers with access to reliable information to navigate the crisis, as well as access to high-quality, online educational resources for secondary students and education professionals.

The online resources directed at education professionals and secondary education students came from long-standing programs within the university and became integral for cities and states looking for readily and freely available remote learning strategies. The support offered to policymakers to address the Covid-19 crisis came primarily from two policy centers within FGV established in the last 4 years. Both centers are managed by leaders in Brazil's education policy landscape and dedicated to supporting basic education systems at the city and state levels. Because of their work prior to the pandemic, these centers had already developed close partnerships with departments of education in several cities and states. Also, the fact that FGV's Business and Public Administration School has such prominent names from the policy field in their faculty aligns with FGV's mission to stimulate Brazil's socioeconomic development. FGV sees itself as a change agent within Brazilian society, and by creating two centers focused on improving basic education, it recognizes that Brazil's socioeconomic development depends on equal educational opportunities for all.

This chapter provides in-depth details of FGV's contributions to education continuity during the pandemic. One of the unexpected results of the pandemic has been the increase in collaboration among the different centers and departments of FGV that focus on basic education, including the joint effort involved in preparing this chapter.

2.2   About FGV

Established in 1944 to promote Brazil's social and economic development, Fundação Getulio Vargas (FGV) has established itself as one of the top 10 think tanks in the world (according to the Global Go To Think Tank Index Report 2017) as well as a well-regarded higher education institution. Its vision is to be recognized as an innovative institution that is committed to Brazil's development, the formation of an academic elite, and the generation of public social goods.

FGV has ten different schools in areas such as Economics, Law, Public and Business Administration, Social Sciences, Applied Mathematics, Public Policy, and Government and over 90 research centers based in Rio de Janeiro, São Paulo, and Brasília. FGV also has two institutes, one of which offers executive education courses in over 100 cities.

In 2019, FGV had 4919 undergraduate students, 2282 master's students, 463 PhD students, and 103,409 continuing education students. There were 606 master's dissertations and 85 doctoral theses approved. FGV's professors, researchers, and technicians produced 2460 academic papers and published 140 books. FGV executed 420 technical assistance projects and organized or co-organized 812 conferences and seminars.[1]

2.3   FGV High School

FGV's involvement in the discourse on basic education in Brazil dates to 1950, when it started Colégio Nova Friburgo, a school that implemented innovative education practices until its closing in 1977, due to financial and political circumstances. From 1971 until 1990, FGV ran the Institute for Advanced Studies in Education (IESAE), which promoted the discussion of a range of educational issues and offered post-graduate studies in Education.[2] In keeping with this tradition, the initiative known as FGV High School[3] was created in 2003 with the dual role of promoting a robust dialogue and impactful contributions to secondary education.

The FGV High School program's main objective is to establish partnerships with schools, departments of education, and other public and private institutions that work in providing or promoting secondary education. FGV High School also forges partnerships directly with teachers from public and private schools in the city of Rio de Janeiro to assist in the production of its pedagogical content.

Additionally, the program designs and produces teaching materials (from books to digital resources) and promotes debates – particularly through events, seminars, publications, etc. – that interrogate the most important issues and trends concerning secondary education. In the last 2 years, FGV High School published two books that compiled articles written by managers and specialists discussing contemporary challenges and best practices in secondary education: *The Challenges of High School Education*[4] and *The New high School Education and Itineraries Training Courses,*[5] issued in 2018 and 2020, respectively. Beyond accessible resources for teachers and school leaders, FGV has also produced digital tools for students.

Launched in 2012, the first version of FGV High School's online platform mainly targeted high school students who were studying for the National High School Examination (ENEM).[6] Since then, the site has reached almost three million views

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[1] FGV's 2019 Annual Report.

[2] Santos, P. S. M. B. dos. O Colégio Nova Friburgo da Fundação Getúlio Vargas: mergulhando em sua memória institucional. Rio de Janeiro, 2005.

[3] In Portuguese: FGV Ensino Médio.

[4] In Portuguese: Os Desafios do Ensino Médio, FGV Editora, 2018.

[5] In Portuguese: O Novo Ensino Médio e os Itinerários Formativos, FGV Editora, 2020.

[6] The National High School Examination (Exame Nacional do Ensino Médio – ENEM) is a yearly college entrance examination. Its results are used to access higher education in Brazilian public and private universities as well as some universities abroad.

and more than 130,000 registered users. In 2019, the second version updated the platform with improvements to its functionalities and objectives.

The core strengths of FGV High School's online platform lie in the quality of production and constant review of content. After being used in the online platform and the ENEM model exams administered by FGV, the existing questions are regularly screened by various specialists in the areas covered (Languages, Natural and Social Sciences, and Mathematics) who analyze and propose improvements in terms of their form, content, and categorization criteria (such as skills and competencies).

Initially, students autonomously enrolled on the platform and would have access to digital resources and a question bank to take simple assessments. In the revised website, the program's focus shifted to provide the students with an evaluation platform that promotes dialogue between the student, the teacher, and the school. Furthermore, FGV High School also seeks constant feedback from teachers and students who use its services, regarding the quality and potential improvements of the online content and user experience.

FGV High School has signed agreements with public Departments of Education and private schools located in Rio de Janeiro and São Paulo. These partnerships comprise the development and monitoring of evaluation processes (mock tests) aligned with ENEM, emulating both the usual test conditions (physical exams) and the online environment (through the FGV High School online platform). Among its most successful and long-lasting partnerships are those made with the city of São Paulo's Department of Education and the SESC High School.[7]

2.4   FGV High School's Response to the Pandemic

Currently, the online initiative of the FGV High School has gained critical importance, especially considering the uncertainty surrounding the 2020 edition of ENEM that was finally set to January 2021, despite students' having expressed their preference for May 2021 on a Ministry of Education online survey. For the first time since the exam's creation, an online version of the test was administered to approximately 98,000 registered students (out of a total of 5,eight million[8]). Since FGV High School offers a tool that emulates the conditions of the virtual version of the exam, students who access for preparation are at an advantage.

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[7] SESC High School is a full-time free residential high school located in Rio de Janeiro city which attends students from all over Brazil. The school was inaugurated in 2008 with 176 students. Nowadays, it serves 500 students. Their class size is limited to 15 students that range between 13 and 18 years old. SESC High School pedagogical project focuses on citizenship education and seeks to conciliate academic education with professional education. The school offers various types of educational activities and has a very extensive students' selection process.

[8] 5.8 million students registered to take the 2020 ENEM; 96 thousand will take the digital ENEM.

Since March 2020, when measures of quarantines and school closures took place, the rapid demand for digital education tools placed FGV High School in an advantageous position to establish partnerships with education departments across Brazil, beyond the states of Rio de Janeiro and São Paulo. These new partnerships included agreements with the Departments of Education for the States of Bahia, Maranhão, and São Paulo. Given the expansion in geographic reach, millions of Brazilian high school students directly benefited from FGV High School's platform. In the state of São Paulo alone, the agreement gives access to approximately 3.5 million students.

Senior education leaders in Brazil are especially motivated to establish these beneficial partnerships because the public education system has previously lacked reliable online platforms that can assist teachers in the provision of exams and mock tests remotely. FGV High School program is particularly suited to fulfill this duty, since its platform creates, administers, and grades exams online, presenting a variety of data that allow teachers to understand each student's strengths as well as the gaps they need to address based on test performances. Accordingly, FGV High School's main role in the collective effort associated with non-tertiary education is primarily that of providing an accessible tool that addresses the managerial gaps schools and education departments face to evaluate and assess its students.

While the FGV High School platform has gained greater visibility and an expanded reach, some challenges have arisen from this sudden growth. These have ranged from having to manage a large and diversified portfolio of students, teachers, and schools to the necessity of continuous improvement of the platform's resources, which requires an effort to interpret the learning outcomes and aspirations of all users.

Nevertheless, the future of FGV High School lies in the maintenance and improvement of its tools and services. The importance of these materials and resources has only increased with the potential addition of millions of Brazilian students accessing them because of the pandemic. Hopefully, this program will endure beyond the pandemic and continue to help improve secondary education across Brazil.

2.5   FGV Free Online Program

In 2008, FGV was the first Brazilian institution to become a member of Open Education Global (OEG), a consortium of educational institutions from different countries that provide online content and teaching materials free of charge. Since the addition of the Free Online Course Program to FGV's education portfolio, the program has registered more than 13 million users and has issued approximately seven million certificates.

The courses available in the program are self-guided and encompass a variety of knowledge areas related to the fields of teaching and research within FGV's academic realms. Participants who satisfactorily complete a course may acquire a

certificate. Currently the program offers 81 courses, with a course load varying between 8 and 30 h; these courses all provide online education to diverse demographics such as vocational education students, undergraduate and graduate students, as well as established professionals who seek to update their skills and expand their competencies.

2.6   FGV Free Online Program's Response to the Pandemic

Since the beginning of the Covid-19 pandemic and the mandatory social isolation protocol adopted in Brazil, which included the closure of teaching facilities, the demand for FGV's online courses has substantially increased. In March 2020 alone, the program's website registered more than 1.6 million hits (accumulating over four million views) with these figures consistently increasing.

To adequately provide this service while facing a surge in its demand, FGV increased the program's investment by strengthening its technological infrastructure to ensure the high quality of user experience and expanding the program's offerings. From March to May 2020, 18 new courses became available, benefitting thousands of students.

During this period approximately one million students enrolled, and more than 300,000 certificates were issued. Graphs 2.1, 2.2, and 2.3 depict information concerning the program's numbers, specifically the monthly and accumulated enrollments from January to May 2020, as compared to the same period in 2019. Moreover, the compiled data shows that in comparison to the same period in 2019, the program's webpage views were multiplied by a factor of over 16, while enrollments and completion certificates issued increased 233% and 136%, respectively. Noticeably, all indicators detailed in the graphs below peaked in March, precisely

Graph 2.1 Access to the FGV Online Free Course Program's website (2020 vs. 2019). (Source: FGV Executive Education Department)
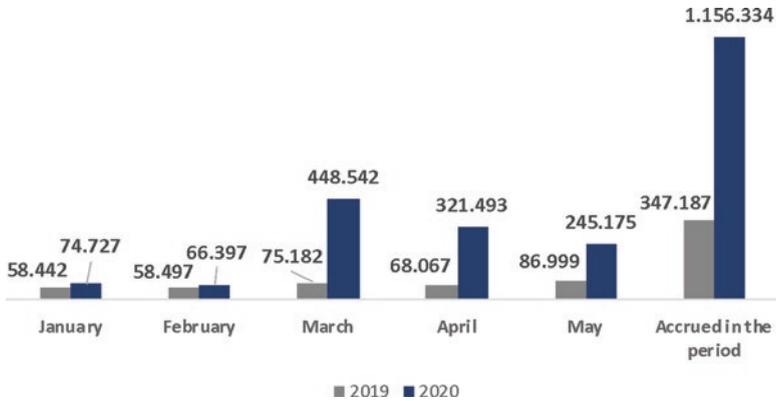
Graph 2.2 Enrollment in the FGV Online Free Course Program (2020 vs. 2019). (Source: FGV Executive Education Department)
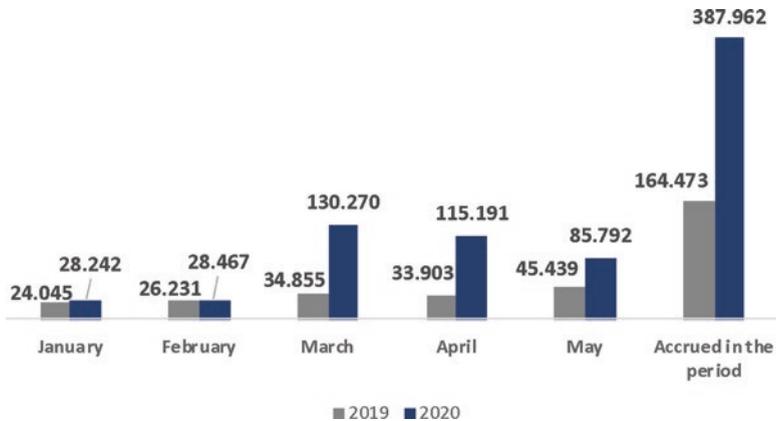
Graph 2.3 Statements of Completion issued in the FGV Online Free Course Program (2020 vs. 2019). (Source: FGV Executive Education Department)

the month in which the enforcement of measures regarding the Covid-19 pandemic started in Brazil.

Lately, FGV's Online Department has turned its efforts to promoting this program to an audience that works directly with public education in Brazil. By forging strategic partnerships with key actors, such as State Departments of Education, Consed[12] and Undime[14], the program was advertised and became known to a broader network of educational professionals (e.g., teachers, school principals, education system managers, etc.). The program also began developing specific content targeting the main topics related to the challenges faced by this audience in their roles.

FGV had formally signed agreements with some public Departments of Education, so that public sector education professionals and teachers of many state and municipalities in Brazil will be directly impacted by the program's

communication and will be able to access this opportunity to invest in their own professional development, which will hopefully lead to improvements within Brazil's public education system.

2.7 FGV's Policy Centers

As previously mentioned, FGV recently created two policy centers which focus on basic education, which in Brazil means from Early Childhood Education to the end of High School. The Center for Excellence and Innovation in Education Policy (CEIPE)[9] was created in 2016 within the Brazilian School of Public and Business Administration (EBAPE) with the mission to improve educational policy management so that Brazil may have an equitable, innovative, and high-quality basic education. CEIPE offers technical assistance to city and state departments of education, produces policy briefs and other applied knowledge publications, and promotes leadership training. The Center for the Development of Public Management and Educational Policy (DGPE)[10] was created in 2018 to promote the development of public management and support public teaching systems to improve education management.

Since late March 2020, both centers have focused on helping city and state Departments of Education from all regions in Brazil already supported by the Centers' projects adapt and respond to the challenges of the pandemic. To extend their reach beyond their current partnerships, both centers have organized a series of webinars featuring city and state education officials as well as representatives from national and international education NGOs to discuss policy responses and recommendations.

2.8 Webinar Series

To promote debates and spread knowledge on the challenges and potential solutions concerning educational issues during the pandemic, FGV hosted two webinars series with specialists and public officials at the forefront of educational policies tackling Covid-19 and its educational implications. The webinars have been open to the public to include all interested parties in such important discussions.

DGPE, FGV High School, and FGV In Company partnered with Consed and Itaú Social (the social responsibility arm of a Brazilian bank) to organize the series titled "Challenges of Basic Education in the Times of a Pandemic" on how to support educational systems in improving management during the Covid-19 crisis.

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[9] In Portuguese: Centro de Excelência e Inovação em Políticas Educacionais.

[10] In Portuguese: Centro de Desenvolvimento da Gestão Pública e Políticas Educacionais.

Considering the effort and dialogue with the state and municipal education networks, the series' objective was to achieve a joint definition of the optimal path to education continuity during the pandemic and possible ways to improve the planning and management of school reopening at this difficult time.

The expected outcome of these dialogues and debates is that new ideas emerge to illuminate and guide the path both state and municipal education departments could follow to mitigate issues and explore opportunities for innovative efforts within the context of this crisis. The Covid-19 pandemic accelerated the digital transformation of educational resources and signaled a renewed effort to improve the management of education across Brazil. To best facilitate these adjustments, this webinar series covered a wide range of relevant topics such as technology, teaching practices, pedagogical materials, logistical issues, and alternatives for monitoring and evaluating learning in the context of the pandemic crisis.

FGV selected and invited a diverse panel of experts with extensive experience in dealing with educational issues to guide these discussions. Among them were former Ministers of Education, governors, members of Brazil's National Education Council, state and municipal education secretaries, and members of Consed and Undime. Additionally, professors and representatives of international organizations, such as the United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Children's Fund (UNICEF), Organization of Ibero-American States (OEI), and Inter-American Development Bank (IDB), were involved as panelists.

Overall, DGPE's webinar series consisted of 12 webinars with more than 10,000 registered participants. CEIPE's webinar series entitled "Education Systems' Responses to the Pandemic" features state and municipal education systems that work diligently to keep students engaged and learning amidst school closures. The series' objective is to discuss and disseminate the experiences of various Departments of Education across Brazil that managed to implement alternative remote education solutions and face the educational challenges imposed by the pandemic. CEIPE's webinars brought together municipal and state secretaries of education whose remote learning strategies involved delivering lessons through several media (online platforms, mobile applications, television, radio) as well as delivering printed materials and providing sim cards with cellular data plans or sponsoring their remote learning mobile applications with the main telecommunications companies to reach all students. This exchange of experiences was meant to inspire all public education leaders to implement thoughtful strategies to ensure students were not excluded from learning opportunities while school buildings remained closed. A strength of this series was how it featured a wide range of municipal departments of education, from small rural cities to large capitals as well as state departments of education from all regions of Brazil, reflecting the wide variety of cultural and socioeconomic realities present across the country. Although national experiences were the primary recognized examples, CEIPE's staff consistently referenced international experiences in the dialogues and directed viewers to its Covid-19-related publications on

their website. The high number of views and engagement that the FGV webinars attract reflects the desire for reliable information that policymakers and education professionals alike have been seeking, despite the overwhelming number of online events that have surfaced with the pandemic. CEIPE has also mentored 50 municipal and three state-level secretaries of education, to address the challenges created in their systems by the pandemic.

2.9   Publications in the Context of Covid-19

Among FGV CEIPE's many functions to fulfill its mission of improving educational policy management in Brazil, it produces and disseminates evidence-based knowledge to Brazilian policymakers and the public. As such, it has added Portuguese versions of publications related to the pandemic to its portfolio; for instance, CEIPE added four reports addressing the main challenges, best practices, and potential solutions to the issues brought upon education systems during the pandemic to its website.

The first such publication was the translation to Portuguese of "A Framework to Guide Education Response to the Covid-19 Pandemic of 2020" produced by Fernando Reimers and Andreas Schleicher and published by OECD, which addresses how efforts to continue education through alternate modalities should be directed while social distancing policies are necessarily enforced.

CEIPE has also translated the second report produced by Fernando Reimers and Andreas Schleicher: "Schooling Disrupted, Schooling Rethought: How the Covid-19 Pandemic is Changing Education." This research provides an insightful overview and recommendations based on the findings from a survey taken by departments of education in 59 countries on how their education systems have been affected by the pandemic and what measures they have employed in Covid-19's aftermath.

Additionally, "Managing Education Systems during Covid-19: An Open Letter to a Minister of Education" originally published by the Center for Global Development, which offers guidelines to education managers on how to better prepare for the implications the Covid-19 is bringing upon education, was added to the website, including a chapter from our founder and director, Claudia Costin.

More recently, FGV CEIPE translated the policy brief "Reopening Schools in the Context of Covid-19: Health and Safety Guidelines from Other Countries" originally published by the Learning Policy Institute, one of FGV CEIPE's partner institutions. This brief discusses preliminary information gathered from five countries that have already or were reopening their schools by the time of its publication.

Besides translated publications, FGV CEIPE also produced original content. Written by FGV CEIPE's Founder and Director, Claudia Costin, "Recommendations for Returning to Classes" provides a set of guidelines to assist departments of education in their strategies and implementation plans to reopen Brazilian schools.

CEIPE will continue to produce its own materials to help Brazil's 26 states, the Federal District that hosts the country's capital, Brasilia, and 5568 municipal education systems face the challenges imposed by the pandemic as well as identify the best resources being produced worldwide and make them available to the Portuguese-speaking public.

2.10   Conclusion: What Is Next?

The variety of initiatives and centers engaged in meaningful work is evidence of FGV's long-standing and profound commitment to improve basic education in Brazil, which is closely aligned with its mission of contributing to the country's socioeconomic development. The pandemic has helped strengthen the reach and impact of several of FGV's online-based programs, such as FGV High School and its Free Online Program, given the general increase of interest in these types of digital solutions brought on by the school closures.

As the pandemic progresses, FGV will continue to provide guidance, information, and resources to public education leaders throughout Brazil. It is difficult to measure the impact of access to information on leaders' behavior and decision-making in general and that is no different in the current context. Nonetheless, FGV is helping shape the discussion, influencing policy decisions as well as how the media portrays the role of remote learning and the priority that should be given to safely reopening schools. This is evidenced by our specialists' constant media presence and their appearances on events alongside prominent public education decision-makers, such as National Education Council members, as well as Consed and Undime leaders. FGV is looked upon as a reliable, nonpartisan voice, amid polarized debate around sensitive issues such as inequalities in remote learning and the responsible reopening of schools during a pandemic. The webinars and publications produced provide pathways for Departments of Education which differ from the extreme viewpoints touted within the current political climate, based on what some departments of education have done to reach nearly all students with remote education and what other countries have been able to do to safely reopen schools.

Even if we can help leaders minimize the negative consequences of the pandemic, Brazil's Basic Education System, which was already among the poorest performers in PISA, is still likely to face even greater challenges in the post-Covid-19 era. Helping education systems worldwide rebuild better, more innovative structures for learning will require even greater efforts, more collaboration, and a wider array of stakeholders. As an institution at the cutting edge of academic knowledge and leadership training, FGV can play a prominent role in helping Brazil's Education System overcome this crisis with the tools to allow schools to function at the highest of standards. The greater integration between FGV's different programs and centers, such as those featured in this chapter, will be a legacy of this crisis.

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Claudia Costin is the Founder and Director of CEIPE – Center for Excellence and Innovation in Education Policies – a think-and-do tank located at FGV EBAPE, one of the most prestigious Public Administration and Business Schools in Brazil. She is a member of the Governing Board of Qatar Foundation and of UNESCO's Institute for Lifelong Learning – UIL. In the past, she was the Senior Director for Global Education in the World Bank. Prior to this, Claudia Costin was the Secretary of Education for the city of Rio de Janeiro, Brazil. Under her stewardship, learning results rose by 22 percent. Until 2009, she was the Vice-President of the Victor Civita Foundation, dedicated to raise the quality of public education in Brazil. Her former positions include being the Secretary of Culture of the state of São Paulo, Vice-minister and Minister of Public Administration and State Reform during Fernando Henrique Cardoso's presidency, and President of Promon-Intelligens, a company focused on e-learning. She has also supported several African countries in public policy and State modernization. Claudia Costin is also a professor at FGV EBAPE. She has lectured at São Paulo's Pontifical Catholic University, Getulio Vargas Foundation, and INSPER – Teaching and Research Institute. She was a visiting scholar at the École Nationale d'Administration Publique, Québec, and at the Harvard Graduate School of Education. She holds a master's degree in Economics from Getulio Vargas Foundation.

João Lins is Executive Director of FGV In Company. He holds a master's degree in Business Administration and is a PhD candidate (FGV Business Administration School of São Paulo). He was previously a partner at PwC, leading the HR Consulting Practice in Brazil.

José Henrique Paim is the Founder and Director of FGV DGPE – Center for Public Management Development and Education Policies – a center located at Getulio Vargas Foundation (FGV), one of the most prestigious education institutions in Brazil. Previously, he worked as a consultant for the Inter-American Development Bank, the largest source of development financing for Latin America and the Caribbean. He has also been the Director of Brazil's National Bank for Economic and Social Development, where he was responsible for directing the Social, Farming, and Environmental sectors. In 2014, during Dilma Rousseff's presidency, he took office as Minister of Education. His career in the Ministry accounts for more than a decade. From 2006 to 2014, he held the post of Executive Secretary. Beforehand, he was the President of the National Fund for Education Development. His former positions include being the Special Undersecretary of Economic and Social Development Council for the President's Office and Secretary of Fundraising and International Cooperation for the city of Porto Alegre. He is a licensed professor at La Salle University and currently a professor at FGV EBAPE, Public Administration and Business School. José Henrique Paim holds a PhD in Education and Health Sciences and a master's degree in Economics from the Federal University of Rio Grande do Sul.

Marieta de Moraes Ferreira is a historian. She is a retired professor at the Federal University of Rio de Janeiro (UFRJ) and former researcher at UFRJ's Post-graduate Program in Social History. She has also been the Director of FGV CPDOC – Center for Research and Documentation of Contemporary History of Brazil – a center located at Getulio Vargas Foundation (FGV), where she had the opportunity to research, lecture, and to coordinate the Oral History Program. UFRJ and

FGV are two of the most prestigious education institutions in Brazil. Until very recently, from 2013 to 2017, she was the National Coordinator of the Post-graduate Program in History Teaching. She was the Founder and first President of the Brazilian Oral History Association, having also presided the International Oral History Association. Currently, she is the Executive Director of Getulio Vargas Foundation (FGV) publishing house and the Coordinator of the FGV High School Program, which is focused on developing teaching materials. She dedicated her life to the study of the History of the Brazil's Republic, and she has undertaken research in numerous fields: History of Rio de Janeiro, Oral History, Present Time History, and Political History. She is the author of "History as an Occupation – The Constitution of a Disciplinary Field" (2013) and "Uses and Abuses of Oral History" (1996), among other works. She is also the co-author of "Present Time History," published in 2014. She holds a PhD in History from the Fluminense Federal University and Post-doctorate degrees from École des Hautes en Sciences Sociales and from the University of São Paulo.

Raquel de Oliveira works as a project manager at the Center for Excellence and Innovation in Educational Policies within the Brazilian School of Public and Business Administration of the Getúlio Vargas Foundation. She is also part of the British Startup Gigalime during the Covid-19 crisis, which aims to rethink possible futures and spaces for digital transformation so that educational systems are redesigned to address the growing needs of contemporary societies. She teaches in the Postgraduate Course of the Singularidades Institute the discipline Methodologies and Teaching Practices. She was Pearson Fellow, within the Master of Public Policy (MPP) program at The Pearson Institute for the Study and Resolution of Global Conflicts, working with early childhood in daycare centers in South Africa. She attended "Excellence in Basic Education Course – The Experience of Shanghai" at Shanghai Normal University, an institution responsible for the initial and continuing training of public-school teachers in Shanghai.

Teresa Pontual is the Executive Manager at CEIPE – Center for Excellence and Innovation in Education Policies – a think-and-do tank located at FGV EBAPE. Before taking office, she was the Director of Curriculum at the Ministry of Education. Prior to this, Teresa Pontual was the Undersecretary of Education at the Department of Education for the city of Salvador. Teresa also worked as Project Manager at the Department of Education for the city of Rio and Undersecretary of Education at the Department of Education for the state of Rio de Janeiro. Teresa Pontual holds a master's degree in International Education Policy from the Harvard Graduate School of Education, where she was awarded a Lemann Fellowship, an MBA from the Federal University of Rio de Janeiro, and a bachelor's degree in Political Science from Swarthmore College, in Pennsylvania.

Vinicius Farias Santos is Executive manager of FGV In Company. He holds a master's degree in Business Administration and an MBA in Business Management from FGV EBAPE – Brazilian School of Public and Business Management. He is a public-school teacher and former member of the Educational Technology Management team at Rio de Janeiro's City Department of Education.

Chapter 3
Pontificia Universidad Católica Support for the School System During the Covid-19 Pandemic in Chile

Ernesto Treviño, Magdalena Claro, and Lorena Medina

Abstract This chapter presents the case of the Pontificia Universidad Católica de Chile in supporting the school system during the Covid-19 pandemic. It shows how supporting individual faculty initiatives as well as interinstitutional collaborations and participating in and supporting specific policies shaped a complex array of support for a highly atomized school system because of its market-driven arrangements. The case study also shows that, beyond individual initiatives, collaboration among Chilean universities was key for rapidly responding to the emerging needs of schools.

3.1 Introduction

The role that universities take in supporting schools during the Covid-19 pandemic is highly dependent on context. This chapter focuses on the role of the Pontificia Universidad Católica de Chile (PUC) in supporting educational continuity in Chile through both a partnership with Universidad de Chile, to coordinate university proposals to advise the government through the *Mesa Social Covid-19* (Covid-19 Social Roundtable), and institutional initiatives.

This chapter presents these two interlinked initiatives for education continuity and is organized into five sections. First, it presents the context of the pandemic in Chile, which is critical to understand this case. The second section presents PUC's mission and role in society as a framework to explain the initiatives to support school continuity. The third focuses on the Joint Venture between PUC and Universidad de Chile to lead a collaborative effort to support school continuity. The fourth section describes and explains, in a timeline format, the different initiatives to support school continuity at PUC. Lastly, the fifth section delves into the main concepts that help to delineate institutional efforts to support school continuity.

E. Treviño (✉) · M. Claro · L. Medina
Faculty of Education, Pontificia Universidad Católica de Chile, Santiago, Chile
e-mail: ernesto.trevino@uc.cl

3.2   Chilean Context During Covid-19

The Chilean government asked academic institutions for assistance to create an advisory committee known as "Mesa Social Covid-19," which began its operations on March 22, 2020. The academic committee of the Mesa Social is led by the presidents of the Pontificia Universidad Católica (PUC) and the University of Chile (UCh) and aims to promote evidence-based decision-making within the government. The Mesa Social focused its attention on different issues starting with public health, epidemiology, and mental health, followed by education and the economy.

As noted, the work of the Mesa Social initially focused on public health issues. However, by the first days of April 2020, the dean of the Faculty of Education proposed to the authorities (Highest Direction or Dirección Superior, in Spanish) of PUC to add a specific multi-disciplinary group on education, healthcare, and the economy to the Mesa Social. This recommendation was accepted and immediately implemented through collaborative work between PUC and Universidad de Chile. The newly established group worked on proposals and specific guidelines to help the school system on the necessary measures to provide socioemotional and academic support to students and their families.

The Chilean educational context has particularities that are important to consider when examining universities' joint efforts to support school continuity. First, it is one of the most privatized school systems in the world, with two-thirds of the enrollment attending private-subsidized schools. These private-subsidized schools, funded with public resources, are primarily schools owned by one individual, not part of a larger network of schools, nor receiving pedagogical support directly from educational authorities. Moreover, since privatization and competition are also central features in the higher education sector, therefore collaboration among leading institutions is less common due to the existing incentives of the system. Additionally, Chile is a national unitarian country, whereas the Ministry of Education, a national government entity, has direct influence over all the schools receiving public funds in the country. These three contextual elements are crucial for understanding the process of supporting schools during the pandemic in Chile, and their obvious fragmentation, which aims at covering a wide range of schools in the initiatives. Finally, it is worth mentioning that several protests had already disrupted schooling between October and December 2019, especially for students in urban areas near places of gathering for protesting. Therefore, the challenges for school continuity in Chile combined previous social unrest with the effects of the pandemic.

3.3   PUC's Mission and Role in Society

Institutionally, PUC's mission includes key concepts that serve as guidelines to deal with the pandemic. Before the arrival of Covid-19, PUC has prioritized public commitment to transfer knowledge and contribute to the improvement of quality of life.

Within this framework, the Faculty of Education had already structured its development around the concepts of educational justice, pedagogies of the practice, and digital educational practices, always considering the link between research and practices as a central part of its public commitment.

During the pandemic, PUC's work on school continuity was guided by several principles. First, there is a growing sentiment that the work at the university and faculty level requires a deeper and stronger connection to the daily challenges faced by schools. Second, this connectedness requires a more holistic and interdisciplinary focus to promote students' well-being in schools. This means re-thinking the logic of educational research to take into consideration different aspects of well-being of the students alongside academic achievement. Such change entails aiming at a more profound comprehension of the personal and social situations of children attending school to craft teaching strategies that promote their holistic development. Third, the challenge of supporting schools requires collaboration rather than competition among universities. For instance, although PUC is a leading research university in Chile, it has a limited scope to cover the needs of the school system just like other institutions. Accordingly, PUC and Universidad de Chile decided to join forces under the umbrella of the Mesa Social to coordinate efforts to support education continuity and invite academics from various universities in the country to contribute according to their different specializations.

3.4 Collaboration Venue: Joint Venture of Leading Universities

As previously mentioned, PUC joined forces with the Universidad de Chile (UCh) to provide academic advice to the government on pandemic decision-making. The PUC is a private institution whereas the UCh is a public university, and both are in the capital city of Santiago. It is worth noting that these two universities are the most prestigious, oldest, and selective in Chile. Both are research-oriented institutions, and their graduates usually take leadership positions nationally. They also form part of the University Presidents' Council, an entity created in 1954 by the Chilean government to support the development of the country via a network of public and private-traditional universities which receive financial support from the government (Consejo de Rectores, 2020).

The joint venture to address the challenges of the pandemic consisted of a strategic plan of three phases within the framework of the Mesa Social. First, PUC and UCh presented proposals to the Mesa Social on school continuity, starting with a report with guidelines and recommendations for policy and practice with short-, mid-, and long-term perspectives entitled "Proposals for Education – Inter-university report of the Social Table 3B Covid-19" (*Propuestas Educación -Trabajo Interuniversitario Mesa Social 3B Covid-19*) (Mesa Social, 2020c). Both universities convened a steering committee to coordinate the preparation of this document

during March, when the government planned vacations during the two last weeks of April and stated that students would be back in schools by April 27. The recommendations prepared for school continuity were published on April 24 and delivered to the Minister of Education. At the time of this presentation, the government had already announced that there was not a fixed date to return to school because such a decision was dependent upon the progression of the pandemic.

The proposals in the document had three aims. First, it recommended measures to provide emotional support for students affected by post-traumatic stress with consideration to the degree of intensity. Second, it provided guidelines to develop curriculum adjustments and suggestions to create remote education strategies. Third, the document provided guidelines for policies in terms of curriculum adjustments, flexibilization of funding, cancellation or diminishing of assessments, and high stakes accountability measures.

In the second phase, the steering committee convened experts from different universities to develop guidelines and pedagogical strategies to work in the prioritized curriculum for 2020 and 2021 (two different school years), proposed by the Ministry of Education through by June 20, 2020 (MINEDUC, 2020). More than 90 academics from PUC, UCh, and other universities, alongside schoolteachers, developed specific and adaptive guidelines to implement the streamlined curriculum, based on principles such as prioritization, flexibility, integration, and fostering student agency. More specifically, the document provides recommendations to follow learning pathways in Arts, Science, Physical Education, History, Geography, Social Sciences, English, Language (Spanish), and Mathematics (Mesa Social, 2020a). In addition, the recommendations consider three different connectivity situations: (a) students and teachers with access to the Internet for synchronous classes, (b) students and teachers with limited access to Internet that may need a-synchronous classes, and (c) students without access to Internet, in which case teachers and schools are organizing the delivery of printed educational materials (Mesa Social, 2020a). The guidelines follow a modular approach that allows for high flexibility in their usage depending on the different school contexts and needs. As such, these recommendations are intended to be useful beyond the emergency of this pandemic. The document was entitled "Pedagogies of the proximity: Learning in times of crisis," available in Spanish as *Didácticas de la Proximidad: Aprendiendo en tiempos de crisis* (Mesa social, 2020a).

Also, academics from PUC, the UCh, and Pontifical Catholic University of Valparaiso created a series of recommendations to support school leaders entitled "School leadership: Learning in times of crisis"—in Spanish, *Liderazgo Escolar: Aprendiendo en tiempos de crisis* (Mesa Social, 2020b). These recommendations focus on three different moments for school continuity: (a) leadership during the pandemic and school closures; (b) leadership focused on teaching and learning during the pandemic; and (c) preparing the schools for returning to in person education. Connectedness, collaboration, contention, training, and trust are the key concepts behind the leadership guidelines (Mesa Social, 2020b).

Both documents with recommendations for teaching and leadership were presented on July 23 in an open webinar with the presence of the presidents and

authorities of PUC and UCh, the leaders of the Steering Committee, academics, as well as two classroom teachers and school principals. Nearly 10,000 people viewed the presentation at some point, and more than 2000 people stayed for the whole webinar. Furthermore, by the end of July more than 1000 people had downloaded the document on teaching, and nearly 300 downloaded the guidelines for leadership.

3.5   PUC's Efforts to Support the School System: A Timeline

As stated before, efforts to support school continuity started within the framework of the Mesa Social with the launch of proposals for education on April 24, 2020 (Mesa Social, 2020c). Since the university has supported school continuity in both collaborative and institutional initiatives, this section provides a timeline of the specific actions and a brief explanation of their content.

In terms of the social and political situation, these proposals helped to delineate the significance and long-lasting adverse effects that the pandemic could have if authorities and stakeholders in the education system did not implement adjustments to the education services.

After the release of the report on proposals for education, PUC continued developing institutional efforts to support school continuity. Specifically, PUC organized 12 webinars, via its Center for Educational Justice with the Faculty of Education, on topics ranging from digital teaching strategies to teaching math, language, science, as well as project-based learning and curricular prioritization. These webinars started in May and continued through September. This initiative was a response to the decentralized organization of the school system and the delay in support responses from the national authorities due to the uncertainty introduced by the pandemic. In this way, it was possible to offer ample national coverage to those schools and teachers in need of support. Nearly 5000 teachers from schools from across the country had participated in the webinars until the end of June. This has been a highly flexible support strategy to adapt to the needs of the school system.

The System of Practices, a program in PUC's Faculty of Education for students in initial teacher training programs, was one of the main direct connections to the school system prior to Covid-19. Student teaching is a requirement for graduation, and the pandemic opened an opportunity to reframe the logic of the teaching practices to support school continuity. The main adaptations to the System of Practices to address challenges caused by the pandemic consisted of:

(a) A series of online training for teaching teams in kindergartens through audio presentations, teaching guides, and some online synchronic sessions to explain the contents
(b) Workshops implemented by student-teachers on topics related to teaching during the pandemic for schools with connectivity limitations
(c) Short videos on the implementation of curricular contents for each discipline and school grade available at each school

(d) Audio recommendations on how to work with families and teaching teams in the school community during the pandemic

(e) Online classes with the participation of student-teachers in schools implementing virtual education during the pandemic

(f) Coaching to groups of students in the classroom in several schools that required differentiated support

(g) The design and distribution of educational lessons to families to support school continuity

(h) Design and dissemination of learning resources for remote development of skills and knowledge for each curriculum discipline and school grade

These initiatives have supported 60 schools (31% public, 30% private-subsidized, and 39% private schools) that have been connected to the Faculty of Education System of Practices before the pandemic. Lastly, the System of Practices of the Faculty of Education at PUC has also contributed to school continuity through the sharing of electronic bulletins that contain recommendations for education and surveys to collect information regarding school needs. These latter actions were implemented in collaboration with the Observatory of Digital Education Practices (OPED, in Spanish *Observatorio de Prácticas Educativas Digitales*).

The Faculty of Education of PUC also joined a governmental program designed and implemented by the Ministry of Education called "Network of Coaches for Chile"—in Spanish *Red de Tutores para Chile*. This initiative offers students in initial teacher training programs (student-teachers) opportunities to develop in-classroom practices required by their initial teacher training programs through virtual education. At the same time, such programs allow students from different universities across the country to provide coaching or tutoring to students in different schools to support classroom teachers. This approach can offer more individualized attention and, especially, a method for self-study and self-learning that can have long-lasting effects developing independent studying and learning skills among students.

In terms of school continuity, the Center for Educational Transformation (CENTRE UC), which oversees providing in-service teacher training and coaching to teachers and school communities, has changed all its programs to be offered virtually, including those involving coaching and feedback. Also, CENTRE has contributed to supporting school continuity by participating in the Group of Innovation on Early Childhood Education from the Ministry of Education which started in July 2020 to develop policy guidelines to face the pandemic in this educational level from 2020 and beyond.

Finally, the Agency for International Cooperation and Development of Chile (AGCID) asked PUC to design and implement a series of webinars to support the continuity of education in other South American countries during the months of September through November. These seminars focused on (a) continuity of education during the pandemic; (b) challenges of the pandemic for pre-service and in-service teacher training; (c) how to prioritize the curriculum to promote development

and learning among students; and (d) current situation of the education systems and challenges for an after-pandemic world.

3.6   Concepts that Frame Efforts to Support School Continuity at PUC

The conceptual elements that can explain PUC's commitment to supporting school continuity can be classified into institutional concepts aligned to PUC's mission and emerging concepts necessary to expand the scope of such a mission in the face of the pandemic.

Five concepts were already present in the PUC and its Faculty of Education when the pandemic arrived, which allowed the institution to frame the challenge of school continuity. First, public commitment is part of the PUC's mission, a concept that entails strengthening links with society to contribute to solving social challenges. The second concept is the link between research and practice, which has been developed by the Center of Studies of Educational Policies and Practices since it was launched in 2010. Educational justice is the third concept, in which the Center for Advanced Studies on Educational Justice of PUC has been researching aspects of policy and practice that influence the possibility of reaching more justice and equality in terms of supporting the most disadvantaged groups of students and critically questioning social expectations based on stereotypes or prejudices since 2017. Fourth, the concept regarding pedagogies of the practice has been used to structure initial and continuous teacher training in the Faculty of Education. Finally, digital education practices were a fifth concept that was already present in the Faculty of Education of PUC. In fact, the Faculty created an Observatory of Educational Digital Practices in 2017 with the aim of supporting academics within the Faculty to incorporate technology in their own teaching and develop student-teachers' digital skills and knowledge. The observatory has also participated in several research projects on remote education in Chile, and most importantly, it has been an invaluable asset to help PUC and the Faculty of Education face the challenge of supporting school continuity. Without this institutional arrangement, it would have been more difficult to respond to the needs of school continuity. Therefore, the combination of having this institutional arrangement and the knowledge accumulated through research has allowed PUC to design responses for school continuity that include digital strategies.

These five principles have allowed training programs to be better designed with solid theoretical bases and an intensive system of practices and coaching to support students in initial teacher training programs in learning how to implement classes that are aligned with evidence and are successful in promoting student learning.

The concepts that PUC had cultivated as an institution before the pandemic were of great help in framing the challenge of school continuity for the wider education community. However, they were insufficient to genuinely respond to the needs

posed by the pandemic. At the institutional level, there are two elements that have been magnified due to the pandemic: collaboration and connectedness.

In this new context, the pandemic has shown us that the magnitude of the challenges is well beyond the scope and capacity of one institution. The notion of collaboration to solve problems has emerged as a critical element even in an education system traditionally marked by high levels of market competition among educational institutions. In this sense, having the public and the private leading universities in Chile collaborating instead of competing represents a profound change in perspective. There has also been a newly applied element of connectedness with the wider school system. As such, the intentional reflection at the Faculty of Education at PUC has focused on redefining the ways in which PUC connects to the school system. On one hand, the conversations among academics have led to initial definitions of relevant research that intends to improve schools, especially learning and development opportunities for the most disadvantaged children. This dialogue has led to an agreement between the Faculty of Education at PUC and the Local Service of Public Education Gabriela Mistral, which is primarily a school district of public schools in a territory serving a low SES population in the surroundings of the PUC San Joaquín Campus. This relationship was formed to support schools with student-teachers doing their practical training and offer different levels of support to the schools.

At the research level, the element of connectedness has been bidirectional. From PUC to the school system, research conducted must consider the evident needs of the population under study, the contextual and bureaucratic demands that schools face, and the requirements of the policy. The other direction of connectedness refers to a more fluid, horizontal, and holistic dialogue between universities and the school system. Consequently, future research projects may evolve toward including more collaboration with school actors in the design, implementation, and production of research results with schools. Although this is not the only way to address connectedness in research, it is a working definition presently used at the university. During a webinar on July 23, the president of PUC pointed out that collaboration needs to lead to connectedness in multidirectional dialogues between universities, school system, academics, teachers, and principals along the country as a way to overcome the crisis and build durable ties for the improvement of education.

Beyond the concepts of connectedness and collaboration, during the social protests at the end of 2019 and throughout 2020, two other elements emerged as concerns in relation to the role of the university to support the school system.

First, the element of holistic well-being among children and school communities regarding the school system was exposed as a primary concern. Chile is one of the most unequal countries of the OECD, a feature that can negatively impact a child's mental health because of the effects of marginalization (OECD, 2020; Treviño, Villalobos & Castillo, 2020). Chile also has high levels of child abuse and maltreatment, which must be addressed in the school system since the national health system offers limited support for mental health conditions (Treviño, Villalobos & Castillo, 2020). The interrelation between the cognitive, social, emotional, and physical elements of child development (Shonkoff & Phillips, 2000) has been

routinely neglected by the school system, whereas incentives and accountability of schools is primarily based on the school average test score results as stated in both national laws for the quality of education (No. 20.529) and the preferential voucher regulation (No. 20.248) in Chile.

Another emergent element is evidence-based guidance for schools from universities. In this context, evidence-based guidance means providing recommendations to overcome the challenges of the pandemic utilizing accumulated knowledge. This required universities to adapt research results, analyzing the existing literature on education during emergencies, and compiling recommendations with the best professional judgment to collectively face an unprecedented situation. The collaboration between academics, teachers, and principals was key in shaping such recommendations. It is important to also note that this guidance must not be misinterpreted as a straightforward prescription. The range of specific situations happening in schools across the country is difficult to predict, and therefore evidence-based guidance aims at providing recommendations that can be adapted and flexible to form a measured response to local needs.

This approach to guidance is especially necessary given the geographic context of Chile. The continental part of the country is long and thin with more than 6000 kilometers of seacoast to the west and guarded by the Cordillera de Los Andes to the east. The maximum width of this long territory is 360 kilometers from the border in Los Andes mountains to the sea, and its minimum width is 17 kilometers. Furthermore, the geography of Chile also includes several islands in the Pacific and Antarctic oceans.

The elements described above define the rationale of PUC's efforts to effectively gather evidence, provide guidelines for the school system, and inform policymaking to ultimately provide locally legitimate support to teachers and schools.

Lastly, it is noteworthy that PUC structured these efforts without providing additional resources to support them. Instead, different actors within the university reorganized their time and resources to serve the needs of the school system. The president of PUC and the dean of the Faculty of Education provided moral, but not financial, support.

3.7   Conclusion

The Covid-19 pandemic has impacted the social and economic life of vast proportions of the population around the globe. And while the effects of the pandemic on school continuity have been adverse, higher education institutions have been attempting to contribute positively to the effort of continuity in various ways.

In Chile, the establishment of the Mesa Social to advise the government with the participation of the presidents of both PUC and UCh represented an important milestone in the process of supporting school continuity. Originally thought as a group to provide advice on health issues, the Mesa Social included a chapter on education

thanks to the commitment of both the Faculty of Education and the highest authorities of PUC.

There are several concepts that were already central to the mission of PUC that were useful guidelines to frame the efforts of school continuity: public commitment of the university to its surrounding environment, the link between research and practice, the notion of educational justice, the development of digital education practices, and pedagogies of the practice. On the other hand, collaboration and connectedness are newly incorporated concepts that emerged as key conceptual orientations for future work with the school system. The practice of collaboration has resulted in growth in the capacity of universities and schools to work together even in a highly privatized and competitive educational environment, in which these educational institutions typically compete for students and funds. Moreover, due to increased connectedness, there has been an expansion of the capacity of universities and schools to mutually learn how to address educational, pedagogical, or organizational issues that may impede schools to fully achieve their mission.

This pandemic has already provided several enduring lessons for Chile, considered one of the most advanced in education and most developed in the Latin American region. The pandemic first exposed how profound educational inequalities are in the Chilean school system and the disparities in access to the Internet between the advantaged and disadvantaged populations.

The shortcomings of the existing regulatory framework, which focuses on high-stakes testing, privatization, and universal voucher funding, were made evident by the extraordinary situation created by the pandemic. Even despite the obvious difficulties of conducting examinations during Covid-19, the national assessment system insisted on applying the national high stakes tests, a decision which was finally reversed by July.

School communities have also been leading impressive efforts to deliver educational services to their students at a time when authorities focused on short-term issues without a systemic and coordinated plan that allowed schools to adapt to this new environment. However, it is difficult to estimate the magnitude of these efforts in the school system.

Within the Faculty of Education at PUC, there is a shared notion that several of these noted changes in the school system and the Faculty itself should be enduring to continue to best support the school system and teachers to shape opportunities for students, with a focus on educational justice, to develop the twenty-first-century skills required to participate in a post-pandemic world.

Although the efforts from authorities and universities to ensure school continuity have been substantial, facing the pandemic has been a challenge in Chile due to inequalities in the access to Internet in the country. Nearly 44% of the population does not have household Internet connection, and 13% of the population does not have any type of connection. Furthermore, the digital gap is significant in the case of low-income households and the elderly (Subtel, 2017). For that reason, the recommendations were designed with this context in mind.

At the moment of finishing this chapter, April 2021, the evolution of the pandemic in Chile and the world is far from being under control. The Ministry of Education in Chile has insisted prioritizing in-person classes over virtual or hybrid models. The ministry announced an in-person beginning of the school year in March, subsequently changing this decision without a robust plan for considering the scenario of the pandemic disrupting school in 2021. Today universities are designing new strategies of support for schools in alignment with their aims toward initial and continuous teacher training, among other priorities.

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Ernesto Treviño is Director of the Center for Educational Transformation, Associate Professor, and Principal Investigator at the Center for Advanced Studies on Educational Justice at the Faculty of Education of the Catholic University of Chile. His research has focused on the connections between education policies and practices, with a perspective of equity and inclusion.

Magdalena Claro is the Director of the Center of Studies for Educational Policies and Practices and assistant professor at the Faculty of Education of the Catholic University of Chile. She has worked in national and international projects related to digital technologies in education, particularly in relation to the definition, evaluation, and development of students' digital skills. Her research is related to digital society and the new divides, teaching and learning in digital contexts and students' digital skills.

Lorena Medina is an Associate Professor at the Faculty of Education of the Catholic University of Chile. She was the dean of the Faculty of Education during the 2014–2021 period. She was also the President of the National Council of Deans of Faculties of Education (CONFAUCE) in Chile for the period of 2019–2021. In January 2021 she founded the Latin American Network of Deans of Education, with the financial support of Siemens Stiftung, as the general coordinator for 2021. Her research has focused on the dialogic discourse analysis in educational contexts, literacy and semiotic initial development, teaching and learning of language, and conceptions and theories on learning specific contents in native language.

Chapter 4
Desafío TEP – Positive Educational Trajectories. A Public-Private Alliance to Strengthen Public Education During the Pandemic

Check for updates

Juan Pablo Valenzuela and Simon Rodriguez

Abstract This case study describes the Desafío TEP project, which arose from a public-private alliance between the Arauco Educational Foundation, the Center for Advanced Research in Education (CIAE) from the University of Chile, and the Andalién Sur Local Public Education Service (SLEP). The goal of the project is to develop a model for the prevention of school exclusion (resulting from repetition and dropout) in public schools.

Although the initiative was in consideration to be suspended due to the closure of schools across the country caused by COVID-19, instead the proposal was completely redesigned, recognizing that the pandemic would increase the problems of school exclusion. The innovations generated in this redesign are anticipated to lead to long-term sustainability and scalability in the region through cost reductions and the promotion of remote interactions between different establishments working in networks, such as the SLEP, the schools, and the teams from the CIAE and Arauco Educational Foundation. This network is further supported by the actors in the educational system of the territory.

J. P. Valenzuela
Instituto de Educación & CIAE, Universidad de Chile, Santiago, Chile

S. Rodriguez (✉)
Fundación Educacional Arauco. Universidad Diego Portales, PhD Program in Education
UDP – UAH, Santiago, Chile
e-mail: simon.rodriguez@arauco.com

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4.1   The Universidad of Chile and Its Support to Schooling System in the COVID-19 Context

Founded in 1842, the University of Chile is the oldest, most recognized national and public institution of higher education in the country. Its mission involves a commitment to excellence in educating people and the vocation to contribute to the spiritual and material development of the nation. The university fulfills its mission by building leadership in the innovative development of the sciences and technologies, humanities, and the arts as well as through teaching, creating, and extending knowledge with a special emphasis on research and graduate studies (Universidad de Chile, 2020). Located in Santiago, the country's capital, the University of Chile has more than 42,000 undergraduate and graduate students. It has 14 faculties and 5 specialized institutes, one of which is the Institute for Advanced Studies in Education (IE). IE was created in 2018, and the Center for Advanced Research in Education (CIAE), created in 2008, is part of IE. The University of Chile has the highest scientific productivity in the country, producing more than 30% of all national research.

The vision of the University for the next decade is to enhance its role as a national and state university to address challenges in higher education in research, creation, dissemination, outreach, and connectedness to the service of the country. It aims to do so in a socially critical and ethically responsible manner and with high levels of quality, pluralism, and social and gender equity. This vision expands the role of the state education system to have a prominent role in Latin American and international university networks, particularly with public universities. Additionally, its mission includes a strong commitment to culture, public education, and the schooling system. In particular, the mission declares that "it is the responsibility of the University to contribute the development of cultural heritage and national identity and to the improvement of the country's educational system" (Universidad de Chile, 2020).

The University of Chile is directly participating in several initiatives aimed at supporting schools from primary and secondary education in the context of the COVID-19 pandemic. On the one hand, the President of the University of Chile and the President of the Pontifical Universidad Católica de Chile participate in the Social Round Table to support the Ministry of Health coordinate general support actions and national policies to contain the effects of the pandemic. Both universities set up and led an alliance of research centers and researchers in the country to support the whole school system in various domains. Also, these leading initiatives motivated public discussions about educational challenges created by the pandemic across the country, such as *Hablemos de Educación* (Let's Talk About Education). Furthermore, the Network Information Center of Chile (NIC), an entity of the University of Chile in charge of managing Internet domains in the country, has been the distribution channel of the national educational curriculum to students and schools of the territories without Internet connectivity in the country. This has allowed the delivery of this material to 130,000 children (4% of the total number of students in the country) from 115 of 345 different municipalities.

In another context, the University of Chile is also collaborating with different public institutions and private foundations to create initiatives related to the development of capacities for educational improvement at schools and the intermediate levels responsible for them, especially those in charge of public education in the country. One of these initiatives, adapted to the context of COVID-19, is the TEP Challenge (Positive Educational Trajectories), which the next section describes in detail.

4.2   Desafío TEP. A Public-Private Alliance to Reduce Exclusion in Public Schools

This case study describes the Desafío TEP project, which arose from a public-private alliance between the Arauco Educational Foundation, the Andalién Sur Local Public Education Service (SLEP), and the Center for Advanced Research in Education (CIAE).[1] This alliance is promoted by the current government and framed under a public-private initiative called *Compromiso Pais*. The goal of the project is to develop a model for the prevention of school exclusion (repetition and dropout) in public schools. Desafío TEP is financed with resources from a national private company (Arauco), its educational foundation, and non-monetary resources from CIAE.

Arauco Educational Foundation is a private, non-profit foundation that has supported educational communities in the south-central region of the country since 1989, with a primary focus on public education. Its mission is to contribute to giving greater development opportunities to children and young people through education. For this, it deploys different lines of work, the main one being the development of educational and cultural improvement programs. Their motto is: "We believe in teachers."

CIAE is a research center located in the University of Chile. CIAE seeks to generate evidence, through R&D, to support educational improvement. For the last 2 years, CIAE has studied factors, strategies, and best practices to reduce school exclusion.

The Andalién Sur Local Service of Public Education (SLEP) is one of the first 11 SLEPs in charge of public education. Since March 2020, Andalién Sur SLEP provides education to more than 17,000 students, most of them with low socioeconomic status (SES), in 83 PreK-12 schools located in 4 different counties of the south-central area of the country (Concepción, Chiguayante, Florida, and Hualqui).

Desafío TEP constitutes a pilot initiative to follow the educational path and reduce school exclusion in 12 of the Andalién Sur SLEP schools. The project design allows for continuous improvement processes before scaling up to the rest of the schools and replicating the experience in other SLEPs in the country.

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[1] "Desafío TEP" project team: Isidora Recart, Juan Pablo Valenzuela, Giulietta Vaccarezza, Simón Rodriguez, Millycent Contreras, Karla Escare, Lorena Peñailillo, Cristian Cardenas.

4.2.1   An Initiative in the Context of a New Public Education System

In Chile, there is an enormous dissatisfaction with the public education system due to the low share of students it enrolls, low levels of performance, and difficulty in sustaining processes of improvement, as well as deficient management of financial, human resources, and challenges with transparency. For these reasons, a new institutional framework for public education was approved in 2017. Between the years 2018 and 2025, public education will be transferred from 345 municipalities to 70 new public entities—SLEPs. SLEPS will be responsible for managing and improving the quality of preschool, primary, and secondary public education, covering 36% of students in the country at the end of this period (Bellei, 2018; Uribe et al., 2019).

This focus on school exclusion is intentional; it seeks to respond to one of the challenges included in Law 21.040 (2017) of public education reforms. This reform indicates that one of the functions of the SLEP is to strengthen the Educational Trajectories of each student, which means to avoid school exclusion (preventing grade repetition and dropout) for every student in its territory by developing information systems and support programs that ensure every child and young person has a sustained and quality education from their initial education until the end of secondary level.

From June to December 2019, this alliance designed and prepared a pilot plan to begin to be implemented in 12 schools for the 2020 school year. In 2019, these schools enrolled 5,068 students.

4.3   Desafío TEP Proposal

In conceptual terms, the "educational trajectories" in TEP refer to the year-by-year performance of each student throughout their schooling, observing their starting point, educational experience, and results of their learning that materialize in their academic progression on this path (OEI, 2015). The additional adjective of "positive" comes from the emphasis on the strengths and resources that mobilize and improve school commitment as well as the generation of strong personal relations with each student. At the same time, this term focuses on the development of capacities from existing resources, prioritizing the generation of robust evidence and integrating the most effective methodologies and strategies learned for this objective. Finally, this development of capacities is located within the intermediate levels, such as schools and work teams of the school system, so that educational organizations can promote the trajectories for every student (Recart et al., 2020).

The theory of change of the initiative states that if capacities for collaboration between and within schools are developed, decisions are made based on data, and leadership and management of processes and practices are mobilized, then

strategies will be implemented which will increase student attendance, school commitment, and student engagement, lowering grade retention and repetition.

The strategy for capacity development is based on action-based learning. The planning, implementation, and learnings of "TEP challenges" are raised and developed by multidisciplinary leading teams from the participating schools and then evaluated in each context in terms of their urgency and relevance. In turn, both the technical advisers belonging to the SLEP and the leading teams participate in three "micro-networks," each one formed by four schools with different characteristics, to promote learning across schools. These "micro-networks" identify best practices and participate in workshops to develop knowledge that enhances the mobilization of skills and practices.

4.4   The Desafío TEP Design and Its Modifications in the COVID-19 Context

The interruption of face-to-face classes led to the suspension of this initiative for 2 weeks in March 2020. Schools and the Andalién Sur SLEP needed to reorganize their teachers and staff to the new context as well as devote attention to actions related to health and social issues for families and students.

Within these first 2 weeks, the team that coordinated this alliance held online meetings to review the continuity of the joint work. These meetings confirmed the shared vision that, in the context of the pandemic, it was even more relevant to maintain contact and engagement with students and families and promote their continuous school attendance and involvement. From the beginning, it was considered that the end of face-to-face classes implied an increased risk of excluding children from the system, especially those most vulnerable, which constitute the majority of the students enrolled in Andalién Sur.

Considering this renewed agreement, we implemented and adapted the following actions:

– Group meetings were held with management teams from all schools from Andalién Sur to hear and record the work that was being carried out directly along with its main challenges. From these meetings, we recognized the enormous effort and energy dedicated by schools in seeking to reorganize and re-generate pedagogical work with students and families.
– Together with technical advisers from the Andalién Sur SLEP, we decided to adjust the work cycle of the project for the group of 12 schools participating in this pilot stage. We focused on supporting the actions and strategies in a context with much more difficulties to connect between schools and families, going from a single cycle for the whole year in 2020 to two smaller cycles for the same period. Each cycle is focused around an urgent and relevant "TEP Challenge." This "TEP challenge" is based on an action hypothesis: a sequence of actions and results to be tested. The actions are put into practice and reviewed based on

data they have and/or collected. It was proposed that the first cycle lasts 3 months, while the second cycle lasts 5 months. Emphasis is placed on "learn by doing" with the possibility of error and improvement being explicit. One lesson learned from this implementation period has been that the first cycle should be oriented toward a simple challenge, which will allow multidisciplinary leadership team (ELM) of each school to build confidence. Therefore, participants learn that it is possible to be successful in the context of virtual education within a short period. It is expected that for the following cycle, the challenge will increase in complexity.

– Micro-network online meetings were used as a strategy for capacity building, with a method that enhances the clarification and deepening of one's work and that of others. As a transversal tool for this cycle, the "TEP virtual notebook" and "TEP infographics" are being used, which seeks to document and organize the work carried out by each multidisciplinary leading team as well as resulting products that can be shared with different actors. This documentation and organization have both a descriptive and analytical level, considering two keys for its preparation: data analysis for decision-making and strategies implemented to address the identified challenge.

– Throughout the cycle, the focus on students with the highest risk of exclusion is made explicit. In the registration of the "TEP virtual notebooks" and the micro-network online meeting, questions associated with data and actions for this target group of students are asked and processed.

– Considering that one of the keys is leadership and management that develops the Andalién Sur SLEP, planning and evaluation regarding each activity meeting took place with every participating technical advisor being present to strengthen the sustainability and scaling potential of this initiative. At the same time, "Whatsapp groups" were created between Arauco Educational Foundation, CIAE, and SLEP Andalién Sur to facilitate constant and fluent communication. All this has led to a manifestation of practices in two different dimensions that are needed to focus on follow-up work with schools teams: i) management of communication and structural conditions to foster micro-networks, which includes constant communication, scheduling of activities, and anticipation of necessary resources; ii) preparation and permanent review of facilitation with leading teams, which includes co-planning and co-evaluation together with co-facilitation of the implementation of the work and permanent training.

– We created an adapted monitoring system of the initiative. The key indicator of this initiative is "school engagement" (Saracostti, 2016). As a result, information related to "school engagement" is being collected. For each of the work activities with schools, an instrument of evaluation and satisfaction has been implemented, together with an analysis of the plans elaborated by the teams of the participating schools. Concerning monitoring capacity development, we applied an instrument to evaluate beliefs, knowledge, and practices to the issue of data-based decision-making, intra- and inter-school collaboration, leadership, and process management. This survey will be repeated at the end of the pilot phase to evaluate changes.

4.5   Learnings from the COVID-19 Context

Since the suspension of face-to-face classes (early March) until July 2020, teams from SLEP and schools have participated in four micro-network online meetings, a coaching session with the leading team, and an online training workshop. These activities are prepared and evaluated jointly between CIAE, Arauco Educational Foundation, and Technical Advisors of the Andalién Sur SLEP.

Two dimensions of learning are recognized: those related to the model and method of work and those related to keys for the protection of positive school trajectories.

Regarding the first dimension, school leaders, teachers, and technical advisers identify that it is a "model of accompaniment that seeks to develop capacities, strengthening the dynamics of networking to explore their own challenges, related to the school trajectories of students, and address them jointly, supporting and nurturing the common and diverse elements" (TEP participant interview), being "fundamental to the TEP methodology the reflection and analysis of the teams, within a collaborative work framework" (TEP participant interview). In the methodological sense, they indicate that it implies the "identification of a specific problem related to this topic, analyze it following a reflective-participatory methodology and establish a plan to address its solution, always considering the importance of the use and generation of data to make decisions, and working on the method proposed by the companions of the project that is based on sharing experiences with other establishments that act as critical friends" (TEP participants focus group). In turn, the methodology "provides design tools and innovative digital tools that are easy to replicate" (TEP participants focus group). The reports of the activities indicate that 82% of the participants consider that what is reviewed in the online micro-networks is useful and contributes to the work of the establishment.

A specific learning in the context of a pandemic, which changed and will remain as part of the work of the Desafío TEP project team, is the mobilization of collaboration and promotion of equitable participation between and within teams. This is done through the use of tools and artifacts in synchronous and asynchronous environments. The possibility of working simultaneously and in a complementary way on a virtual device, which records and represents the elaboration and planning of a practice challenge, has promoted a "very efficient work strategy" (TEP participants focus group) and pertinent to schools. At the same time, it mobilizes a greater "fluidity" of the conversations and interactions between the different participants, be they teachers, school leaders, or system leaders, enhancing confidence and a "sense of security" to tackle complex issues.

Regarding the keys for the protection of positive school trajectories, the following lessons have been drawn from the content of the different "TEP virtual notebook":

4.5.1 Making Students Feel Competent and Secure

Leading teams have identified that it is necessary and relevant for students to feel content and motivated in their activities so that they feel they are learning. Moreover, this will ensure that they successfully perform the tasks they are being required to do. This is not an easy task and has generated two great challenges in the work carried out by teachers:

a) Change, modify, and/or adjust learning resources.
b) Provide descriptive, individualized, and permanent feedback to students, highlighting progress and achievements to mobilize engagement.

4.5.2 Socio-emotional Bond with Families and Students

Considering the circumstances of social distancing and the uncertainties that they entail, the teams have identified the following needs:

– *Diversification of channels and means to contact students and their families.* Knowing the economic and social situation and environment of the students is key.
– *Identifying risk factors to offer support in various forms.* There are different kinds of risks, all of which are non-exclusive: i) material resources (water and electricity, connectivity, access to technological devices, geographical isolation); ii) sanitary and mental health of students and family; iii) the state of support networks and the need for emotional contention; iv) students that require permanent special educational needs (elaboration of specific resources in social distancing); and v) the situation of children and students that are currently the object of protective measures because their rights as children have been violated.
– *Maintaining a permanent connection to parents and guardians.* The role of parents and guardians in social distancing times is relevant. To this effect, "it is necessary to promote parents and guardian's engagement to promote student's engagement." As such, parents and guardians must become involved because they are valuable allies of the school's work. "If parents don't want to, their children will hardly want to."
– *The key role of head-teachers.* Teachers who are close to their students and show profound knowledge of everyone in their classroom are key. They help gather information and keep each student feeling noted and valued.

4.5.3 Making Teachers Feel Competent, Safe, and Learning from Each Other

The reorganization of labor that the pandemic has forced on schools has shown the importance of interprofessional and interdisciplinary collaboration between teachers. An example of this would be the collaborative work between teachers and

educational psychologists or the pairing of a technologically savvy teacher with one that needs help in this area. These professional collaborations help build a feeling of security, competency, and learning in the understanding that there is much to be done and measures are being taken.

These measures have shown an interdependency with teachers supporting and teaching each other. The leading teams expect this will survive beyond the times of social distancing.

4.5.4 Workplans in Social Distancing Must Be Based on Existing and Currently Used Technological Resources

The lack of access and use of social media can further deepen inequalities in learning. Remote working is a gradual process, in which educational platforms must be known, familiarized, and progressively tested. In this context, teachers must start with the most popular platforms such as Facebook, Whatsapp, and Google Drive. In parallel, other resources such as learning capsules and specific educational platforms can be developed and trained for. This relates to the notion that teaching during social distancing has permanent and non-permanent features.

4.5.5 Make Visible the Achievements of Students and Schools with a Focus on Comprehensive Care and Learning

Multidisciplinary Leadership Teams and teachers mobilize the achievements of their students, requesting evidence (photographs, audio records, videos) in which they, together with their families, present how to carry out learning activities on various interests (musical, artistic, etc.). Parallel to this, they communicate the importance and need to take care of themselves, to be well and safe in their homes.

These actions seek to confront and/or reduce discourses that may negatively affect the school's trajectory. A clear example is the communications in secondary education, where students have declared that they will (possibly) opt for adult education (completing two grades in one year) in the year 2021, or that 2020 is a lost year in terms of learning.

4.6 Sustainability and Projection

The extension of the closure of face-to-face schooling in Chile motivated the Ministry of Education to convene a Commission of experts to prepare proposals to reduce the risk of further dropout in Chile. CIAE and Arauco Educational Foundation were invited to it given their experience in Desafío TEP. In July, the "Proposals for

a Technical Table for the Prevention of School Dropout. For the timely detection of the risk of school exclusion and the construction of positive school trajectories for all children and young people" was published (MINEDUC, 2020), which included the practices developed in Desafío TEP.

Regarding the future, the Desafío TEP initiative is discussed in the *Andalién Sur Development Plan* for the coming years, so its expansion to the rest of the schools will continue in the following years. Also, the concept of TEP was included in the *National Strategy to Strengthen Public Education* elaborated by the Directorate of Public Education (*DEP)* for the coming 8 years, and the initiative already has the support of *DEP*. This means that the learning model of TEP initiative has a high chance of being replicated in the rest of the SLEPs in the country.

Regarding the virtual methodology, both the leading teams and professionals in the SLEPs and the teaching teams in participating schools and institutions are continuing a majority of methods that were developed because they allow for the increased time dedicated to collaborative work and implementation, reducing transport fees for many professionals. Also, they will allow for an easier scaling-up of the initiative as the professionals involved in the SLEP Andalién Sur will be able to help other SLEPs in the country without leaving their local communities, as well as empowering micro-networking opportunities between SLEPs, professionals, and schools from different regions in the country, supporting the initiative in other SLEPs and schools. The learning and adjustments of Desafío TEP due to the pandemic will be integrated into the regular model in its expansion phase.

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Juan Pablo Valenzuela is Full Professor from the Universidad de Chile and main researcher at the Institute of Advanced Studies in Education (IE) and the Center for Advanced Research in Education (CIAE), both from the same university; also he teaches at the Economics Department of the Universidad de Chile. He is a main researcher at the C-Lider, a leadership center for improvement education, where IE/CIAE collaborates with other national universities and research centers. He has a Bachelor degree in Economics from the Universidad de Chile and a Master and PhD degrees in Economics, from the University of Michigan, Ann-Arbor. He has published nationally and internationally several researches about school improvement on primary and secondary education, evaluation of public policies on the field, segregation analysis, public education reforms, and schooling leadership. During the pandemic he has participated in national commissions to improve students' retention and to support re-opening schools and early education centers in the whole country.

Simón Rodriguez Espinoza works and researches on leadership and school improvement as key focuses for the quality and equity of public education. Works as a senior consultant in the area of development and evaluation at Fundación Educacional Arauco. He is the coordinator of Desafío TEP, and collaborating with professional teams from different communes in the design and implementation of educational programs. Previously worked as coordinator and advisor in the Education Area of the Municipal Corporation of Villa Alemana. He has taught at the university level in initial teacher training programs and in continuing training programs for school leaders. He has been part of research teams with publications in books and journals. Simón Rodriguez has a degree in psychology from the Pontificia Universidad Católica de Valparaíso; a Master's degree in Leadership and Educational Management from the Alberto Hurtado University, Chile; and a student of Ph.D. in Education Universidad Diego Portales – Universidad Alberto Hurtado, Chile.

Chapter 5
Reimagine Elementary and Secondary Learning During the Pandemic: Tsinghua University

Deyu Woody Wang, Weihang Cheng, Yun Jin, and Manwen Ivy Guo

Abstract New technologies inspire the reforms in education. A global pandemic that kept people including students and teachers in their homes only accelerated the progress of adopting new ways for students to learn and for teachers to teach. This chapter presents two programs carried out by Tsinghua University and Tsinghua University High School to provide adequate learning experience for students even when they cannot attend school physically. The merits of the two programs are not only reflected in the new content students learned, but also emphasized by the fact that students from distant areas and diverse backgrounds can form online learning communities that continue to exist after the pandemic. Finally, how teachers inspired undergraduates to act as peer learners for younger students is also inspected and discussed here.

5.1   Introduction

Tsinghua University is one of the most prestigious and influential universities in China. Established in 1911 and now a public university located in Beijing, Tsinghua has 20 schools and 59 departments with 3600 faculties members in science, engineering, humanities, law, medicine, history, philosophy, economics, management, education, and art. Tsinghua University has 50,000 registered students, including 16,000 undergraduates, 18,000 post-graduates, and 16,000 doctoral candidates. Within its main campus in Beijing, Tsinghua University also hosts a network of schools,   including   Tsinghua   University   High   School   (THUHS),

D. W. Wang (✉)
iCenter, Tsinghua University, Beijing, China
e-mail: wdy@tsinghua.edu.cn

W. Cheng · Y. Jin
Tsinghua University High School, Beijing, China

M. I. Guo
Chieon Future Ed Tech, Beijing, China

Tsinghua International School, Tsinghua University Primary School, and Jiehua Kindergarten, covering all pre-K to Grade 12 for both national curriculum and AP courses.

Tsinghua graduates follow diverse career paths in academia, industry, and government. Among them are award-winning members of academies, professors of world-class universities, government officials, as well as founders of overseas listed companies and leaders of multinational companies. Tsinghua alumni are also active worldwide in many countries, and around 20,000 alumni currently stay abroad, mostly in North America. There are nearly 50 Tsinghua alumni organizations in over ten countries.

The following excerpts from the president's address provide a glance at the strategic plan of the university:

> *Tsinghua continues embracing the world with open arms and confidence. The vision of the university shapes the kindred minds of its talents. Tsinghua continues to pursue innovation and creativity. In the past year, Tsinghua celebrated a range of ground-breaking achievements in areas of AI, physics, electronics, bioscience, archeological discoveries, and literature. As for the overall academic planning and strategy, Tsinghua continues to promote the development of humanities, engineering, and science disciplines through a series of comprehensive implementation plans. Innovation is the best course of action at a new age that presents us with unprecedented opportunities and challenges.*[1]

The onset of the COVID-19 pandemic brought challenges to the university itself. The president's office assembled a fast response team to coordinate academic affairs during this period. All students were required to stay put instead of coming back to campus. Faculties prepared and delivered all spring semester courses through *Rain Classroom*, a native online learning platform developed by Tsinghua Online Education Office in 2016, and other online meeting software such as *Tencent Meeting* and *Zoom*. Meanwhile, *XuetangX*, the MOOC platform launched by Tsinghua in 2013, hosted over 2300 courses provided by universities globally, among which Tsinghua offered over 1900 free of charge to the public.

Tsinghua University High School (THUHS) adopted a strategy of blended learning well before the pandemic. In 2016, THUHS began to build its own online learning platform, and by 2020, it had already offered thousands of students and faculties with modularized learning tools. Given that the transition toward online learning was rather smooth for THUHS, the focus was on accelerating the progress of restructuring curriculum and learning experience.

Among all these efforts, several Tsinghua University subsidiaries initiated programs to support elementary and secondary education. The goal of such efforts is to fulfill social responsibilities and to find new possibilities in online learning. This chapter aims to examine the approaches taken by different parties in various scenarios of elementary and secondary education engagement.

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[1] Revised from "*Message from the President-Tsinghua University*" https://www.tsinghua.edu.cn/en/About/Message_from_the_President.htm. Retrieved 9 July, 2020.

5.2   Connecting Online, Bridging the Gap

Alongside the efforts to maintain the quality of learning in courses, Tsinghua launched initiatives covering a broad spectrum of K-12 students, teachers, and parents. This chapter includes two cases that focus on exploring a new way of online-community-based learning that empowers K-12 learners on social, operational, and strategic levels. In case 1, Innovative Talent Cultivation Open Forum (ITCOF) hosted by K-16 Technology and Engineering Education Alliance (K-16 Alliance) invites educators, researchers, and practitioners from universities, schools, as well as governments to share insights into education for innovative talents. In case 2, the Student Development Center of THUHS hosts the *Minds of Youth* (MoY) learning camps that create online collaborative learning communities for students from different parts of the nation, including sixth graders up to undergraduates.

K-16 Technology and Engineering Education Alliance (K-16 Alliance) was co-founded in 2019 by Tsinghua iCenter, together with research centers of the Ministry of Education, universities, and schools. The mission of the K-16A is to build a stronger tie between K-12 and higher education, specifically in nurturing innovative talents. The Innovative Talent Cultivation Open Forum (ITCOF) has hosted 18 online public talks in 6 weeks, with speakers from Tsinghua University, Beijing Normal University, high schools, and ed-tech companies. These talks cover various topics, including education research, policy review, education outlook, learning and teaching strategies, and best practice review. The ITCOF creates an easy-to-access way to share challenges and know-how for K-16 educators. The speakers address the issues that arise during the pandemic and will continue to last into today's ever-changing world. The talks are broadcasted through multiple channels to reach out to different audiences. Data from the top viewing portal shows that ITCOF was viewed over 714,000 times across the nation with over 96,000 unique viewers. Comments on the talks show that the forum bridges the gap between educators of different grades, especially between teachers from K-12 schools and universities.

A series of learning camps named *Minds of Youth* (MoY) were designed for THUHS students after the onset of the COVID-19 pandemic in 2020. It has created a more concentrated learning experience and a sense of bonding for K-16 students. The 5-day online learning camps aim to provide opportunities for participating students to learn how to stay positive while learning at home away from friends and teachers. As an online learning consortium, MoY also encourages students to associate with peers and other learning partners in the community, helping them maintain a high level of self-efficacy in the online learning scenario. From March to May, three MoY camps had attracted 152 middle school students from sixth to eleventh graders, 14 Tsinghua undergraduates, and 7 Tsinghua faculties. Participants reported that the camps opened up a new perspective for the pandemic and helped them embrace the abrupt change in ways of learning. The blended learning community with university students brought unique opportunities for teenagers to make friends with and learn from their senior peers, thus cultivating social and emotional competence beyond a positive self-identity.

5.3 Rationale and Motivation

With the motto of "*Self-Discipline and Social Commitment*" and the spirit of "*Facta non verba* (Actions speak louder than words)*", Tsinghua University strives to influence younger generations on building up a strong will and an intelligent mind. Each summer, the Tsinghua Summer Schools are open to high school students. Many other activities, such as Lab Open Day and Lab Tours, welcome thousands of students from all around the country each year. XuetangX launched 7 years ago has already proven to be a practical approach to deliver knowledge. To have a positive influence on young learners and talents is part of Tsinghua's mission. During the pandemic, Tsinghua University opened all spring courses online according to the academic calendar while maintaining high teaching and research standards. In addition to undergraduate courses, faculty members used the Internet to deliver quality content, such as parallel courses that students from partner universities in Wuhan can take and get credits from. For younger generations, Tsinghua launched programs for sixth and twelfth grade students, especially those in the epicenters, to provide more opportunities for them to have genuine experiences with Tsinghua.

Online-community-based learning is a continuation of learning innovation that emphasizes learning in the context of society. As part of the general policy to enrich middle and high school student experience from the Beijing municipal government, students are supposed to take 6–8 days of social field study across the nation or even abroad per semester. The online learning format has opened up new possibilities to reach out further to local learning communities in both urban and countryside areas. Video conference, WeChat groups and other low-cost solutions enable students and teachers to learn and work with peers remotely without compromising the quality and intensity of interactions. We argue that in the digital era, online learning communities will become permanent infrastructures for students to learn together over long distances.

Both ITCOF and MoY serve the purpose of enhancing students' career and life planning by connecting the learning experience in a college with elementary and secondary levels of learning. We argue that a stronger connection with learning communities of higher grades and deeper understandings of what to expect in the future study will help younger students perceive studying as a whole to be more purposeful and, hence, increase the engagement with learning activities.

5.4 Case 1: ITC Open Forum

"*Innovative Talent Cultivation Open Forum*" (ITCOF) is a series of online talks that bring together education practitioners from universities and K-12 schools. As part of the K-16 Alliance yearly events, ITCOF serves the purpose of enhancing communication across different stages of learning. The invited speakers include professors from Tsinghua University and Beijing Normal University, experts from

government research institutes, and teachers from top middle schools. Over 90,000 unique viewers watched 18 talks on various topics and interacted with speakers in WeChat group chats. The approach received positive feedback from participating students, parents and teachers.

ITCOF is hosted by Tsinghua University iCenter, together with the Beijing Institute of Science Education Innovation (BISEI) and China Education Innovation Institute of Beijing Normal University (CEII). QC Maker, an education startup founded by Tsinghua graduates, runs the online event platform and coordinates the speakers. ITCOF aims to empower students, inspire teachers, and inform parents. Students of grades 7–12 can learn from professors and get first-hand information on their latest research projects. Teachers and parents can get insights into up-to-date policies released by the Ministry of Education and universities. The forum also serves to fulfill the social responsibilities of Tsinghua University by inviting young students to experience university studies before they get enrolled.

The forum is fully open and free to all audiences. Beijing Association for Science and Technology (BAST) provides funding to cover the cost of inviting speakers, recording, as well as bandwidth and platform maintenance. BAST also offers technical support for the live talk platform adapted by QC Maker for these events.

5.4.1 Participants

As of June 30, 2020, the organizers had invited professors, researchers, science teachers, and industry leaders as guest speakers to the forum. Eight professors and researchers were from universities or research institutes, including three from Tsinghua. Eight principals and science teachers were from high schools. Two experts were from the science education and design industries.

The organizers posted digital flyers primarily via WeChat, the most popular instant messaging app in China, and reached out to students through the network of K-16 Alliance. Over 80 schools received the invitation to the forum and spread the information among students and parents. According to data analytics of the live show platform, 96,416 unique users from 15 cities in China had registered and viewed at least one live or recorded talk as of June 30, 2020. Since the forum was open and free, the organizer did not collect any specific information upon viewer registration. However, the organizers analyzed the comments left by the viewers and identified four typical audiences:

1. Students. They are undertaking specific science projects in their schools.
2. Science teachers. They are dedicated to mentoring students' science projects or giving science courses in schools.
3. Parents. Their kids are interested in or are already undertaking science projects.
4. Sales representatives/R&D engineers. They are from science education hardware suppliers.

Although the exact proportion of these types of audiences is unknown, it is estimated that the majority of the viewers are science teachers and parents, each accounting for 40%.

5.4.2 Method

The forum consists of one-hour online live talks on a tri-weekly basis. The audiences can view the talks and leave comments on smartphones or computers but cannot talk directly to the speakers. Speakers will respond to selected comments after the talk. Alongside 18 talks, a special event invited the audiences to a virtual tour of Tsinghua iCenter with detailed explanations about various advanced technologies, including AI-embedded flexible manufacturing, additive manufacturing with non-metal and metal materials, and high-precision optical inspection.

Each week, three speakers gave talks individually on three consecutive nights. Speakers used slideshow screen shares to present the content while appearing live through video. Every talk lasted one hour with selected topics on science education. The diversity of speakers' backgrounds allowed the audiences to approach the issue of science education from distinct perspectives – from elementary to university levels (Table 5.1).

The organizers created a WeChat group chat for speakers and audiences each week. Audiences were encouraged to raise questions before the talk and extend the discussions into the group chats after the talk.

5.4.3 Data and Results

Students viewing counts and the number of audiences for each lecture are collected from the online community administration console. By June 30, 2020, the top speech had received 171,445 numbers of live views from 17,296 viewers. It was given by the former principal of Beijing No. 4 High School, which ranks among the top 10 schools in Beijing and sends hundreds of students to prestigious universities in China and abroad each year. A lecture given by Jian Liu, Head of China Education Innovation Institute, received 156,735 live views from 10,639 audiences, ranking second on the list. Some other top speakers include experts in innovation project mentoring, professors from Tsinghua University iCenter, and experts in psychology and computer sciences. Though a limited number of feedbacks are collected

Table 5.1 Numbers of ITCOF talks hosted by speakers from different backgrounds on different topics

	University/research institute	Schools	Industry
Strategy	6	4	0
Practice	2	4	2

afterward, the viewing numbers demonstrate the popularity and impact of ITCOF. Today, recordings of all talks are still being reviewed by more people who are interested in related topics.

5.4.4 Next Steps

A more formalized assessment system would be in place for future events in this series. Key parameters about the lectures will be collected on the online platform to yield more meaningful information about the audience and their gains from attending the event virtually.

We also plan to conduct a survey among high school teachers and parents on their feedback about previous events and expectations for future events.

5.5 Case 2: *Minds of Youth*, an Inclusive Blended Learning Community

An immediate challenge for students learning from home is the absence of personal interactions with teachers and classmates. Video-based online classrooms and other expedient solutions for online learning are inadequate to facilitate social interactions among teenage learners. Therefore, it becomes difficult for students to have instant emotional support in the short run, or to obtain guidance for career path planning in the long term. Students reported having a hard time studying alone at home for an extended time. An online learning community provides opportunities for participating students to associate with peers and other learning partners, helping them maintain a high level of self-efficacy in an online learning scenario.

Minds of Youth is a small-scale inclusive learning community as well as a program for student social involvement designed and managed by THUHS. The Student Development Center of THUHS is the administrative entity of the MoY program. It aims to transform the learning experience by introducing an online community to the learners and by facilitating the participants to write and share. The primary goals of MoY are to encourage participating students to find internal study impetus, to adopt a more positive perspective for learning from home, and to find diverse ways to define the value of life, self, and others.

As part of the long-term strategy for THUHS students to gain real-life social experience, MoY also serves to expand students' scope of Chinese society by connecting them with contemporaries from less-developed areas in southwestern, southeastern, and central China.

The purpose of the Online Community is to provide both intellectual and mental support for younger students by inviting them to communicate with university students and faculties in a series of learning activities.

5.5.1 Participants

The three 5-day learning camps admitted 166 students and 7 faculty members from Tsinghua University and THUHS. Students volunteered to participate in at least one of the three learning camps. Most students proposed to get enrolled for a second or even third time immediately after the closing ceremony of the previous camp, even though they knew the content and curriculum design would be very similar. The proportion of students from THUHS and partner schools are balanced (89 vs. 63) to ensure that applicants can form up into teams with diverse learning buddies. Students from elementary schools to universities are invited to provide a mixture of knowledge and experience and to boost peer learning (Table 5.2).

Organizers used an existing network with school administrators to find partner schools for MoY. Individual applications for enrollment were also accepted. As of June 30, 2020, 152 students had signed up for three camps. They came from 16 schools, including 8 in Hubei, 1 in Yunnan, 1 in Fujian, 1 in Anhui, 1 in Zhejiang, 1 in Sichuan, and THUHS in Beijing. The schools outside Beijing were in areas where the pandemic hit the most severely.

Fourteen sophomores from the School of Social Sciences at Tsinghua University volunteered to be mentors in MoY Camp III. They have backgrounds in sociology, international politics, and psychology (Table 5.3).

The MoY learning camps were designed by Weihang Cheng from THUHS Student Development Center and Yun Jin from THUHS Administration Center. The events in three MoY learning camps were prepared, coordinated, and supervised by Weihang Cheng. Three other teachers from THUHS and Tsinghua University participated as mentors.

Class teachers and parents of some participating students joined the WeChat group as observers without involvement in daily assignments or other learning tasks.

5.5.2 Method

The community held a series of 5-day online learning camps, inspiring participants with self-regulated learning, empowering them with learning methods and tools, as well as creating a supportive and inclusive learning environment for students from multiple grades. Participating students usually take one or more roles defined in the

Table 5.2 Numbers of *Minds of Youth* participants from different schools and grades

	Tsinghua University	THU High School	Partner schools
Grade 6	-	-	2
Grade 7–9	-	70	61
Grade 10–12	19	-	-
Undergraduate	14	-	-

Table 5.3 Numbers of *Minds of Youth* participants undertaking different roles

	Learning buddies	Lecturers	Podcasters	Mentors	Organizing volunteers
Grade 6	2	-	1	1	-
Grade 7–9	131	12	11	-	10
Grade 10–12	19	-	-	-	19
Undergraduate	14	-	-	14	-

community. They are all learning buddies by default and can additionally choose to be a lecturer, a podcaster, a mentor, or an organizing volunteer.

- **A learning buddy** participates in discussions and submits learning progress reports.
- **A lecturer** gives lectures on one of the learning topics.
- **A podcaster** provides one podcast on one of the learning topics.
- **A mentor** participates in discussions and responds to buddies' questions.
- **An organizing volunteer** coordinates events, designs slides and posters, or compiles deliverables.

Participating students and teachers use three platforms to coordinate learning activities:

- WeChat group chats, for morning lectures, evening podcasts, notifications, and free discussions.
- ShareDaka, a third-party mini-program run on WeChat for checking in daily learning tasks.
- Shimo Online Docs, for collaborative writing within co-create learning teams.

The core learning theme consists of four topics: a) flow, b) nonviolent communication, c) learned optimism, and d) a hero's journey. Lecturers work in a team of three to compile the content of one topic into slides and an explanation script with the help of mentors and organizing volunteers. At seven o'clock in the morning, lecturers post pictures and voice messages into the group chat and elaborate on that topic to their peers. On the same day, all learning buddies need to submit an essay on the topic to ShareDaka mini program. Afterwards, another group of students will collaborate and compose a podcast on the same subject matter after reviewing all the essays and post the voice messages into the group chat the next evening. At the end of each camp, all the essays are compiled into four digital books according to four topics by volunteers.

Meanwhile, all of the learning buddies are divided into eight to ten co-created learning teams. Team members are supposed to be from different provinces. Within each team, members take their own roles to enhance one another's sense of engagement. Generally speaking, one member will be in charge of managing the learning tasks every day, ensuring that everyone keeps on track with the intensive learning agenda. Another member will collect feedback and compose a line chart to visualize the teammates' daily mood swings. Aside from giving feedback on learning

buddies' performance, mentors also initiate several discussions about any hesitation, confusion, or frustration incurred in the interactions or about other life issues.

5.5.3 Data and Results

The MoY team assessed the learning process with analytical data from administrative portals of the online learning tools. They also conducted interviews with stakeholders of the events, including students, parents, and class teachers.

The learning task completion rate reflects the involvement of students in the camps. A gap between students from THUHS and other schools indicates different baseline participation rate among students from different backgrounds (Table 5.4).

Students' self-reported expectations before the events were expressed via online application forms, and their comments on the learning experiences were collected through online interviews. Among all the purposes of participation mentioned, the top-ranked goals include "to be a better self" (37.8%), "making new friends" (35.1%), "enhancing writing skills" (32.4%), and "supporting others" (18.9%) (Fig. 5.1).

Post-event assessment contains several online interviews with students, parents, and their class teachers. The interviews include 5 *Tencent Meeting* video conferences, 10 one-on-one WeChat text or voice message talks, and 70 individual online questionnaires. In response to their claimed purposes, students reported having gained more than expected in MoY camps.

5.5.4 Feedback from Participants

"Be a Better Self"

Students found new perspectives to value themselves during learning activities. They began to view their life in a broader way in comparison to the original scope of schoolwork.

> I feel lucky to be part of this, where I found a new and different way to live my life. – Childish Lemon, Grade 7, Wuhan, Hubei
>   Devote into myself and think thoroughly through each topic, write down what's in my mind, leave behind judgment from others, and just be myself. – Peach, Grade 8, Beijing

Table 5.4 Learning task completion rates (The percentage indicates the total number of learning tasks finished out of all assigned tasks. The numbers in parenthesis indicate the number of students included in each camp)

	Camp I	Camp II	Camp III
THUHS	97.06% (17)	79.55% (22)	87.04% (27)
Schools outside Beijing	70.83% (18)	61.36% (22)	91.66% (21)
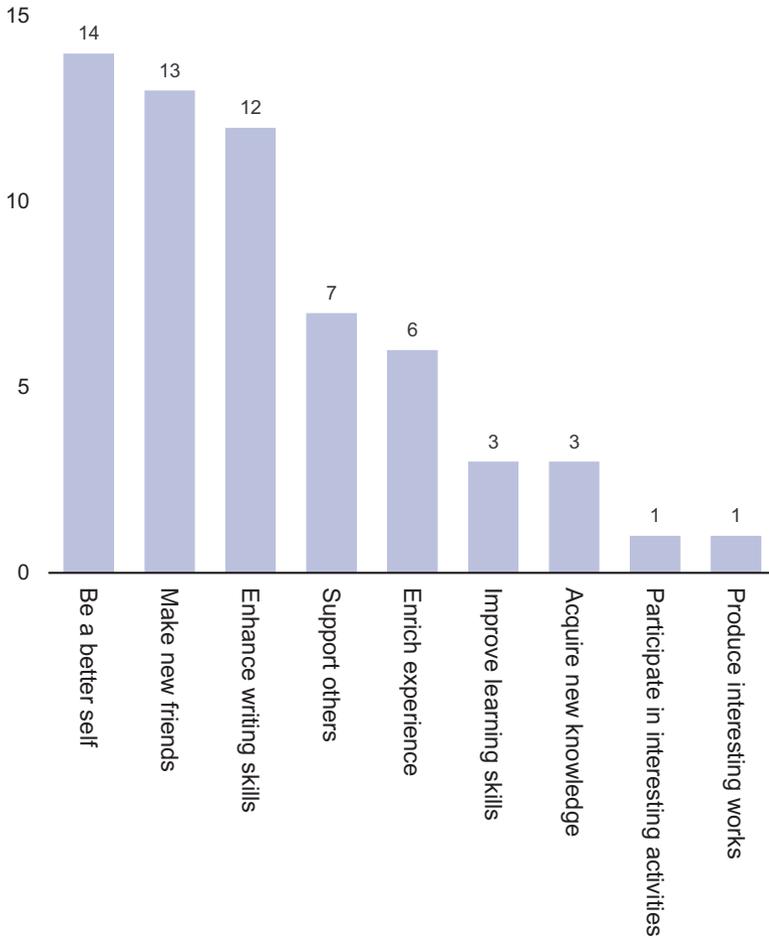
Fig. 5.1 Purposes of participating in MoY mentioned by students from 37 responses

> I would like to participate again and challenge myself to be a podcaster. I missed the opportunity this time because of fear. I would definitely try something new next time. – Bonnie, Grade 7, Wuhan, Hubei

"Make New Friends"

New friendships emerged between students from Beijing and other areas. They shared common interests and bridged the gaps of different life experiences and family backgrounds. They opened up to each other and built mutual trust to cherish their friendship. Many students extended their relationships well into their lives after the events.

I made a lot of friends from Beijing, who share common values with me. They have similar hobbies as I do, and we share happiness and eagerness for beautiful things in life. The depth of friendship does not depend on how long people meet, but on how well their souls resonate. – Yuexixi, Grade 8, Jingzhou, Hubei

It truly was a special spring for me. When I listened to the MoY lectures and worked on the related assignments, I was still stuck in my everyday routine of courses and homework. Yet *Minds of Youth* brought surprises to my life. Within this community, I met with quite a few friends who shared similar interests with me. I'm sure it is one of the most enjoyable things in my life. I can get acquainted with people from far away, not only from around here. – Sextet, Grade 8, Wuhan, Hubei

This cohort of teenagers with distinctive backgrounds who share and fight for the same goal have brought light and color to my stereotyped life of dining, sleeping, writing, and watching. Now I begin to look out of the window, starting to wonder: the things that matter are not only studying and working hard, but connecting with all of you, despite that we are a thousand miles apart, without meeting in person. – Ian, Grade 7, Beijing

Not only have we college students shared our experiences with middle school students, but we've learned a lot from them about what contemporary teenagers are thinking and their perspectives of the society. It is thought-provoking to compare the buddies' ideas with what we used to think about the world, which was not far away back. – Ruoxing, sophomore, School of Social Sciences, Tsinghua University, Beijing

"Enhance Writing Skills"

The learning tasks involved a lot of writing. Students found it enjoyable and beneficial to write and share on a regular basis, even for a limited period of time. The fact that actual people were reading, talking about, and giving feedback to their works inspired participants' self-regulated learning in the most natural way. Hence the students became more and more self-driven with a certain purpose.

Each and every article melts in my heart; each and every podcast echoes in my head. – Eaglet, Grade 7, Beijing

I have found myself making a lot of progress this week, in terms of both speech and writing. – Yuanzi, Grade 8, Jingzhou, Hubei

Dive into my own little world and retrieve my past quietly. I have found a small piece of undiscovered happiness from my long-sealed past. How long has it been since the last time you wrote down anything authentic from your heart? Forget about those tricks to get a high score in writing, and forget about the second-hand stories told by others. – Yisheng, Grade 8, Jingzhou, Hubei

5.5.5   Feedback from Parents and Teachers

Two conflicting points of view exist among parents about such unconventional learning activities. On the one hand, parents struggle to find opportunities to build closer relationships with children whose time is occupied with schoolwork. On the other hand, parents consider that having extra-curriculum learning activities will waste too much time, even though the MoY tasks are designed to optimize parent-child relationship.

1. Case A [Positive]: A sixth grader from Chengdu, Sichuan, volunteered to be a podcaster. She used to be regarded as a typical rebellious adolescent since she always quarreled with her parents. During her time in MoY, she became more active and better engaged in learning. Her parents witnessed how she was taking responsibility when working with her peers to prepare for the podcast, not the trouble-making girl anymore. Afterward, both of her parents dropped prejudice and decided to give their daughter more freedom. And the family reported to enjoy a more harmonious parent-child relationship.

2. Case B [Negative]: A father from Jingzhou, Hubei, and a mother from Xiantao, Hubei, found it challenging to balance the MoY tasks and subject learning. They decided that the students were better off not spending time on these online activities in order to allocate more effort to subject learning. Although the two are rare cases in the camp, they reflect a widely spread misunderstanding that the learning environment and social interactions are isolated and irrelevant to students' performance.

To most parents' surprise, MoY has been proven to improve children's overall academic performance by nurturing a positive learning atmosphere as well as a healthy psychological and mental state. The following shows some observations of the campers by their parents:

> It's not that we want to fight with our child, but that we are not able to find a pivot point to open his world. In MoY, sense of fulfillment and joy replaces his purposelessness by means of free writing. We feel grateful for this event and hope it can last forever! Thanks to MoY, my son and his fellow students in Hubei have been illumined to find their own directions. – Parents of an 8-grader, Shiyan, Hubei
>
> Being part of MoY truly brought some changes to my kid. First, he began to love writing, which used to be his biggest problem at school. In this event, he read others' work and found a lot of inspirations. He talked about writing to his new friends, filled with purposes and interests. He delightfully joined the daily online meetings punctually, and carefully chose the words for each sentence. I believe that is the magic of open topic writing. In addition, the enthusiasm from the MoY buddies enhanced my son's confidence and interest in learning. I truly appreciate the teachers and students who made this event possible. – Parents of a 6-grader, Wuhan, Hubei

Generally speaking, the transform in learning attitudes will help improve students' performance in schoolwork. Class teachers who are in favor of students participating in MoY also reported that students demonstrated a more positive attitude toward learning after the camp.

> I notice that Zhang has grown to be more and more self-disciplined. She had to study at home on her own because both of her parents had been back to work since the beginning of March. To my surprise, she became even more self-regulated while she had easy access to smart phones and computers. I did witness the improvement of Zhang's performance in online courses and exams. And I had no doubt that she had learned a lot from MoY when she shared with me her plan of introducing a similar program to our class in order to involve more classmates in. What a smart girl with critical thinking and the ability to transfer! I will be more than grateful to see this girl's promising future. – Comments from Zhang's class teacher in THUHS, Beijing

5.5.6 Future Plan

Expanding the Sphere of Influence in THUHS.

Positive results from the three learning camps of MoY boosted the confidence of administrations of THUHS. The Career Planning Office of the Student Development Center is working with the founding team of MoY to make plans for more learning camps in the following summer vacation. More students from Grade 7 to Grade 11 will be encouraged to sign up.

Optimizing the Format and Content.

Taking advantage of combining the MoY camp with social practice, THUHS will produce more possibilities for students. Merging the online phase and the offline phase together, the school's summer or winter study tour will create a more comprehensive learning experience. For instance, in the preparation stage, the students are supposed to participate in the online camp with learning buddies of the same age from one or two schools in the travel destination. Once the travel starts, students from both THUHS and the cooperative school will meet with each other in the on-site activities.

It has also been suggested that more knowledge of developmental psychology should be introduced to the program. Therefore, the MoY camp can be transferred to be an orientation camp for Grade 7 and Grade 10, which are respectively the starting grades of junior high school and senior high school. Moreover, an additional part of parent-child communication may enable the program to be more family-friendly.

Applying the Pedagogy to Semester Courses.

The event has attracted several teachers from THUHS to be observers in the past three camps. They have found it so impressive and positive that they are considering applying the strategy to their semester courses. In fact, one of the teachers is already planning another online summer camp focused on science of learning following the format of MoY.

5.6 Discussion of this Chapter

In the past 5 months, efforts to maintain a high level of engagement with students have yielded positive results. Online events are overall more capable of maximizing outreach and influence. Feedback collected from informal ways such as messaging with organizers reflects that the outcomes of most events have exceeded audiences' expectations. In the meantime, some obstacles are identified for further improvement, and some unexpected values from the events are evaluated and discussed.

A Better Experience for More People.

Feedback from science teachers in elementary and secondary level schools have confirmed that ITCOF talks are useful and practical. They left comments on virtual tours to Tsinghua iCenter, saying that the experience was impressive. Students regarded it as a once-in-a-lifetime experience. Teachers who visited iCenter in person before described the online virtual tour as more efficient since "the contents are well-orchestrated and presented by the person most suitable for the job, thus everyone owns the best vista point."

Online Learning Communities Help Students Keep Motivated.

A critical issue for learning from home is motivation management for both completing daily learning tasks and preparing for future career paths. It is widely reported by class teachers that students often experience a loss of mindfulness learning from home. Key reasons include the drastic change in the learning environment and the absence of peer learners. Homes are full of distractions, such as food and playful items. Video-conference-style online classes are widely adopted by schools in China during the pandemic. Interactions with peer learners will possibly drop to a minimal level when students engage with the class only through a screen with a camera, which is more often than not left switched off by students. An online learning community that requires students to work in teams and complete group tasks has proven to be accepted and effective among students and their guardians.

In MoY learning camps, most students gained learning motivation and better relationships with guardians after the 5-day experience. It turned out that the only adverse factor was a few guardians' lack of understanding about the purpose of such learning communities.

A distinctive feature of learning tasks in MoY is that they require students to use diverse skillsets and mindsets. Students who understand this are more willing to participate multiple times to try out and practice with different roles. Generally speaking, students who fall behind academically hardly enjoy the sense of presence in the fierce competition at school. By contrast, MoY provides a huge stage for them to unfold their hidden skills such as poster designing, eloquence, etc. In a word, MoY is an inclusive learning community where peers celebrate all kinds of talents and teenagers build up self-efficacy.

Many other cases provide evidence that the online learning community is an effective way to keep students motivated. However, whether the effects on self-efficacy building and motivation boosting will persist after the camp is left for further investigation.

Mixed-Grade Learning on a Larger Scale.

ITCOF and ALL create large open platforms for learners, teachers, and other stakeholders to exchange ideas and to communicate. Students report the lectures given by professors have transformed their understanding of learning and research in a university. They set up an internal goal of realizing a better self and earning the

opportunities to study with peers. It goes far beyond the external goals they initially held of scoring higher in the next exam to satisfy their parents and teachers.

The discussions with undergraduates in MoY have deeply impressed the middle school students. These young people started to make connections between what they are currently learning and what will be used in the future. They can also raise questions for "college student mentors" about what careers they are pursuing after graduation. Such a question is usually rare among high school students either because they do not have much time to think about it or because they simply do not have anyone to turn to when the question arises.

Quality of the Content.

As for online talks and courses, the larger audience brings about more uncertainties in the preparation stage due to diverse backgrounds of listeners. It requires the presenters to think through the content more thoroughly in advance and predict what questions might be most appropriate and effective. Online platforms provide instant feedback to speakers. Compared with traditional ways of questionnaire or interview, the real-time comments from audiences are more accessible for speakers to review and reflect on, in order to improve and iterate the speech content.

Moreover, the availability and accessibility of online content increased peer learning among experts. A distinguished guest to ITCOF viewed all the talks before him. He used what he learned from both the speakers and the audiences to tailor his presentation and responded to some key issues addressed. As a result, his talk was viewed by over 10,000 unique users, ranking third among all 18 talks.

From Live Show to Short Video.

Switching from classroom learning to online learning leads to an increase of electronic device usage among students. Since last year, short videos have consumed more time of Internet users than ever. A video that goes viral can easily earn millions of views within days. Live shows that take an equivalent time as traditional classes are merely a preliminary solution. New formats for online learning are still to be explored. Nonetheless, whether online learning can be a more substantial part of the blended learning format is yet to be proven.

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Woody Wang is the Director of Innovation Education Pillar at iCenter, Tsinghua University. His major is industrial engineering, which gave him the insight in systematically managing college students' innovation and entrepreneurship projects. He serves as the Secretary General of Maker Education Base Alliance, which has 178 members of universities, colleges, and enterprises in education industry around the country. Woody has 7 years of rich experience in entrepreneurship education, collaborative learning, VR/AR and simulation, industrial system design, human-machine interaction design, etc. He is one of the instructors for TEDxTHU and THU Makerspace Student Club. His achievement has been published on domestic and international journals and conferences.

Weihang Cheng is a political science teacher of Tsinghua University High School (THUHS). As a former student development counselor, she was responsible for designing and coordinating student activities in THUHS. Before she was awarded an MA in Education, Policy and Society by King's College London, Weihang had already gained rich teaching experience in project-based learning and experiential learning. After receiving her Bachelor of Law in Sociology from Tsinghua University, she joined Teach For China, a non-governmental organization, and dedicated herself to a 2-year volunteer teaching project at two schools in rural southwestern China.

Yun Jin is a teacher of English at Tsinghua University High School (THUHS). She hosts multiple selective courses about learning sciences. She received her BA degree at Beijing Normal University. Her research interests include how to create an immersive learning experience for students with specially orchestrated learning activities and a refined reward system.

Ivy Guo is both a researcher in learning sciences and an entrepreneur in education technology. Ivy received her MA in Learning, Design and Technology from Stanford University and her BS in Psychology with honors from the University of Illinois Urbana-Champaign. Ivy translated the book, The ABCs of How We Learn, and introduced the concept of Scientific Learning into China. She collaborates with top high schools and universities to make an impact among students, teachers, and parents. She is also a founding team member of Tsinghua University Lab for Lifelong Learning.

Chapter 6
A Covid-19 Response with Years in the Making: The Contribution of EAFIT University to Basic and Secondary Education in Colombia During the Pandemic

Claudia María Zea Restrepo, Diego E. Leal-Fonseca, María-Antonia Arango Salinas, and Laura Hernandez-Velez

Abstract During the health emergency generated by Covid-19, EAFIT University has worked closely with the National Ministry of Education (MoE) and its Vice-Ministry of Preschool, Basic and Secondary Education, providing ideas and guidelines to 96 certified Secretaries of Education (In Colombia, Secretaries of Education are responsible for managing resources and activities for the educational sector at the province and municipality level. Province governments coordinate educational service in all their municipalities except those over 100,000 inhabitants, which can apply to be *certified* and become autonomous in the management of their resources) in Colombia and strengthening their capacities to autonomously address the emergency in educational institutions. This work includes the development of a national project focused on collectively defining the actions needed for the successful return to academic activities.

This experience is derived from the development, since 2012, of the UbiTAG (The name UbiTAG derives from "ubiquitous learning," followed by *tecnología–aprendizaje–gestión* ("technology"–"learning"–"management"). The label was introduced in Zea et al. (2012)) model, a holistic approach to digital maturity and change management in schools that has been implemented through ongoing long-term projects in the Itagüí municipality (24 schools) and the Bogotá Capital District (383 schools). This case study will focus on the work that EAFIT has been doing during the emergency, supporting both the MoE and specific Secretaries of Education. In addition, the case will describe some aspects of the UbiTAG model that have helped to address the educational communities' current challenges.

C. M. Zea Restrepo · D. E. Leal-Fonseca (✉) · M.-A. Arango Salinas · L. Hernandez-Velez
EAFIT University, Medellín, Colombia
e-mail: dlealfon@eafit.edu.co

6.1   About EAFIT

EAFIT[1] is a private university in Medellín (Colombia) and an institution that both generates and disseminates knowledge, thus fulfilling its role as a teaching and research university. Its declared purpose is to inspire lives and share knowledge to support humanity and society. With a 60-year history since its foundation on May 4, 1960, EAFIT has trained business leaders from Medellín, Antioquia, and other parts of Colombia while positioning itself as a global institution that encompasses different areas of knowledge.

EAFIT's "Itinerary 2030," the strategic plan set forth for 2019–2030, has four main objectives: 1) to promote learning, discovery, creation, and culture within a humanistic approach; 2) to become an intelligent and mindful learning ecosystem; 3) to advocate for alliances that can transform society; and 4) to encourage sustainability that creates trust and hope. Throughout the years, EAFIT has remained open to new areas of knowledge, starting with a School of Management, and gradually including Schools of Economics and Finance, Engineering, Law, Humanities, and Sciences. EAFIT's commitment to the development of Colombia is also evident through institutional consulting services and projects implemented in collaboration with companies, national and local governments, and other entrepreneurial initiatives. Within this context, the university strives to give back all that it has received from society, infusing its social responsibility efforts with a greater sense of purpose. With these strategic commitments in mind, EAFIT remains firm on its promise to inspire, create, and transform.

6.2   Background: 30 Years Working for the Consolidation of a National Ecosystem of Educational Innovation in Colombia

During the health emergency triggered by the spread of Covid-19, EAFIT University helped to support the continuity of academic life in public primary and secondary schools. The initiative was based on a trajectory of more than 30 years of research in education and digital technologies starting with the *Conexiones*[2] project, which helped to establish an ongoing relationship with the MoE since 2002. EAFIT was a key player in the creation of the *Colombia Aprende* educational web portal in 2004, supporting the MoE in articulating joint efforts to improve access and connectivity

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[1] EAFIT is an acronym derived from the name at its foundation, *Escuela de Administración, Finanzas e Instituto Tecnológico* (School of Administration, Finance, and Technological Institute).

[2] *Conexiones* was a project launched in 1993 that sought to bring digital technologies closer to the classroom, the student, and the teacher. It fostered interrelationships between institutional education projects and new pedagogies oriented to digital technologies, reaching around 150 schools in several regions of the country.

to educational resources in underdeveloped areas and to develop teachers' digital skills until 2010. Through subsequent partnerships with the Itagüí municipality (since 2012) and the Capital District of Bogotá (since 2016), EAFIT has contributed to the development of organizational capacities regarding change and educational innovation management, which are essential aspects to make sense of the role of digital technologies in schools. As a result of the experiences detailed below, the university had the trajectory, tools, and resources that allowed it to generate quick proposals and respond to emerging needs.

Between 1993 and 2012, the R&D group in Educational Informatics at EAFIT University designed, structured, and implemented a set of solutions to integrate digital technologies in education, which were formalized in a ubiquitous learning model called UbiTAG. The UbiTAG model "measures the capacity of an educational institution for the integration of ICT in education… The original model, called TAG, was proposed in Zea et al. (2012) and includes three dimensions that must be developed in a balanced way for an educational institution to provide ubiquitous education" (Zea et al., 2013, 2015). The model was developed by considering three initial dimensions: technology, learning, and management. Later, an additional dimension – research, development, and innovation (R + D + i) – was added to give the model "capacity for permanent reflection" (Zea et al., 2013; Zea et al., 2015). In this way, UbiTAG enhanced the original concept from a results-based vision to a continuous developmental assessment based on ongoing improvement and adaptation to the needs of the learning environment. In addition, it allowed the other three dimensions of the model to adapt to any educational context and to circulate content and knowledge to foster a culture of learning and educational innovation through technology and change management processes.

In 2010, EAFIT started *Proyecto 50*, a unit created to support the use of ICT by faculty and administrative staff in the university, which later assisted the R&D group in Educational Informatics to deploy *Plan Digital TESO* (2012)[3] and *Saber Digital* (2016),[4] both initiatives aimed to develop capacities in local governments and public schools for the integration of ICT. These initiatives evolved as part of a multi-year research project funded by the International Development Research

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[3] Since 2012, EAFIT University has been developing the application of this model in the municipality of Itagüí through a public-private initiative called *Plan Digital TESO*: "We transform education to create dreams and opportunities." In 2015, the achievements of the TESO Digital Plan led to the creation of public policy for the municipality through Agreement No. 10 of December 2015, *Plan Digital TESO 2015-2023*, a public policy of educational innovation incorporating smart use of technologies. Leal and Zea (2017) include a detailed discussion of the components and achievements of Plan Digital TESO.

[4] Starting in 2016, the Secretary of Education of Bogotá and EAFIT University began a process of sensitizing educational actors in schools, highlighting the importance of strengthening learning environments through the integration of digital technologies. Likewise, they undertook a review of the context of digital education in the city and the state of the technological infrastructure and perception of its use and appropriation of ICT by teachers and administrators from 41 schools within the framework of a project entitled "Strengthening of Learning Environments with the use of Digital Technologies (Saber Digital)." This project scaled to reach 383 schools in 2019.

Centre (IDRC, Canada) between 2015 and 2019 and were brought to a national level in collaboration with the MoE twice: in 2015–2016 by means of the *Colegio10TIC National Plan* and more recently through *Aprender Digital* (2019), an initiative that builds on the lessons learned in *Colegio10TIC* and *Saber Digital*, reaching 200 schools across the country.

So far, EAFIT has worked with over 600 schools and 96 Secretaries of Education across the country, designing actions that foster the development of their local capacities to manage change, innovation, and digital technologies, using custom-designed projects based on the UbiTAG model. This work has helped to sustain EAFIT's role as a leading actor at the national level.

These actions are directly connected to the university's mission, which has committed to social construction through partnerships with public and private sectors since its founding, so that its educational impact can have permanence and continuity within Colombian society. EAFIT considers innovation as a bridge connecting the university with its context as well as articulating its relations with public entities.

It is important to highlight that, while no one might have imagined all the societal challenges brought about by a pandemic, the first decades of the twenty-first century projected significant changes in the development of most human processes and relationships brought by the fast advancement of digital technologies. Thus, if education had not been deemed one of the areas with the greatest influence on societal change prior to the pandemic, there can no longer be any doubt about the crucial link that the health emergency has reinforced between education, society, and digital technologies.

6.3   The Covid-19 Pandemic: An Opportunity for the UbiTAG Model to Evolve

When the health emergency in Colombia started in March 2020, EAFIT reached out to several Secretaries of Education to provide informal assistance regarding the challenges of school closure, remote work, and learning at home. Also, the continuous relationship with the Ministry of Education led to an agile collaboration focused on two fronts: the creation of an immediate action protocol for the activation of teaching and learning processes in the territory and updating the *Colombia Aprende* portal.[5]

The first front started by proposing instruments to recognize educational and digital technology needs in the different territories of the country, considering that only around 21.7 million people in Colombia (i.e., 47.69% of the population) have Internet access (Ministry of ICT, May 19, 2020). EAFIT provided technical advice to organize and articulate the operation of Secretaries of Education during the health

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[5] More information about the portal can be found at: http://aprende.colombiaaprende.edu.co/en/abouteportal/aboutus

emergency, as well as recommendations regarding the use of other digital resources using the Internet, radio, and television broadcasting, also considering the available physical resources that could ensure the continuity of educational processes for students without connectivity.

On the second front, the *Colombia Aprende* portal was updated and enabled to strengthen the processes of the Ministry of Education regarding the provision of learning services for the educational community. This allowed the MoE to make digital resources and tools available to streamline the remote teaching-learning process.

These first steps led to an ongoing project in which the university is focused on supporting the Vice Ministry of Preschool, Primary, and Secondary Education, on three main fronts: two of them are oriented to respond to the sector's needs regarding the Covid-19 pandemic, while the third one aims to consolidate the solutions generated during this period for the near future. For María del Rosario Atuesta, project manager of *Aprender Digital* program, the first front is focused on "support[ing] the Ministry as a complement in those areas that are not easy for them to manage, given their government structure" (personal communication, June 24, 2020). The role of the university is to provide orientation in the creative adaptation of traditional learning methodologies and to transfer the lessons and strategies provided by the UbiTAG model, to enhance continuity to the educational processes of students from their homes.

In coordination with the support provided to the Ministry, the second front involved work with 96 Secretaries of Education across the country during 2020. Through knowledge transfer and technical support, the capacities of officials from territorial entities would be strengthened, so that they could lead, develop, and support innovation processes in their own school systems. Also, Secretaries of Education received orientations to formulate territorial plans for educational innovation, considering emerging dynamics in their local contexts.

Drawing on the first two fronts, the third front intends to structure a national ecosystem of educational innovation so that local governments, the national government, and other actors in the Colombian educational system can articulate their efforts in providing resources, advice, support, and guidelines sharing successful experiences within the territories. In other words, the actions carried out to address the Covid-19 pandemic will lay the foundations to improve the coherence and alignment of the Colombian educational system in the future, using digital tools and technologies that allow the development of new learning experiences for students.

> What we are doing is supporting the strengthening of the national ecosystem of educational innovation (…) through the conversations and the bets that we are making for the territorial entities, specifically Secretaries of Education. So that they are the ones that stimulate all the innovation and all the possibilities of reinventing themselves, that this contingency generates in each one of the territories. (personal communication, M. del R., Atuesta, June 25, 2020)

The Ministry of Education provided funding for the actions described above, with an investment close to US$850,000 during 2020.

In addition, EAFIT developed a partnership with the Secretary of Education of Bogotá to support 183 public schools in the capital city (about 50% of schools). It is worth mentioning that, starting in January 2020, there were new local governments (governors and mayors) across the country, so the beginning of the period of mandatory preventive isolation in the country coincided with the beginning of their terms. In the case of Bogotá, the change of mayor meant at the same time a change of political orientation. However, the *Saber Digital* project, implemented by EAFIT since 2016, was selected to continue its implementation during the Covid-19 pandemic with the name of *Aprende en Casa con Saber Digital (Learn at home with Saber Digital)*.

Thus, since March 2020, days before the declaration of a health emergency, the Secretary of Education of Bogotá and EAFIT began preparing action protocols that would allow a rapid response to the emergency. Then, while all the schools in the country were on a break from activities (according to guidelines from the national government), schools in Bogotá continued their educational activities with the support of *Red Académica*[6] and the city educational portal, which had been strengthened as part of the implementation of *Saber Digital* (2016–2019). According to Patricia Toro, director of *Saber Digital*, several strategies were deployed during the second half of 2020, providing immediate reaction to the emergency and providing feedback for the design of the initiative in the long term. The intervention focused on principals and administrators, educational innovation lead teachers, counselors, students, and parents.

Some actions that were carried out during 2020 include i) online brainstorming and exploration sessions with teachers and principals to develop their skills in the use of digital tools; ii) planning and deployment of a support network for parents and caregivers building on their learning experiences at home; iii) organization of online meeting spaces focused on the discussion of domestic violence with the accompaniment of psychologists; iv) design of future scenarios with school administrators; and v) strengthening of *Red Académica* with educational content for different grade levels and a digital toolbox that facilitates learning processes. The Secretary of Education of Bogotá provided funding for this project, with an investment close to US$540,000 during 2020.

Some of the specific actions that were developed throughout the year for each stakeholder are:

(i) For principals (n = 183): a) reinforcement of skill development as necessary (based on a needs analysis); b) dissemination of innovative emergency management responses; c) documentation of emerging innovative educational practices.

(ii) For teachers (n = 800): a) development of digital skills in teams of lead teachers; b) support for the recognition of students' home learning environments; c) conducting brainstorming sessions to enhance learning at home; d)

reinforcement of training for the design of online activities (i.e., digital educational content); e) dissemination of innovative experiences through *Red Académica*.

(iii) For counselors (n = 183): a) capacity building for the design of online activities; b) socialization and appropriation of digital educational content; c) dissemination of innovative experiences through *Red Académica*.

(iv) For students (n = 1600): a) accompaniment during the selection process of monitors (junior teaching assistants) and student leaders; b) formation of student support networks; c) development of brainstorming sessions; d) collaborative work with student leaders.

 (v) For parents (n = 400): a) activation of a district network of parents and caregivers; b) brainstorming days with parents and caregivers to improve learning at home; c) distribution of tools and content to strengthen learning at home.

In summary, throughout 2020, EAFIT worked with 96 Secretaries of Education at the national level, which affects around 11,700 basic and secondary schools across the country (Ministry of National Education, August 16, 2017). In addition, EAFIT has been working directly with 183 schools in Bogotá.

Articulated interdisciplinary work is essential to get the results mentioned above, which is why several units within EAFIT are part of these projects. Among these, the Center for Excellence in Learning (EXA) and *Innovación EAFIT* department stand out, being respectively responsible for the academic and administrative coordination of the projects. EXA "works for the consolidation of ecosystems of educational innovation, through the connection between learning, discovery, and creation as key elements in the transformation of education in Colombia" (Center for Excellence in Learning, 2018). On the other hand*, Innovación EAFIT* channels and organizes the intervention that the University carries out with public entities, being "a platform that participates in the execution of projects from the formulation and administrative, technical and contractual organization so that they flow properly" (Adriana García, personal communication, June 25, 2020). Depending on the scope of the projects, other areas are involved as well to complement the process with their learning and experiences. For example, the academic departments of Systems Engineering, Economics, and Government and Public Policies contribute with their research and work teams from the technical and educational points of view with processes that enrich the model. Finally, programs such as *EAFIT Social* and the Office of the Vice-president for Learning guarantee the social work and real contribution of the university in the country's educational sector.

However, these partnerships between governments and EAFIT's research teams have not led yet to a close integration with the regular activities the university develops for its undergraduate and graduate students. Therefore, a new project to involve EAFIT's students with the model UbiTAG throughout a service-learning volunteer experience is being planned in the short term. This will be the ideal scenario to underscore the importance and relevance of this model, its significant contribution to the learning processes of the university community, and its undeniable opportunity to be customized for other higher education institutions in Colombia and

abroad. In the medium term, addressing this disconnection involves strengthening the Learning and Educational Innovation Research Group and its associated student research incubator. Finally, in the long term, the university will focus on creating a School of Education to ensure continuity and coherence in the actions it undertakes as an actor in the educational innovation ecosystem at the national level.

6.4   A Sense of Possibility: The Challenge for Education in Colombia

The actions described have presented significant implementation challenges, both before and during the Covid-19 crisis. Some challenges are related to the continuity of the processes, for example, the timing gaps between contracts and changes in government. Others have to do with the volume of information to be collected and the scale of the actions to be implemented. These, in addition to limited resources, are aspects that make monitoring and evaluating interventions a particular challenge. EAFIT has developed a monitoring and evaluation strategy that tracks the actions implemented in the strategic plan of the different projects at the local and national level. Two of the tools supporting this strategy are directly related to the UbiTAG model:

 (i) Multivariate Index of Use and Appropriation of Technologies in Schools (Zea et al., 2017): The index is based on the measurement of six dimensions from the perspective of teachers. It accounts for factors regarding knowledge level, intensity of use, intentionality, availability, institutionalization, and benefits of technology appropriation. The measurement has allowed the generation of timely diagnoses in schools regarding the integration of digital technologies as an element of pedagogical and educational mediation, while allowing to understand the extent to which the actors are advancing according to the model. (personal communication, M. del R., Atuesta, June 25, 2020).

(ii) Educational Innovation Index for Territorial Entities: The index is a self-assessment tool that allows for the evaluation of the state of educational innovation management. It identifies the potential of public entities to engage in educational innovation processes, by comparing the progress made in acquiring skills. It is made up of three pillars, nine dimensions, and twenty-nine questions that seek to assess the progress in the implementation of the strategy that sets the goal of consolidating a national ecosystem of educational innovation. The index will begin to be applied in the territory to establish a baseline on the management of innovation so that a diagnosis can be generated about the situation of provinces and municipalities in relation to Educational Innovation and its effects after the interventions carried out during the pandemic. Based on this self-assessment, territorial entities will be able to identify their needs and establish the necessary coordination with entities of different levels (even among peers) for the development of actions that allow them to strengthen initiatives in their territory.

Both indexes have been developed with the participation of EAFIT's School of Economics and Finance, which made key contributions to the creation, validation, and monitoring of these tools, their application, and results. In Itagüí and Bogotá, for example, the first index was applied every 2 years, which has allowed for the collection of reliable information to enrich the lessons learned and provide feedback and adjustments to the model.

It has been pointed out that specific actions developed in relation to the pandemic have been a natural consequence of years of collaboration with many organizations. However, it is possible to single out the achievements obtained in recent months, regarding the continuity of the academic life across the country and in Bogotá:

(i)   The availability and functionality of the *Colombia Aprende* portal: This is one of the six pedagogical tools prioritized by the National Ministry of Education for the continuity of the academic life of boys and girls. Thanks to the efforts made in previous years, it was available from the first days of the crisis.

(ii) Achieving continuity to *Aprende en Casa con Saber Digital*, which supports institutions in the capital district in a year of government change.

(iii) The recognition by the Ministry of Education on the importance of deploying work with territorial entities focused on current needs, but with a vision for the future that allows building the necessary capacities to meet the needs of the territories.

During the last few years, the actions carried out have shown that the scalability of the model depends on the ecosystem robustness, which highlights the role of EAFIT supporting its implementation. Regarding the country's educational sector, responsibility must be shared, so decentralization is key. Along those lines, Mario Vargas, director of EAFIT Social, reiterates that "when proposals highlight the autonomy of the territories, spaces of respect and accommodation are created that value the capacity of each Secretary" (personal communication, June 24, 2020).

These milestones are building blocks of a path that does not end here. The current situation will soon become another milestone allowing EAFIT to move forward. For example, the *TESO Digital Plan*, as expressed by Adriana García, was a milestone that moved the university to systematize the model and to understand that it is in constant construction, that it evolves and feeds on itself. In the same way, María del Rosario Atuesta states that every time the model is applied, they have learned the importance of the participation of the territories, the relationships of the actors, and the dynamics of demand and supply in an environment where it is challenging for local actors to make sense of change (personal communication, June 25, 2020).

The Covid-19 pandemic has shown that, despite the previous efforts made by organizations such as EAFIT and many local and national governments, there is still a long way to go to provide all schools in Colombia with basic public services (water, electricity, Internet). For instance, as reported in 2019, 58% of the country's rural population received non-potable water (*El Espectador* Newspaper, September 30, 2019). There are social and technical gaps that still need structural changes to satisfy the educational needs of the country, and the required biosecurity protocols

to contain the pandemic demand additional efforts for which most territorial entities are not prepared for.

On the other hand, continuity is one of the great challenges faced by the actions described, closely related to planning and monitoring. Mario Vargas expresses that, particularly in education, time is a crucial variable that demonstrates the need for long-term processes. When interacting with governments, designing and executing projects beyond a single term is critical, given that education processes are focused on the relationships between people. If these relationships do not provide trust and security, the interactions that occur in the ecosystem will not generate the intended impact.

In this sense, there is an important role for universities to provide the continuity that remains elusive for governments. In many ways, EAFIT has been part of the history of educational innovation in the country, safekeeping lessons learned and using them to consider the recurrent educational challenges that lie ahead for Colombia. The future of the actions described depends on the delicate balance between change and continuity, but also on the institutional capacity to strengthen the next steps and to adapt to new contexts and needs. Thus, future actions are focused on:

  (i) Developing a model to measure the social impact of the interventions, not only to measure what outputs they contribute, but also to identify and act on the specific contexts of the communities.
 (ii) Creating elements of transition to remote-online work and generate the basis for protocols and possible future scenarios, since some characteristics of the current scenario might happen again.
(iii) Working toward the evolution of the model so that it caters to the national, regional, and local needs in a relevant way.
(iv) Transferring the intervention to the territorial level to develop the capacities of officials and Secretaries without losing sight of the schools, therefore building bridges between the natural actors of the ecosystem.
 (v) Evaluating the role of the model within national ecosystems while recognizing its strengths and shortcomings, as well as the current challenges that make long-standing issues even more critical.
(vi) Remaining attentive to the changes suggested by the environment so that the model continues to adjust to current demands and remains true to its spirit, recognizing the need for adaptation that monitoring the implementation indicates.
(vii) Focusing research efforts on the improvement of monitoring and evaluation to obtain information that allows reorienting of the model, as well as understanding how the territories behave in relation to educational innovation during the Covid-19 pandemic through gathering information involving students' experiences with the model.
(viii) Gathering relevant information to compare the outcomes achieved before and after the pandemic to prepare the model for future scenarios.

Ultimately, the presence of unexpected challenges, such as those presented by the Covid-19 pandemic, has reaffirmed EAFIT's mission of working toward the development of a sustainable education ecosystem. Although there is still a long way to go through this scenario of uncertainty, the emerging opportunities to reinvent the educational sector will help to consolidate the National Ecosystem of Educational Innovation.

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Claudia María Zea Restrepo is Vice-President of Learning at EAFIT University (Medellín, Colombia). With more than 35 years of experience incorporating digital technologies on teaching and learning processes, she dedicates her life to promote the creation of interdisciplinary groups that organize projects for research, development, and innovation on the Educational System. She also has participated in many international research projects such as the Horizon Project, RELPE, REPEAL, ALFA, CYTED, and REDAL, as well as local projects envisioned toward the improvement of education in Colombia as the head of the R + D + I Group in ICT, head of the R&D Group in Educational Informatics, and developer of the Model on Ubiquitous Learning Management, UbiTAG. She created the Laboratory for Innovation in Learning at EAFIT University in 2010. Furthermore, she was director of the Colombia Aprende educational portal and the director of the Colombian Ministry of Education's National Program for the Use of Media and New Technologies between 2002 and 2010.

Diego E. Leal-Fonseca is Director of the Center for Excellence in Learning at EAFIT University (Medellin, Colombia), leading a multidisciplinary team on the design and development of projects focused on enhancing the capacity of individuals, communities, and organizations to create and support educational innovation processes supported by digital technologies. During his 20 years of experience, Diego has contributed at the forefront of the educational technology area in Colombia, developing projects aimed at primary, secondary, and higher education at the institutional, municipal, and national levels. He has acted as consultant and advisor to educational and government organizations in Colombia, Uruguay, Argentina, Chile, Mexico, Peru, and the United Nations Economic Commission for Latin America and the Caribbean (CEPAL). He has been part of the Advisory Committee of the Horizon Report for Ibero-America and the Committee of Specialists of the Ibertic Institute (part of the Organization of Ibero-American States).

María-Antonia Arango Salinas leads the research area of the Center for Excellence in Learning at EAFIT University (Medellin, Colombia). She has over 11 years of experience as a university instructor, and educational experiences design through art. Also, her main purpose is to align the university's transforming potential by improving the understanding of learning processes. Using the perspective of the learning sciences, she unifies the fourth industrial revolution with human thrive to draw a constantly changing educational panorama that demands on our part a propositional and co-creative position.

Laura Hernandez-Velez is a research assistant at the Center for Excellence in Learning at EAFIT University. She is finishing her Political Science bachelor's degree. Also, she has been the Student Government President at the University for two periods. She has made an impact through the Student Government to ensure that the University gives enough resources for every student to make sure that they have a wide range of opportunities. Now, she is committed to direct those efforts toward EAFIT'S work with the National Education Ministry alliance, working to improve education in Colombia.

Chapter 7
Coping with Covid-19: Forging Creative Pathways to Support Educational Continuity Amidst the Pandemic

Check for updates

Vidya Yeravdekar and Nidhi Piplani Kapur

Abstract The pandemic has forced all educational institutions to grapple with challenges. Throughout this time Symbiosis International University (SIU) in India has been proactive in leading change not only at the university but also in K-12 schools. While the university transitioned to virtual teaching and learning, a methodical approach was laid out in assisting its eight elementary and senior secondary schools in both urban and rural areas, through the Symbiosis Schools Central Directorate (SSCD), to adapt to the needs of a public health crisis. While connectivity challenges continue to haunt schools, especially in rural areas, training and capacity building of K-12 teachers and administrators by university professors and experts has been a saving grace in navigating the pandemic.

The focus of this case is understanding the parallels and the partnership between SIU and its K-12 schools. It reflects a bottom-up approach in dealing with the pandemic where Symbiosis Society, the non-profit organization that has established the schools as well as the University, invested in teacher capacity building at its elementary and secondary schools through its Symbiosis Schools Central Directorate (SSCD) in both rural and urban areas to ensure continuity of teaching and learning while adapting to this new normal. The investment in teacher capacity building has enabled the leadership to address the emerging circumstances, stimulate momentum to create or demand needed change at their institutions, inspire peer learning, and foster innovation in strategy and practice for the greater benefit of its stakeholders including students and parents.

This case study reflects on SIU experiences in dealing with the dynamic circumstances such as training and capacity building with respect to supporting teachers in developing skills to adapt their content to virtual mode, blended learning, and inte-

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A Blended Approach to Advancing Teaching and Learning: A Collaborative Effort of Symbiosis Schools Central Directorate and Symbiosis International University, India.

V. Yeravdekar · N. P. Kapur (✉)
Symbiosis International University, Pune, India
e-mail: head_sces@scie.ac.in

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grating Collaborative Online International Learning (COIL) into the curriculum. In addition, SIU had to counsel students and parents to adapt to this new way of learning. SIU's experience encompasses a coordinated approach of working with internal and external stakeholders to develop a response to the crisis, short-to-medium-term strategic planning in the face of uncertainty, exploring technology solutions, partnership management, and effective communication processes with its stakeholders. Special emphasis has been put on ensuring the mental and physical wellbeing of the learner, constant communication and guidance to parents, and virtual activities to promote community engagement to mitigate the loss of physical social interactions at this crucial time.

7.1   Introduction

When our Honorable Prime Minister Shri Narendra Modi announced the sudden lockdown in India on March 25, 2020, it brought about abrupt disruptions to the second fastest growing economy in the world. With 247 million children enrolled in elementary and secondary schools in India left in an educational limbo due to this public health crisis, immediately questions arose about the educational implications of such disruption for a young economy.

Every sector has been hit significantly, because of the social distancing measures. In a developing country that is fast growing in terms of both economy and population, the education systems have been particularly rocked because of the large number of students they serve. While many schools and higher education institutions (HEIs) have adopted a reactive approach to respond to the crisis, Symbiosis International University in India has been proactive in leading the change their students and campuses needed. Symbiosis, a large family of K-12 schools, and HEIs navigated the situation by focusing on a "blended/hybrid approach" in teaching and learning. Blended/hybrid learning is defined as a combination of synchronous and asynchronous forms of delivery. Synchronous learning is online or distance education that happens in real time, whereas asynchronous learning occurs through online channels without real-time interaction.

While the university transitioned to virtual teaching and learning, a methodical approach was laid out in how to assist its elementary and senior secondary schools spread across rural and urban areas of the country. It has not been an easy process especially due to low bandwidth and connectivity impacting teaching and learning in its schools in rural areas. On the other hand, training and capacity building of schoolteachers and administrators by university professors and experts have been a saving grace in this pandemic.

7.2   The Journey of Symbiosis

Symbiosis has a unique history of being the only institution in India that was created as a "home away from home" for international students. Symbiosis Society, a trust that encompasses both the University and the K-12 schools, was established in 1971 to "promote international understanding through quality education." Symbiosis developed its motto to be "Vasudhaiva Kutumbakam," which translates to "the world is one family." With its foundation based on forging a symbiotic relationship between foreign and Indian students, its philosophy is drawn from a blend of Eastern wisdom and Western dynamism. To realize its vision of "promoting international understanding through quality education," SIU has kept internationalization as a very strong focus in all its activities and believes that it is much needed in today's globalized world. Coincidentally, Symbiosis celebrates its golden jubilee this year. Today, Symbiosis, a private entity, has over 40,000 students from all States of India and over 85 countries across the globe studying in 70 of its institutions spread across Pune, Nashik, Nagpur, Noida, Bangalore, and Hyderabad.

7.3   SIU's Support for K-12 Schools during the Pandemic

In 2015, Symbiosis Society created Symbiosis Schools Central Directorate (SSCD) to ensure equity, excellence, and consistency across all Symbiosis Schools. SSCD is the central office entrusted to make these schools the most reputable schools. SSCD ensures that SIU collaborates in the quality enhancement of the schools as required. The human and material resources of the university are utilized optimally to strengthen the elementary and secondary education at the various schools.

SIU contributes to both the rural and urban schools. These efforts and interventions are not new, but the present pandemic has reinstated the efforts and highlighted on some focus areas, namely, the use of virtual learning. Since the lockdown, SIU has increased its investment of resources and finances in these K-12 schools. Investments have been made in capacity building of schoolteachers in adapting their content to the online environment, making content engaging for students, and ensuring achievement of outcomes through blended learning. A special training on Collaborative Online International Learning (COIL) has been also taking place for its urban schools.

The scale of these efforts has been immense in urban areas, but unfortunately rural schools have not been able to achieve their target. The 23 schools adopted in the Lavale villages, neighboring SIU, are also facing similar issues as they are crippled due to poor access to Internet and bandwidth issues. Also, since more than 50% of the Lavale villages schools are elementary, they are affected by the regulations and restrictions the government imposed on virtual learning for young students. An alternative solution of learning through television and community radio is being

Table 7.1 Schools managed by SSCD

Name	Number of students impacted by these efforts
Rural schools	
Symbiosis school, Harali	194
23 schools adopted in Lavale Village	1228
Total (rural)	**1422**
Urban schools	
Symbi stars, Pune	433
Symbiosis kindergarten, Nashik	350
Pune police public school kindergarten, Shivajinagar, Pune	268
Symbiosis primary and secondary school, Prabhat road, Pune	1894
Symbiosis international school, Viman Nagar, Pune	710
Symbiosis school, Nashik	1368
Pune police public school (primary and secondary), Shivajinagar, Pune	1152
Total (urban)	**6175**

explored for students studying in rural areas, which will be the first time this strategy is attempted for these schools (Table 7.1).

7.4 Key Methodology during the Pandemic

Figure 7.1 summarizes how the Symbiosis Society, operating through the Central School Directorate, integrated efforts to mitigate the educational impact of the pandemic in the schools and SIU, through four key areas of action and partnership.

7.4.1 Addressing Emerging Concerns

The SSCD, an umbrella institution for schools under the Symbiosis Society, coordinates these developmental efforts with SIU through the Symbiosis Teaching Learning Resource Centre (STLRC). SIU conducts workshops and training programs for faculty and schoolteachers to promote capacity building, technological solutions for e-learning, and resource persons. These resource persons are faculty members from SIU who are involved in handholding and training schoolteachers. The pace of these efforts has picked up due to the emergency of moving to virtual learning. Typically, STLRC (SIU) earmarks a special budget of approximately 5% for development of schools which was increased to 10% this year due to the pandemic. A budget of USD 19000 (approx.) equivalent to INR 13,385,600 has been
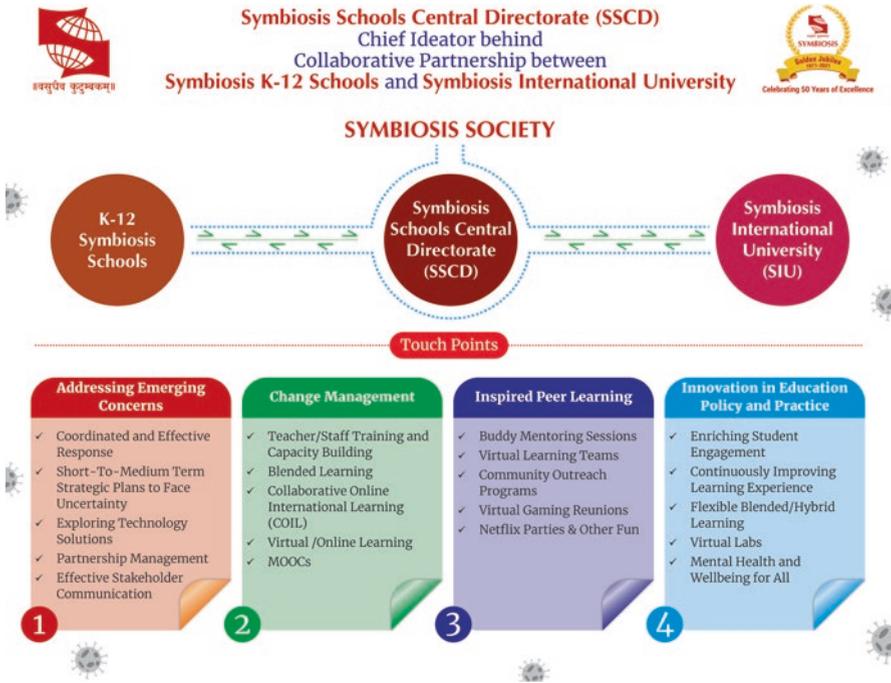
Fig. 7.1 Symbiosis Schools Central Directorate integrates education response during the pandemic in K-12 schools and the university

allocated. A large part of this budget is being used to invest in technology solutions like Padlet, Zoom, and Microsoft teams. Open-source learning management system software Moodle, Canvas, intranet websites, e-learning courses, Curiosity software, digital library, NPTEL online lecture series, and online tutorials, webinars, and virtual laboratories are also being used for conducting blended learning.

In rural schools, a part of this budget was spent months before the lockdown to install solar panels, undertake digital literacy and learning sessions for teachers, students, and parents, invest in sport equipment, construction work, and a special provision for scholarships for 11 female students.

In urban schools, SIU set up a special lab as part of India's "Content and Language Integrated Learning (CLIL)" project, a program for schoolteachers and students co-funded by the European Union's Erasmus+ program. This lab embraced the multilingual culture of India and helped students ease into classrooms that are predominantly monolingual. The education through these labs was shifted to the virtual environment to continue support, with a special focus on the vernacular language of Marathi. An investment of approximately USD 24000 equivalent to INR 17.5 lakhs was done at our Symbiosis School, Prabhat Road.

The University's efforts to support these initiatives did not start at the beginning of the pandemic, but rather built on already established goals and programming. It

is true, however, that the urgency to fuel these efforts was greatly increased after the sudden lockdown resulting from the pandemic.

The efforts reinstate the institution's mission statements of contributing toward knowledge generation and dissemination, thereby inculcating the spirit of "Vasudhaiva Kutumbakam" (the world is one family). This has led to an "inclusive" approach to teaching and learning both at the K-12 schools and SIU, where technology has become an enabler. Through STLRC, the SSCD ensures that faculty members are trained in the use of modern innovative practices and thus able to execute the methods well. The SIU professors have mentored and trained schoolteachers to bring in ICT and use technology for their students' and their own benefits without compromising on the learning outcomes.

In addition to ICT, school staff and leadership have increased their skillsets in softer areas which focus on non-technical skills. This primarily aims at developing ability of teachers to respond to parents and other stakeholders in the pandemic. This was done through dedicated training of schoolteachers by the university professors which also included specific sessions that involved our Symbiosis Centre for Emotional Wellbeing. The schoolteachers have therefore been able to develop a coordinated approach to communicate with internal and external stakeholders in response to emerging circumstances, dynamic short-to-medium-term strategic planning such as adapting to changes day-by-day, and partnership management for various projects.

These changes have impacted the overall quality of the learning experience. For SIU, this has also resulted in a slow but steady increase in the number of research papers and virtual presentations in International Conferences, participation in e-seminars, achievements at intercollegiate competitions, and participation in national and inter-varsity activities, despite the gloomy period.

7.4.2   Change Management

The Symbiosis Society has provided administrative and financial support to all initiatives between the schools and university. There has been direct support from the leadership which includes the Principal Director of Symbiosis Society, Pro Chancellor and Vice Chancellor of SIU, and Board of Management (BOM). This has enabled university professors to seamlessly empower schoolteachers with technological support and soft skills, especially through a difficult time imposed by the pandemic.

The Covid-19 pandemic suddenly brought to the forefront the immediate need of shifting the teaching and learning process to the online mode. Though the initial reaction may have been passive in certain cases, it did not take long before teachers rose to the occasion and transitioned from a reactive to a proactive approach. This movement resulted in blended learning as an alternative to face-to-face learning. The schools have now shifted to the blended mode of curriculum. This step has been taken in consideration of the uncertainty that schools may or may not reopen due to

the ongoing crisis. In case the schools are forced to remain shut even in 2021 due to deadly second wave of the Covid-19 pandemic, the teachers have planned the curriculum such that there is a blend of synchronous and asynchronous teaching using the online learning platforms. The urban schoolteachers are also being trained on integrating Collaborative Online International Learning (COIL) into the curriculum, creating virtual programs, MOOCs, etc. These efforts were initiated since this was the best way to reach the learners in a way that does not disrupt the learning continuity. A total of 342 urban and nine rural schoolteachers were trained.

COIL, also referred to as globally networked learning and virtual exchange, is a new teaching.

and learning paradigm that promotes the development of intercultural competence across.

shared multicultural learning environments. Using Internet-based tools and.

innovative online pedagogies, COIL fosters meaningful exchanges between university-level.

teachers and students with peers in geographically distant locations and linguistically different backgrounds. This is a bi-directional methodology involving teachers to co-create the module. Delivery happens real time where students from both parts of the world learn from each other's reflection. COIL has been particularly useful for our urban senior secondary and IB school to bridge the learning gap experienced due to the limitation on physical mobility imposed by the pandemic.

The university initiated the first of its kind in India, "E-Academies on Internationalization." Through the faculty E-Academies, the central international office of the university sourced resource persons from different parts of the world who conducted half day workshops that were hands-on and cutting edge in different topics. The trainings focused on advancing internationalization at home, both for our schools and university. The trainings were centered around topics that helped teachers design their curriculum and instruction, understand, and use COIL methodology in teaching and learning and integrate climate action in the curricula. Some of the senior secondary school teachers from our schools were trained on this aspect.

7.4.3   Inspire Peer Learning

In India, unlike other countries where education is state funded, most schools are privately managed. The private schools have been very proactive; in addition, the teachers have been rising to the occasion to give their best efforts during this sudden shift in teaching and learning. However, the major constraints in these efforts have been the poor connectivity and low bandwidth in many areas especially the remote areas and rural sector. Reaching out to the urban students was not a big challenge since most of them had the necessary hardware and software required for online teaching and learning. Moreover, the urban students as well as their parents are comparatively more technologically savvy than their rural counterparts.

Parental involvement had a major role to play during this teaching and learning shift, and their presence around the children during the initial phases has been a big advantage in the process. The parent community was initially reluctant to this new change due to the increased screen time and competing pressures of their own jobs and home commitments. However, after getting oriented parents have now become an active participant in this Covid-19 phase. Schools regularly interact with the parents so that the children get the necessary support and required supervision. Emphasis has been laid on inspiring peer learning through small virtual teams, simulations in virtual labs, buddy mentoring, etc. A special focus has been given to ensure mental and physical wellbeing for both students and parents. Informal virtual morning/coffee sessions with parents, meditation mornings, gaming reunions, Netflix evenings, and other social events are planned to ensure the continuity in nurturing of social skills. A counsellor is available for virtual meetings for both students and parents to deal with the ongoing stress in this situation. Community engagement with activities like create and donate a mask were carried out to help the underprivileged. Care, agility, and action have been the cornerstones in navigating through this challenging and dynamic times.

7.4.4   Nurture Innovation in Policy and Practice

There has been a systematic monitoring in place to ensure that the efforts are leading in the right direction. The office of Symbiosis Schools Central Directorate (SSCD) is actively involved in monitoring all these efforts. SSCD conducts regular meetings with the heads of schools and understands the processes involved in the implementation of online classes. The curriculum and instruction planning, i.e., lesson plans, are submitted by the schools to the SSCD office after which the quality aspects are deliberated on before they are approved. Moreover, SSCD office bearers randomly go online while lessons are being conducted to see if the implementation is happening in accordance with the planning. Feedback gathered from students is shared with teachers as well as heads of the respective schools. SIU professors are handholding and mentoring schoolteachers who are in the nascent stage and continuing their efforts in improving teaching and learning through technology.

In addition to these self-monitoring practices, SSCD is open to constructive criticism from the parent community. Parents very often send mail to SSCD sharing their concerns, difficulties, or the things they appreciate. Each message receives a response and further action is also taken by SSCD, if necessary. SSCD strives to give the best educational experience to their learners by monitoring the complete system, evaluating it, and taking the necessary steps to improve and grow.

The efforts have achieved positive results so far, and both the teachers and students are excited and looking forward to the next academic year of online learning. In India, the new academic year begins in the month of June. The teachers are better prepared after a very short summer break especially now that they have been able to understand their strengths and limitations and are working to improve on their

weaknesses. The beginning of online teaching and learning was a very sudden transition, and most of the teachers were caught unprepared. They did not get sufficient time to prepare their best lessons and so their instruction may have been compromised in certain areas. Nevertheless, teachers are a strong community and should be commended for their efforts to increase their skills and bring out the best of themselves and their students. In the month of June, through the mentoring and training received from SIU professors, they are much better prepared and much more confident after their learning experience in April and May 2020. The teachers, the heads of school, and the management have reviewed the previous lessons, and their feedback has enriched and motivated the teachers to learn from their mistakes and do better.

The efforts are now moving in a concerted direction to build on blended learning. Approaching challenges day-by-day has made teachers and staff resilient to change, and they are now better able to cope and adapt to the emerging circumstances, something that was a major difficulty before.

7.5   The Hits and Misses

The sudden need to transfer the teaching and learning mode to the online environment has made the educator community come face to face with some unexpected results.

Positive:
- Parents have been active partners in the efforts taken by the schools to facilitate learning. Never before have the parents been so involved in the classroom activities.
- Teachers have become more accountable for what they are teaching since anyone can be a virtual participant in the classroom activities.
- The teaching and learning community have accelerated their technological preparation to face the virtual classroom with greater ease.
- Students are getting a multimodal experience which may have been missing in many of the conventional classrooms. Teachers are teaching the way students have always preferred to learn.
- Since the parental expectations from the schools have increased multifold, it has prompted the teachers and schools to take proactive steps in their efforts to improve the quality of delivery and communication.

Negative:
- The biggest challenge that we have realized is the divide between the urban and rural community in terms of access to technology. If these efforts need to be sustained in the future, it shall require proper government intervention in various phases of the rural sector. It may be in the form of infrastructural support to strengthen Direct-to-Home DTH broadcasting service, community radio, etc. so that the accessibility is improved.

- Because the students are not interacting in schools, this has also led them to be deprived of opportunities to practice some key social skills. Since learning is happening in the isolation of their respective homes, learners are away from their peer groups resulting in lack of peer-to-peer learning, cooperation, communication, empathy, etc.
- This new teaching and learning modality has led to more screen time, leading to digital fatigue for students. This was something we hoped to avoid, but with no better option, children are spending a lot more time in front of their gadgets.
- Children are missing out on fun-filled activities such as physical education, arts, and crafts, etc. It is not natural for the children to learn in the confines of the four walls. In the current situation they are being kept away from playgrounds which act as an important learning center in the life of a child.
- Due to the increased parental expectations, this would pose a challenge to the school and staff even after the blended mode of curriculum transaction has begun.

7.6   Beyond Imagination: What Did Not Work

One of the biggest shortcomings of these efforts has been our inability to reach out to the rural students the way their urban counterparts have been reached. Since the complete shift in the process has been dependent on technological support, it has turned out to be the biggest bottleneck. The poor connectivity and lower bandwidth have resulted in the lack of accessibility.

On the other hand, though accessibility has not been a problem with the urban learners, there have been concerns shared by anxious parents regarding the amount of time students are now spending on a screen.

Apart from these specific issues, the biggest failure of this approach has been the lack of social development of students. They are missing out on face-to-face peer learning which is an important developmental aspect of their school-age years. The social isolation has also resulted in the reduced opportunity to learn and practice social skills.

7.7   A Revolution that Is Not

There could be no better time for the transition from face-to-face teaching to online teaching and learning than now. If we were to take advantage of this opportunity, we could shift to a blended mode of teaching and learning in the future in a way that expands opportunities for all. However, this pandemic had not given sufficient time to the schools to be prepared for this change, although it has alerted us to the importance of being better prepared moving forward. Schools will now create a stronger system and invest in different hardware and software to create school level parallels of such organizations as Coursera, other MOOCs, etc. Moreover, SSCD will take

systematic steps to orient the schoolteachers on better delivery using these mediums through different professional development programs. The higher education faculty members of SIU and students from the university pursuing IT and Computer Studies shall also be roped in to give the necessary training to the school staff.

The coronavirus pandemic has brought to the forefront the realization of the need to enhance the use of existing resources and approaching new ways to teaching and learning. It has been less of a revolution of the system but more [a shift] of mindsets of the thousands of students and parents who are culturally diverse but united by the thread of face-to-face education. This pandemic does not bring a revolution, but rather an evolution of what we already had but did not recognize. Blended learning is now going to be the new reality, but in a country like India, it is still going to be a luxury available mostly to urban communities unless policy makers step in. Systemic efforts are required to ensure last mile connectivity of basic Internet access in rural areas for those students to benefit without any discontinuity in their learning, a challenge that is beyond the scope of the school or university leadership.

It is now time to value the indigenous knowledge and foster collaborative efforts that connect people to their territory. Social/physical distancing will be the norm till the younger population is inoculated and we champion herd immunity. While dealing with and emerging out of this pandemic, what is going to remain with us is how these networks support, mentor, and evolve in the process.

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Dr. Vidya Yeravdekar is the Pro-Chancellor, SIU, and the Principal Director of Symbiosis Society, which encompasses the Symbiosis schools, College of Arts & Commerce. Dr. Vidya holds a Postgraduate Degree in Medicine, a degree in Law, and Ph.D. in "Internationalization of Higher Education in India." She has been a member of the University Grants Commission for two terms, Central Advisory Board of Education, India Brand Equity Foundation Trust, ICCR, and many other organizations. She is currently the Chairperson of the FICCI Committee on Higher Education. Dr. Vidya has been ranked one of India's top 25 Powerful Women by Fame India Magazine and has also been recently awarded "Exemplary leader in internationalization of Indian education" at the 30th annual EAIE conference in Geneva, Switzerland.

Prof. Nidhi Piplani Kapur is the Head of Symbiosis Centre for European Studies (SCES), Symbiosis International University (SIU) in Pune, Maharashtra, India. Prof. Nidhi was also the youngest and only Indian elected to General Council, the highest governing body at European Association for International Education (EAIE), located in the Netherlands. At Symbiosis, Prof. Nidhi set up the Symbiosis Centre for European Studies (SCES) which is an umbrella support system for all academic/scholarly/generic activities of SIU Institutes with European nations/institutes. It facilitates more meaningful, research-based, and strategic partnerships and projects with European counterparts. She is also a professor in Economics and Strategy. An alumna of University of Delhi, she specializes in Economics at the undergraduate and postgraduate level.

Chapter 8
Case Study on Distance Learning for K-12 Education in Japan: The Nagasaki-Takaoka Model

Masaki Umejima, Cherry H. Y. Wong, Jiro Kokuryo, Jun Murai, David Farber, Keiko Okawa, and Kan Suzuki

Abstract A pre-existing partnership between the Japanese Government and Keio University paved the way for K-12 education to embrace distance learning. The university has been engaging in the revision of educational ICT policies in Japan for many years. In Japan, universities have been accumulating knowledge in distance learning practices since the emergence of the Internet, though earlier educational ICT policy required the ICT system in K-12 education to depend on dedicated Internet lines. In December 2019, the Japanese Ministry of Education, Culture, Sports, Science, and Technology (MEXT) announced a new ICT policy to allow K-12 education to launch distance learning classes via public cloud on the Internet. The university's experience with running distance learning, bundled with the stipulations of the new educational ICT policy, enabled K-12 education to carry out distance learning. New subjects can be taught daily, and continuity of education is ensured in disaster situations, such as the Covid-19 pandemic. The research team at Keio University built the "Nagasaki-Takaoka Model" as a reference model with the added aim of ensuring data security and trust in the open network. In December 2020, Takaoka City successfully deployed the "Nagasaki-Takaoka Model" across all public schools.

8.1 Introduction

Keio University was established in 1858 by Yukichi Fukuzawa as a small school of Western learning. As such, Keio is Japan's very first private higher education institution. In over 150 years since its founding, Keio has fostered its founder's motto of

M. Umejima (✉) · C. H. Y. Wong · J. Kokuryo · J. Murai · D. Farber · K. Okawa
K. Suzuki
Keio University, Minato City, Tokyo, Japan
e-mail: masaki27@sfc.keio.ac.jp

jitsugaku, i.e., the use of empirical science in transforming Japan into a modern nation through contributions in education, research, and medicine. *Jitsugaku* is the expression of science in the truest sense of the word and a powerful tool in Keio University's never-ending search for practical solutions to real-life problems. Keio University leverages its strengths by offering a comprehensive curriculum to promote multidisciplinary research under the three values of longevity, security, and creativity.

Akira Haseyama, President of Keio University, explained the principle by which the university contributes to solving problems associated with Covid-19. Since its establishment in 1858, Keio University has overcome many hurdles and crises caused by wars and disasters, and as a private institution of learning it evolved into one of Japan's leading comprehensive universities with the cooperation of benefactors who share its philosophy. Whenever the university faces a crisis, the overwhelming support it receives through the power of *Shachu Kyoryoku* (the entire Keio community coming together and collaborating), fueled by students, alumni, faculty, and staff members, enables it to prevail [Haseyama, 2020].

The Keio University Shonan Fujisawa Campus (SFC) is Japan's pioneering center for project-based learning. From the start of university attendance, students participate in project-based learning through seminars to work on advanced research themes and issues while acquiring the ability to shape the future. Held online, SFC's project-based learning classes and curriculum are intended to motivate students to design solutions to real-world problems.

8.2   Universities: The Pioneers of Distance Learning in Japan

In December 1997, Japanese universities started distance learning in response to the report "Handling of Distance Learning According to University Establishment Standards," produced by the University Education Council of MEXT. Universities have developed practical knowledge based on successful cases in mutual, interoperable communication enabled by the Internet. Adopting the Internet for communication has allowed increased exchange of course content among teachers in different universities.

In 1996, one year prior to government de-regulation, Keio University, led by Professor Jun Murai (a well-known member of the internet Hall of Fame), launched the academic alliance aiming to set up School on Internet (SOI) Asia. The SOI Asia Project was formally launched in 2001 as a platform for inter-university education programs among universities throughout Asia, with the purpose of establishing an Internet-based education platform utilizing satellite technologies and collaborating with the AI3 project (Asian Internet Interconnection Initiatives project). Higher educational institutions were to jointly operate high-speed Internet backed by satellite telecommunication. By 2019 Keio University worked together with 28 leading universities in 14 Asian countries. For example, an entrepreneurship class at Keio University SFC is managed by three faculties in two universities, targeting startup businesses in the ASEAN market (Fig. 8.1).
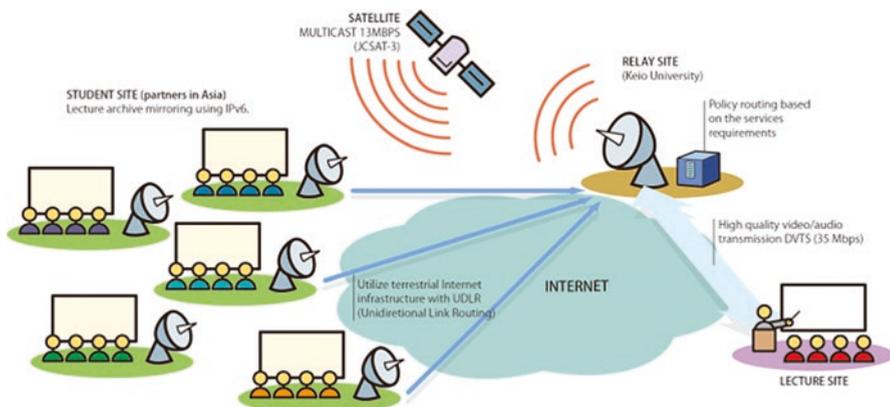
Fig. 8.1 SOI Asia platform

8.3 Distance Learning: A System Used in Daily Education Becomes a Solution to Disrupted Learning in the Disaster Situation

A tailor-made system for disaster response does not work because teachers and learners cannot rely on external supports when the system is necessary. Our trial on distance learning in K-12 education showed that no teacher could identify the problem by Ping Test when the Internet was disconnected. This experience spotlighted how distance learning would increase the needs in daily education. Daily use is the best training to prepare for disaster.

8.4 K-12 Education System and Reform in Japan

8.4.1 The Principles of K-12 Education

Kan Suzuki, the former Deputy Minister of MEXT and Professor at Keio University, says: *The 'Courses of Study' emphasize language competencies. However, the current university entrance examination does not assess such competencies. As a result, in high school, developing language-based skills is ignored. [Suzuki,* 2017].

The K-12 education system in Japan primarily consists of 6 years of elementary school and 6 years of secondary school. The latter is divided into 3 years of junior high school and 3 years of senior high school, from where education continues to junior college or university. Compulsory education lasts for 9 years through elementary and junior high school, with the objectives of building the foundations of education. One important principle in public education through elementary and junior high school is equity. Equity in education has two dimensions. The first is fairness, which entails that personal and social circumstances – for example, gender,

socio-economic status, or ethnic origin – should not be an obstacle to achieving educational potential. The second is inclusion, which ensures that everyone acquires a basic minimum standard of education – for example, the ability to read, write, and do simple arithmetic. These two dimensions are closely intertwined: tackling school failure helps to overcome the effects of social deprivation which is often shown to be the root of failure [The Public Affairs Division, Public Affairs and Communications, OECD, 2008].

MEXT determines the Courses of Study as broad standards for all schools, from kindergarten through upper secondary schools to ensure a common standard of education programs throughout the country. The Courses of Study are generally revised once every 10 years, with the latest revision having been carried out in 2017–2018.

8.5   Reform of the High School and University Articulation System

The new Courses of Study are aimed at increasing the number of classes with an emphasis on the balance between acquiring basic and fundamental knowledge and skills and fostering the ability to think, make decisions, and express oneself. For instance, the study requirements at junior high schools are stated as follows: (1) commitment to an education that enables students to solidly acquire basic and fundamental knowledge and skills, fosters their ability to think, make judgments, and express themselves to solve problems, and cultivates an attitude of proactive learning in developing individuality and the capacity for working together with diverse people and (2) enhancement of student activities helpful to creating the foundations of learning, such as language skills and other abilities, giving consideration also to the developmental stages of students, to cooperation with student families, and to the establishment of good study habits [Ministry of Education, Culture, Sports, Science and Technology, 2017].

However, the present high school and university articulation system, such as the National Testing Center for university admissions, tends to favor rote memorization and recall of information. As a result, competencies such as taking an attitude of proactive cooperation with a diverse cross section of people using intellection, problem-solving, and self-expression – that is to say, true scholarly ability – has not been cultivated or recognized.

In 2020, reform of the university entrance examination system began with a discussion in the Central Council for Education at MEXT. The roots of this reform originate from a policy recommendation by the Education Rebuilding Implementation Council in 2014, promoted by Prime Minister Abe in the previous year. The Council issued the report "Integrated Reforms in High School and University Education and University Entrance Examination Aimed at Realizing a High School and University Articulation System Appropriate for a New Era," outlining the major pillars of the university selection process reform.

The new university entrance selection process aims to evaluate prospective entrants in a multifaceted and holistic manner to promote the acceptance of students from a diverse range of backgrounds. In particular, since the goal is to align reforms in entrance exams with reforms in education and the curriculum, Council members support multifaceted and holistic selection processes that reflect the three aspects of scholastic ability based on the admission policies promoted by individual universities: proficiency, drive, and suitability [Minister of Education, Culture, Sports, Science and Technology, 2015]:

> Fostering descriptive expression for university entrance exams creates an environment where learners can concentrate on acquiring language skills that incorporate thinking, expression, judgment, and so on. Such an environment is realized comprehensively in high school with the exploration of subjects using improved language-based competencies. This requires a focus on logical thinking, problem solving, and the application of these abilities in social and public studies which are helpful in defining problems that require solutions. Mathematics, being fundamental to logical thinking, and the national language, which is essential in the development of communication ability, are critical in this learning process. [Suzuki, 2017]

8.6   Pressing Needs for Distance Learning in K-12 Education

To ensure that the textbooks are objective, impartial, and incorporate adequate educational principles, MEXT examines textbooks using textbook examination standards based on deliberations of the Textbook Approval and Research Council. The examination standards include General Rules, which outline the basic policy for screening, common conditions applicable to all subjects, and subject-specific conditions. These conditions are arranged from the following three viewpoints: "scope and degree of difficulty," "selection/treatment and organization/amount," and "accuracy, orthography and expression" (as per the overview of the General Rules and common conditions).

In contrast, for language competencies such as logical communication, teaching materials are updated constantly. This requires teachers to adapt to the latest changes, which is a challenge due to the short period of time teachers must catch up with these programs. Teachers of K-12 schools in Japan are required to prepare lesson materials, while at the same time, on weekdays, they need to deal with individual students and parents. During holidays, teachers are required to be the coaches or advisers of sports and cultural clubs, called Bukatsu. A government survey indicated that the average working hours of teachers of K-12 schools exceeded 11 hours per weekday. The work overload of teachers is becoming a serious social problem [The Ministry of Education, Culture, Sports, Science and Technology, 2018].

Ari Nito, visiting researcher at Keio University Research Institute at SFC, declares, "If the university takes on new forms of education in developing language competencies, it will ease the workload of teachers in K-12 education in Japan. Teachers in K-12 education are not good at designing new subjects because many of the subjects taught in K-12 education are developed in accordance with textbook

standards and the Courses of Study that come with government verification. In that sense, inter-organizational cooperation would be a rational way of addressing quality issues in subjects requiring language skills" (personal communication, Ari Nito, May 1, 2020).

There are three critical needs with respect to distance learning in Japan: (1) new educational subjects (stressing logical communication and English conversation), (2) educational opportunities for all (whether living on remote islands or in underpopulated areas), and (3) individual needs of students (due to illness, accessibility, or refusal to attend school). In Japan, "losing a school," the closure of schools resulting from lack of students in the community, is a critical social problem in local communities that faces the aging problem. The disappearance of schools is normally followed by an economic downturn in the community. Once schools close, younger families do not move in, and this depresses economic activity in the community.

For example, Nagasaki prefecture has 971 small islands, more than any other prefecture in Japan. Yet, it is suffering from a population decline which causes many small communities to "lose their school." The combination of distance learning and face-to-face learning for K-12 education is expected to be a way to ameliorate the problem.

Virtually the entire population has broadband high-speed Internet access in Japan, with close to 100% coverage of homes (5595 million homes nationwide) [Ministry of Internal Affairs and Communications, 2018]. However, many schools might still experience difficulty connecting with each other via the Internet even if teachers agree to distance learning, and even where the connection is feasible, latency and packet loss make distance learning impossible.

8.7   Emergence of a New ICT Policy in Education

As discussed, distance learning is common in university education but had not been allowed for K-12 education in Japan. It was through the engagement of Keio University in the revision of educational ICT policies that distance learning in K-12 education became a possibility. A research consortium at Keio University carried out an empirical study with industries and local governments, including Microsoft, INTEC (a Japanese ICT company), V-Cube (the biggest video conference service provider in the Japanese market), Dai Nippon Printing (a Japanese giant in the printing industry), Nagasaki Prefecture, and Takaoka City, to identify the impacts and problems of implementing distance learning in K-12 education. The initial phases of the study were:

✓ Keio commencement of empirical research at high schools (April 2012)
✓ A round table at Keio University (October 2013)
✓ A presentation to Council for Regulatory Reform, Cabinet Office (December 2013)
✓ MEXT launch of a task force to drive distance learning (July 2014)

The study at Keio University facilitated discussions at many institutions such as the National Diet, the Council for Regulatory Reform, and the Taskforce Committee at MEXT. In March 2015, Keio University hosted an international round table to discuss the future shape of distance learning in K-12 education in Japan. Panelists were united behind the need for distance learning:

✓ "People wish to see educational innovation based on the power of ICT. Distance learning is a landmark," said the leader of Parliament, Toshiaki Endo (personal communication, Toshiaki Endo, March second, 2015).

✓ "Microsoft, through our corporate mission of enabling people and businesses throughout the world to realize their full potential, has long believed in educational transformation," said Jean-Philippe Courtois, CEO of Microsoft International. (personal communication, Philippe Courtois, March second, 2015).

✓ "Distance learning provides quality education by overwhelming regional differences," noted Professor Jiro Kokuryo, Vice President of Keio University (personal communication, Jiro Kokuryo, March second, 2015).

In April 2015, Japan announced that every Japanese high school could launch distance learning for daily lectures. Since this policy reform, every high school student in Japan can take 36 of 74 credits necessary for graduation by distance learning. In general, distance learning systems are categorized in four dimensions across two axes: 1) differences between synchronous and archived and 2) differences between individuals and groups. The research consortium at Keio University is recommending a group-type/synchronous interactive communication model (top right in Fig. 8.2), while an individual study/synchronous model is recommended in cases of diseases and emergencies such as the Covid-19 pandemic (top left on Fig. 8.2), backed by the empirical study and MEXT guidelines.
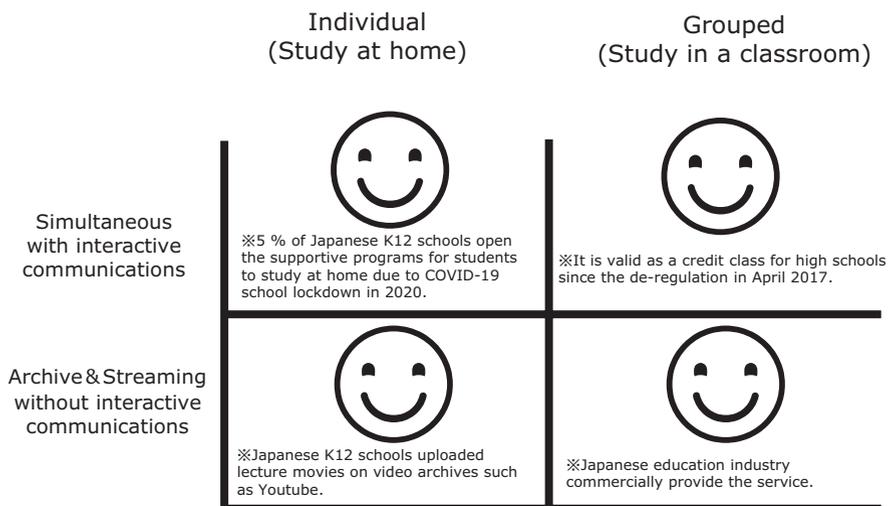
Fig. 8.2 Structure of distance learning

In April 2015, MEXT provided guidelines to ensure the quality of school education in distance learning at high schools [The Ministry of Education, Culture, Sports, Science and Technology, 2015].

First, in high school distance learning, the guidelines stipulated that the communication between teachers and students would be synchronous and the number of students in the classroom could not exceed 40. This number, as applied in the guidelines for distance learning, rests on the same standard as in a face-to-face class. The model in which one teacher is teaching 100 students, as seen in university classes and cram school lectures, was prohibited.

Secondly, the guidelines stipulated special provisions for students who are absent from high school for a considerable period due to medical treatment of an illness or disability.

Thirdly, the guidelines defined the qualifications for teachers in charge of distance learning. A teacher must be licensed to be authorized to teach remotely, and regardless of whether there is a license for the subject, must be present to look after study activities in the class. For example, a university lecturer could conduct distance learning in a high school with a special license issued by the Local Educational Administration Committee and the principal of a private school.

In the process of developing the pilot cases, the research team at Keio university discovered a problem in the education network guidelines issued by MEXT. To gather all packets of schools at one gateway at the local educational administration office, the guidelines enforced the use of a dedicated line in every school instead of using public cloud services via the Internet. As a result, when a school accesses a distance learning service, the packets become congested at a gateway in the educational administration office before reaching the Internet. The gateway becomes overloaded and cannot scale to meet the rapidly increasing demands for higher capacity and data speeds. The schools who planned for distance learning ended up struggling with high cost and low speed of data services.

In December 2019, 3 months prior to the day when the Japanese government announced the lockdown of schools because of the Covid-19 pandemic, the new education network policy paved the way for every lecturer and student to be able to participate in distance learning via the public cloud services over the Internet. The new policy mandated that the combination of cloud service, authentication, and encryption ensure the protection of student data, while unbundling security and network design.

8.8   Distance Learning for Education Continuity during the Covid-19 Pandemic

As discussed, teachers of K-12 schools in Japan are suffering from work overload on weekdays, due to lecture and material preparation, individual instruction to students, and communication with parents, among other responsibilities. In addition, on holidays teachers advise sports and cultural clubs, called *Bukatsu*. Overwork of

teachers has become a social problem. Extra arrangements, such as the countermeasures during the Covid-19 pandemic, have added even more to the current overload of work.

Only 5% of Japanese K-12 schools managed to open supportive programs for students studying at home due to the school lockdown during Covid-19 pandemic [Ministry of Education, Culture, Sports, Science, and Technology, 2020]. Obviously, there is a growing need for educational ICT, especially for support in distance learning.

8.9 The "Nagasaki-Takaoka Model": A Prototype of Distance Learning in K-12 Education

8.9.1 Requirements of the "Nagasaki-Takaoka Model"

Supervised by the research consortium at Keio University and with strong support and subsidies from the Japanese government, high schools in Nagasaki prefecture and junior high schools in Takaoka City (Toyama Prefecture) are implementing a distance learning prototype which can serve as a model for other Japanese cities. The details are as follows:

✓ In Nagasaki Prefecture, Shimabara High School is providing classes in logical communication in line with language competencies from the MEXT Courses of Study. In Shimabara High School, Skype for Business (currently Microsoft Teams) with Internet access has provided secure and smooth interaction between the lecturer and the classroom 850 kilometers away from the lecture room. Just as in traditional classes, students can raise questions while seeing the teacher's face and can participate in the class with assurance that their personal data is protected from inappropriate use.

✓ In Takaoka City, every junior high school is providing classes in language skills and support programs for home study in response to the education interruption caused by Covid-19. In schools, V-CUBE is used to ensure smooth interaction between classroom members and the lecturer at a distant place. In this case, too, classes are perfectly interactive.

Let us summarize the requirements of the "Nagasaki-Takaoka Model" for the distance learning system:

• Open network access to enable "access anytime and anywhere" so that students and lecturers can open a remote class on demand.
• Quality of system and operation target set to about 60% of that of face-to-face lessons.
• Data security implemented not based on closed system interface but in comprehensive ways referring to international standards and disallowing vendor lockdown.
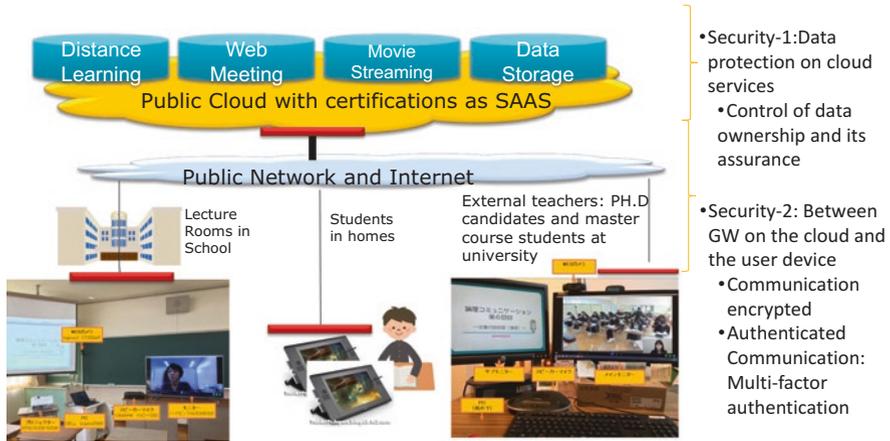
Fig. 8.3 Distance learning system in the Nagasaki-Takaoka Model

- A method of communication to transfer data following end-to-end encryption. If third parties like ISP and cloud service players enable monitor, watch, and analyze data, the system can decouple security and network in design.
- International certifications like ISO/IEC 27001 and 27017 together with service contracts with cloud service providers to ensure data protection and privacy (Fig. 8.3).

The Nagasaki-Takaoka Model targeted the quality of distance learning lessons at about 60% of that of face-to-face lessons. As shown in Table 8.1, the Keio empirical study showed that the average satisfaction rate for teachers in the school was 72%. Students, too, indicated satisfaction at well over 60% of the target rate.

8.9.2 Implementation of the "Nagasaki-Takaoka Model"

In June 2020, the Keio University Research Institute at SFC and Takaoka City announced a comprehensive partnership to develop a Global Innovation and Gateway for All program (GIGA), in which MEXT promotes new educational ICT policies with supplementary budgets for 1700 municipalities nationwide, exceeding \500 billion ($5 billion) in all. Currently, in Takaoka City, all junior high schools are equipped with an environment where remote classes can be conducted under the supervision of Keio University. The partnership plans to handle Covid-19 risk management and serve as proof of concept by being the national leader of the GIGA School Program founded on three pillars:

1. Distance learning enabled anytime and anywhere.
2. High-quality access via public networks and the Internet environment for public cloud services.
3. Educational ICT models that can be used economically, technically, and independently (Fig. 8.4).

Table 8.1 Student and teacher satisfaction with distance learning

	Students' answers [%] N = 87	Teachers' answers [%] N = 7
Objection to language skills classes	1	–
Minor complaints about language skills classes	2	–
Little satisfaction with language skills classes	17	–
Satisfaction with language skills classes	79	–
Same satisfaction as for face to face	–	0
Over 80% satisfaction compared to the face to face	–	29
Over 60% satisfaction compared to the face to face	–	43
Less than 60% satisfaction compared to the face to face	–	28
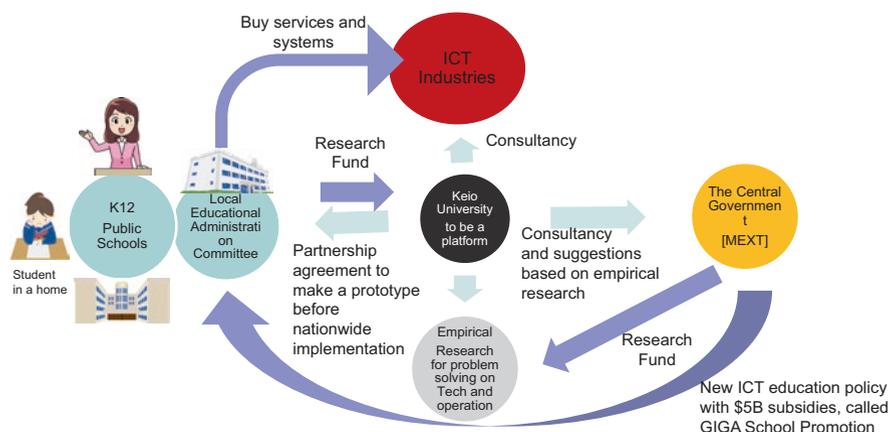
Fig. 8.4 The relationship among stakeholders in research at Keio University

8.10   Conclusion

Kazuya Kometani, Chairman of the Educational Administration Committee of Takaoka City, observes: "The Covid-19 crisis has impacted K-12 education continuity. The need for distance learning will rocket as it reaches every student and lecturer" (personal communication, Kazuya Kometani, April 20, 2020).

Distance learning is the enabler of quality education beyond local boundaries. With today's Covid-19 quarantine and social distancing guidelines in place, the "Nagasaki-Takaoka Model" is expected to transform classrooms using video conferencing. The "Nagasaki-Takaoka Model," in which data trust is ensured on the open network aims to be the reference model for distance learning in K-12 education in Japan. The MEXT GIGA program supports the model by giving every

student and lecturer tablets with a wide range of digital education tools. Those tablets allow writing on the screen with a digital pen, taking photos with a high-definition camera, and using cloud services on demand. The new tablets – which come with their own full-sized keyboard – were introduced in all Japanese cities by March 2021. In Takaoka City, distance learning is becoming more common in every junior high school.

ICT adoption in education and distance learning delivers satisfaction while also raising concerns between teachers. The major concerns are affordable Internet access and education fairness, data management of education records, lack of trust in user authentication, and bullying cases enabled by ICT.

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Masaki Umejima is Associate Professor, Member at Cyber Civilization Research Center Global Research Institute, Keio University. Dr. Umejima received master's degree in 2004 and PhD in Media and Governance in 2017, both from Keio University. He has served Chairman of Cyber Security for Virtual Power Plant Promotion Committee in Resource and Energy Agency of Japanese Government. His leadership enabled that over 100 million IoT devices, e.g., air conditioners, power meters, EV, Solar Panel, and a battery, spoke the same language, called ISO/IEC14543–4-3(ECHONET Lite). Regarding distance learning, Dr. Umejima has served Member of School Education Informatization Promotion Expert Committee, Ministry of Education, Culture, Sports, Science, and Technology (MEXT). To his accomplishment, IPv6 Forum awarded him to the IPv6 world leader in 2015 and ECHONET Consortium prized him to the owner of ECHONET Prize 2017.

Cherry H.Y. Wong is the Research Coordinator at Cyber Civilization Research Center, Keio University, who facilitates research projects in the areas of interactions between emerging technology and society, cybersecurity with interests in human rights, international governance, and global citizenship education. Being raised in Hong Kong, she received a bachelor's degree with honors in Social Sciences majoring in Managing Global Cities from The Education University of Hong Kong.

Jiro Kokuryo is Professor and Vice-President, Keio University. As Keio University's Vice-President for International Collaboration, Professor Jiro Kokuryo plays a key role in developing the university's international strategy and raising its profile abroad. He is concurrently a Professor at the Faculty of Policy Management, where he served as Dean from 2009 to 2013. Vice-President Kokuryo's research and teaching interests are focused on developing business and social models that maximize the benefits of information technologies to society. Vice-President Kokuryo graduated from the University of Tokyo in 1982. While an employee of Nippon Telegraph and Telephone Corporation between 1982 and 1993, he obtained a Master of Business Administration (MBA) in 1988 and Doctor of Business Administration (DBA) in 1992, both from Harvard Business School.

Jun Murai is Distinguished Professor, Co-Director, Cyber Civilization Research Center Global Research Institute, Keio University. Dr. Murai received his PhD in Computer Science, Keio University in 1987, majored in Computer Science, Computer Network and Computer Communication. He developed the Japan University UNIX Network (JUNET) in 1984, established WIDE Project in 1988, aiming to research and develop the computer networks. He is a member of the Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (IT Strategic Headquarters), a member of the Cyber Security Policy Council, National center of Incident readiness and Strategy for Cybersecurity (NISC), Cabinet Secretariat, chairs and serves on many other governmental committees, and is active in numerous international scientific associations. He is known as the "Internet samurai" and, in Japan, has also been called "the father of the Internet in Japan." He was inducted into the 2013 Internet Hall of Fame (Pioneer)/2011 IEEE Internet Award/2005 Jonathan B. Postel Service Award.

David Farber is Distinguished Professor, Co-Director, Cyber Civilization Research Center Global Research Institute, Keio University. Before joining Keio, Dr. Farber was the Distinguished Career Professor of Computer Science and Public Policy at the School of Computer Science (SCS) at Carnegie Mellon University with secondary appointments at the Heinz School and EPP prior to his retirement. He is now the Adjunct Professor of Internet Studies in SCS and Adjunct Professor in EPP. From 2000 to 2001, he served as Chief Technologist for the Federal Communications Commission. He was awarded the Sigcomm Award for lifelong contributions to communications and Philadelphia's John Scott award for Contributions to Humanity as well as an Honorary Doctorate from Stevens and a Pioneer of the Internet Society Hall of Fame.

Keiko Okawa is Professor in Keio University, Japan. Dr. Okawa received master's degree in Engineering in 1985 and PhD in Media and Governance in 2001, both from Keio University. In 12 years of computer industry experience, Dr. Okawa oversaw research on "the internet and higher education" at United Nations University, Institute of Advanced Studies in 1996 and Keio University Shonan Fujisawa Campus from 1997. As the director of the SOI Asia Project, which is Asian wide top university alliance for the Internet education, she also has initiated the Global Education Project in collaboration with UNESCO and partner schools and universities throughout Asia.

Kan Suzuki is Professor in Keio University, Japan. Before joining Keio, Mr. Suzuki was the member of the House of Councilors in the Diet, serving as State Minister of Ministry of Education, Culture, Sports, Science, and Technology (MEXT), Japanese Government. In February 2015, Mr. Suzuki was appointed to the chief advisor to Minister of MEXT in charge of reform of high school and university articulation system.

Chapter 9
Benemérita Universidad Autónoma de Puebla (BUAP). A Transversal Model to Support Educational Continuity Fostering Resilience, Innovation, and Entrepreneurship

Rodolfo Zepeda and Roberto Quintero

Abstract Throughout its history, Benemérita Universidad Autónoma de Puebla (BUAP), a public institution, has always been a guide of social and economic development of the state of Puebla. From one moment to another, the state was unexpectedly immersed in the Covid-19 pandemic that caused the sudden migration from a mostly face-to-face instructional model to an online one. Immediately, the institution summoned different staff members to define and analyze the situation and then establish actions to guarantee educational continuity.

As part of this analysis, they identified opportunities specifically at the upper secondary level, which includes high school. In particular, one opportunity was to offer entrepreneurship courses in an online format, capitalizing on the experience gained from the undergraduate program. Given the characteristics of the pandemic, the analysis also highlighted that the crisis would have severe economic effects on the students and their families, diminishing their income.

It is estimated that the entrepreneurship education program reached 18,000 people, including students, faculty members, and parents. Over 10,000 more people will be reached throughout the rest of the year. Therefore, it is essential to strengthen the resilience, innovation, and entrepreneurial capacity of the university ecosystem.

9.1   Introduction

Throughout its history, Benemérita Universidad Autónoma de Puebla (BUAP) has always been a driver of social and economic development in the state of Puebla. The institutional positioning in the state, regional, national, and international

R. Zepeda (✉) · R. Quintero
Benemérita Universidad Autónoma de Puebla, Puebla, Mexico

environment is associated with the university's contributions through thousands of graduates, basic and applied research, the extension of its services, and several cultural and educational outreach activities.

BUAP guides its work through its strategic agenda, The Institutional Development Plan 2017–2021 (IDP), which establishes its commitment to the members of the university and to society. This includes a commitment to a viable vision of the future and an outline of the path to achieve the desired objectives, closing the gap between the present and the future. The agenda discusses the need for every student to take at least one course online during their time in school, and the goal for 2020 was to develop 1125 additional courses to provide flexibility and increase coverage and access. To achieve this goal, it is necessary to provide the academic, technical, and administrative conditions and to ensure proper preparation for future teachers to teach online.

Suddenly, the institution was immersed in the Covid-19 pandemic, a threat impossible to have predicted. As this came unexpectedly, it forced the university to suddenly migrate from an in-person instructional model to an online one. Without delay, the institution summoned staff to define and analyze the situation and establish courses of action to guarantee educational continuity. As part of this analysis, opportunities were identified specifically at the upper secondary level, which includes high school. One opportunity was to offer entrepreneurship courses in an online format, capitalizing on the undergraduate program where two optional courses are available. Given the characteristics of the pandemic, the analysis also highlighted that the crisis would have economic effects diminishing student incomes.

Some activities were put in motion at the high school level to guarantee academic continuity. The first was to offer the entrepreneurship course online as part of the curriculum, keeping the design principles and basic content and approach used to teach this subject in person. The second activity, "Sal de la Curva" (which translates as "get out of the curve"), consisted of offering a series of mentoring and online master classes to support the students and their environment in the development of self-knowledge, resilience, and their families' and their own well-being. Both activities are fully linked to the mission of the university and can be achieved through collaborating with different units within the BUAP as well as other social and business parties. The background of BUAP will be described in the next section.

9.2   The Benemérita Universidad Autónoma de Puebla

The Benemérita Universidad Autónoma de Puebla (BUAP) is a public and autonomous institution consolidated at a national level. The university is committed to the comprehensive education of professionals as well as critical and reflexive citizens at the middle, higher, and postgraduate levels of education, who can generate, adapting, recreating, innovating, and applying knowledge of quality and social relevance.

Founded in the sixteenth century by the Society of Jesus, the institution was recognized as University of Puebla in 1937, and it became autonomous in 1956. In 1963, a reform was approved that underscored its secular and public character. On April 21,987, the State Congress of Puebla recognized the University's many contributions to science and culture in the state declaring it "Benemerita" (meritorious).

BUAP encourages research, creation, and dissemination of knowledge as well as promotes inclusion and equal opportunities to students. It also contributes as a community of knowledge to the development of art and culture in addition to economic, environmental, social, and political solutions for the region and the country. The university's activities are carried out with transparency and accountability, based on ethical principles oriented toward sustainable development in defense of human rights, tolerance, and honesty and contributing to the creation of a proactive, productive, fair, and safe society. Furthermore, it is recognized by the civil security and safety system, food stipends, multi-classroom buildings, multi-laboratory buildings, sustainable kiosks, drinking fountains, and mobility that impact the economy and health of the University community.

In the first semester of 2020, the total enrollment comprised 96,409 students, 46% of them men and 54% of them women. 19,773 corresponded to high school and 76,736 to higher education. This enrollment represented 27% of the enrollment in higher education in the State of Puebla. Students were admitted from a pool of 91,670 applicants of which 73,727 were applying for undergraduate studies and 17,943 for high school studies, representing an increase of 48% over the previous year due to the elimination of fees in entrance examinations. It has presence in 24 of the 217 counties of Puebla through 5 regional complex facilities. Eighty-nine under and post graduate programs, of which five are offered as hybrid programs (part in person and part online) and eight virtually, comprise the academic offering available in a virtual and in person modes. Lastly, there is a base of 2322 online courses and 77 graduate programs (BUAP, 2019a).

The BUAP holds national and international standings due to the quality and relevance of its educational offerings and academic services that are supported by a solid and recognized academic staff. This staff is composed of more than 7000 faculty members who utilize relevant and flexible educational models that focus on the student, scientific and technological development, culture and the arts, and an academic structure that serves in national and international cooperation and collaboration networks. In addition, the administrative and management structure is nimble, functional, accredited, and flexible, supporting the academic work under a policy of transparency, accountability, and sustainable development.

The principles of the institution are autonomy, academic freedom, freedom of research, secular nature of education, quality and relevance, co-responsibility, high institutional performance, inclusion, social responsibility, and accountability.

The BUAP ranks sixth among the top 22 public and private Mexican universities, according to the *Times Higher Education's Latin America University Rankings* (2020), which recognizes its commitment to educational quality, scientific production, and academic achievement (BUAP, 2020).

In order to fulfill its mission, the university has a strategic agenda embodied in the Institutional Development Plan 2017–2021 (IDP), which includes the following subjects: (1) educational offer; (2) admission, permanence, terminal efficiency, and graduation; (3) teaching; (4) research and graduate studies; (5) linkages and social responsibility; (6) positioning, visibility, and international quality; (7) maintenance and adaptation of educational infrastructure; and (8) management and governance (BUAP, n.d.-b).

9.3   Support to K-12 Systems

The accelerated pace of globalization and new developments have increased the importance of educating students toward the development of a society and a global consciousness in the context of interdependency between local events along with remote and global events. For example, education now involves developing skills to promote sustainable development and understanding this as meeting the needs of the present without compromising the ability of future generations to fulfill their own needs. This requires building an inclusive, sustainable, and resilient future for people and the planet and harmonizing economic growth, social inclusion, and environmental protection. These are interrelated and essential elements for the well-being of people and society.

The eradication of poverty in all its forms and dimensions is a prerequisite for achieving sustainable development. By promoting inclusive and equitable economic growth with enhanced opportunities for all, this will lead to reduced disparities, improved living standards, and enhanced equitable social development, which promotes ecosystem sustainability.

As a result, education in the twenty-first century requires an educational model that considers cooperative, project-based, and self-managed learning as well as critical and analytical thinking. In addition, it should consider the use of simulators and technology to foster the development of disciplinary and soft skills in the interpersonal and intrapersonal domains: leadership, responsibility, creativity, ethics, perseverance, functional mastery of digital knowledge, goal-oriented, oral and written communication skills, and teamwork (BUAP, 2019c). The challenge is to articulate the development of skills with the different learning contexts and methodologies.

The BUAP's IDP educational offer strategy, defined under the educational model and on the initiative of President Alfonso Esparza, has the following objectives: ensure relevance, respond to regional, national, and international needs for social and economic development, and promote graduate profiles that ensure the development of competencies associated with employability and entrepreneurship. This strategy fosters entrepreneurship, its culture, and an ecosystem that supports it, such as EmprendeBUAP. By awarding recognition to the achievement of competitiveness among entrepreneurs, BUAP is thus contributing to building a better world as

well as cultivating creativity and innovation in the creation of solutions to problems locally and globally (BUAP, 2019b).

Two routes were proposed in the project: (1) entrepreneurship training and educational programs for all levels so that students receive the basic elements to undertake it according to their life and career plans and (2) support in the different stages of students' entrepreneurial projects for students interested in the entrepreneur's route. In both cases, the student is invited to identify a project aligned with the UN Sustainable Development Goals as a starting point.

The central question when undertaking this project is how to formulate a strategy in the face of an environment characterized by rapid technological change and high economic interdependence. VUCA, the acronym for Volatility, Uncertainty, Complexity and Ambiguity, was adapted to the context for students to work actively with a sense of urgency and a scarcity mindset. Online education was considered the best option for content development and training in entrepreneurship since it responds to the entrepreneurial context (BUAP, n.d.-a).

Process and impact indicators were established, including the percentage of programs offered in non-conventional modalities of students participating in entrepreneurship programs and of alumni who are company or business owners. An inter-functional committee was set up with the participation of the Vice-President of Academic Affairs, the Principal of High School Education, the Head of Community Work, Internships and Academic Affairs, and Alumni and Career Services Office; the Vice-President for Graduate School and Research along with the Innovation and Entrepreneurship Director; Communication and Information Technologies Director; and News and Communication Services Offices. The implementation of the program and operation of the committee was assigned by the President's office to the Student Affairs office. When the high school curriculum was updated in 2018, an opportunity to incorporate entrepreneurship training became apparent for the committee, which ensured that at the end of their high school studies, students would have the skills to develop their entrepreneurial project along with their soft skills.

Once the proposal was disseminated, the subject of entrepreneurship was incorporated to each of the six semesters of the curriculum, with the following general proposal: to promote a quality entrepreneurial education through developing the skills which an entrepreneur should possess, such as self-knowledge and resilience, understanding of value chain, and developing a business model. This is done through activities and cases that allow their identification and progress, integration of collaborative teams, and the cultivation of an entrepreneurial spirit in their family and social environments as much as in the academic one.

This course includes the following elements: critical thinking and problem-solving in which the student uses logical mathematical thinking and research methodology, teamwork, and collaboration. Here, the student participates, both individually and in teams, to propose alternatives to act and solve problems of social impact, allowing the students to develop a constructive and respectful behavior. Socio-emotional skills and their life project encourage self-knowledge and resilience, which allows them to discover themselves and find their internal strengths to face and solve problems in their environment.

In the last President's report, the results of EmprendeBUAP are as follows: 172 faculty members have provided basic training in entrepreneurship to 16,400 students, of which 15,500 are from middle education and the remaining from 30 academic programs in higher education (Unidas Naciones, 2019).

9.4   Actions During the Pandemic

We are experiencing the biggest global education crisis ever with school systems and classes suspended in more than 170 countries. Around 1.6 billion students are out of school worldwide, 170 million in Latin America, and more than 35 million in Mexico. Lack of educational continuity is a silent crisis. As World Bank education expert Emanuela di Gropello says, it could have an impact on social mobility, poverty reduction, sustainable development, innovation and development, and care for the environment (Mundial Banco, 2020; Saavedra, 2020).

Faced with an unexpected event, school systems with their different capacities migrated from a face-to-face education model to a remote one. Moving education from the classroom to the home brings with it several challenging factors into consideration: the role of parents, computer availability and access for both the student and the faculty member, teacher training in digital competencies, and a platform and content relevant to the teaching-learning process.

In Mexico, 40% of the population have computer and Internet access at home. It is estimated that 50% of the country's educational institutions have the technology and resources to achieve a continuous education. In addition, there is currently an educational gap in our country in terms of coverage and quality. On the other hand, it is known that more than 90% of those between the ages of 18 and 26 have a device that connects them to the Internet (Secretaría de Educación Pública, 2020).

In view of this scenario, BUAP is considering its social commitment to take the opportunity to contribute. With its acquired experience and infrastructure, the university can contribute to the educational continuity of students in high school, both within the institution itself and of third parties.

Safeguarding the integrity of the university community and establishing actions for academic continuity are the priorities established by the BUAP, in high school education. Specifically, BUAP is focused on guiding the work and academic continuity, such as prompt communication of official information through social networks, video platforms, and "Course Management System" (CMS) to continuously inform the different actors of the community: students, faculty members, and parents.

One of the biggest challenges in the face of health contingencies is faculty professional development since the current modality is classroom-based. Through the Communication and Information Technologies Director, faculty members took part in a course on Microsoft Office 365 along with other content management system (CMS) platforms like Moodle. BUAP also met with the staff and academic leaders to discuss the various problems that arose in the regions of Puebla to take the necessary actions.

Follow-up and monitoring of the academic activity help assure BUAP's essential function in the teaching and training the students. When faced with the situation where the student is at home, it is impossible to directly observe their actions, thus requiring an innovative approach. EmprendeBUAP's faculty called a meeting in the second week of March 2020 to implement the strategy for academic continuity, which included using the existing curriculum, migrating the subject of entrepreneurship from face-to-face instruction to online, and establishing a program to support teachers, parents, and students to address the following priority issues:

- What do I do with myself? This is done in the environment of uncertainty, addressing personal well-being, anxiety, and stress.
- What do I do with my training? This speaks to the continuity of training while facing unexpected change from a face-to-face model to an online one.
- What can I do to mitigate the effects of the crisis in my environment and in social, familial, and economic areas?

To migrate the subject, a team comprising high school principals, faculty members, instructional design specialists, and entrepreneurial consultants was created. They decided that each subject would comprise of 2 blocks, and each block would encompass the review of 16 activities. Differential elements like the use of the case method, simulators and exercises, conceptual maps, keynote speeches, virtual forums used for presenting projects, and an evaluation system to monitor knowledge, practice, and application were considered.

With the aim of supporting students, faculty members, and parents in mitigating the effects of the pandemic, the team developed the initiative: "Sal de la Curva, la otra cuarentena" (which translates as "get out of the curve, the other quarantine"). The team created and presented a prototype to businessmen, entrepreneurs, outstanding professionals, the media, and business chambers to validate the model, improving on it, and inviting them to take part. Because of this dialogue, it was considered appropriate to use the mentoring and master classes format to achieve an easy transfer from a theory of action and to encourage participation. This maintained a sequence which allows for the construction of meaningful learning, to select and train the mentors, to use straightforward and accessible virtual platforms, to spread through social networks, to carry out an advocacy campaign with business and civil society organizations, and to extend collaboration with other educational institutions.

Mentoring is offered through an online platform with a duration of 60 min under the following schedule: 5 min for a presentation followed of 30 min of exposition and finally 25 min of open forum with Q&A session to address doubts, share experiences, and generate proposals for action. At the end, they are invited to answer to an evaluation.

Online master classes were carried out with the support of prominent entrepreneurs and business chambers. For example, "El sueño mexicano" (the Mexican dream) was taught by the prominent entrepreneur, Arnoldo de la Rocha, in alliance with the National Chamber of Restaurants and Seasoned Food Industry (CANIRAC) and a civil society organization. "Como emprender con sentido social" (how to be

an entrepreneur with a social agenda) had the presence of the entrepreneur Juan Servitje in alliance with the international organization ENACTUS. "¿Cómo abordar la crisis en mi negocio?" (how to address the crisis in my business) included the participation of the entrepreneur Eugenio Cárdenas, president of "Unión Social de Empresarios Mexicanos" (USEM).

To increase the impact of these efforts, a partnership was established with the following institutions: Universidad de Costa Rica, Universidad D'Vinci and Universidad San Carlos de Guatemala, and the Universities of El Bosque, Minuto de Dios, and Santo Tomás in Colombia. In addition, there is a link with the "Unión Poblana de Escuelas Privadas" (UPEP), which includes 120 basic education schools. They were offered mentoring and master classes and a program for staff management of affiliated institutions covering issues of welfare, digital skills, and strategy and finance before Covid-19.

The offering of these courses, mentoring, and master classes are the product of the collaborative and supportive work of the directors of the faculties of Administration and Public Accounting, who contributed content and academic links; of the President of Higher Education with a team who worked on the development of lesson plans, teaching sequences, and content; of the Directorate General of Computing and Information Technology and Communications who led the platform, social network management, and educational technology for online instructional design; of the Director of Innovation and Knowledge Transfer with the link to the sectors, content, and its model of social entrepreneurship; of the Director of Community Work who focused on the UN Sustainable Development Goals; of the General Coordination of Student Affairs who supported the collaborative work between the parties; and of the support of the President's office to set the guidelines for achieving the mission and the IDP.

The initiatives were developed with the resources and infrastructure of BUAP along with the solidarity of teachers, mentors, businessmen, and entrepreneurs who donated their talent and time.

9.5   Evaluation and Learning

One of the lessons that BUAP has learned in considering entrepreneurship as a transversal competence is that one must act with a sense of urgency, use resources at hand in a rational and intelligent manner, develop prototypes, and pivot. Covid-19 tested the entrepreneurial spirit of the community. As the university was working in advance on an online course offering for undergraduate studies, this was seen as an opportunity to strengthen educational continuity and develop online courses with innovative and disruptive content.

The results are encouraging, with achievement percentages above 80% and 90% in the different indicators for the established action lines. Within 45 days of their conceptualization, the online subjects for higher education were developed and

implemented. These are ready to be offered by the second semester and will reach 18,000 students.

85 mentoring sessions were conducted along with 6 master classes in the span of 11 weeks. It is estimated that 6000 people were reached, including students, teachers, and parents. Out of 893 responses received, 92% expressed their satisfaction with the presented content, 89% with the mentoring dynamics, and 87% commented that they achieved significant and transferable learning. Ignacio Alarcón, President of the Business Coordinating Council of Puebla, stated:

> A wise initiative of the BUAP to help counteract the effects of the pandemic we are experiencing and will continue to experience for several months and perhaps some years. 'Sal de la Curva,' provided information, knowledge, and competence so that students, teachers, parents, and businessmen became aware of the situation and, in an orderly fashion and working as a team, found the way to navigate during the pandemic and glimpse plans and actions to return to normal. I acknowledge the commitment of BUAP and the president with the society of Puebla and my gratitude to the whole team.

The UPEP, through the President of the Association Javier Osorio, reports it has achieved the participation of 100 directors and 1500 middle school students. This was very useful to adjust the dynamics of the mentoring, giving more agility and flexibility and encouraging active participation from the students.

9.6   Future Plans

The impact of the pandemic on the economic activity in Mexico has been very significant. The magnitude and characteristics of this impact can be identified in three distinct phases or stages.

In the first instance, there was an initial effect at the end of the first quarter of 2020 derived from the closure of several countries and the first disruptions in the productive processes and education.

In the second instance, economic activity in the country slowed down significantly because of the decision to suspend all activities considered as non-essential ("Jornada nacional de sana distancia").

A re-opening process that will be slower and more gradual than originally anticipated will define the third phase. In that sense, this third instance will not only be much longer than the previous ones, but its duration is, up to this moment, quite uncertain.

It is estimated that the drop in GDP in 2020 may fluctuate between -8.5% and -10.5%. This has caused a significant contraction in formal employment and major changes in the composition of the labor force. A significant increase in total and extreme poverty rates is anticipated in the country. According to various estimates, around 9 million Mexicans may be considered poor, and a similar number might fall into extreme poverty (Esquivel, 2020).

The BUAP is aware of this complex situation and maintains its commitment to its mission, with the flexibility to adjust the strategic university agenda to the

requirements that the situation demands. Thus, the institution made the decision to offer 100% of the online subjects and to share the study plans with the 34 incorporated high school institutions, benefiting over 10,000 students.

One of the main challenges to be addressed is the availability of computers and Internet access, particularly in the student world. According to OECD data, only 68% of students have an infrastructure of adequate quality, and therefore other means must be proposed to maintain equality of opportunity in education. BUAP has established a strategy to support those students who are in a vulnerable and unfavorable position in their economic situation to guarantee their online continuous education. Aware of this problem and to ensure equal opportunities and equity in 2020, all candidates for high school level will be accepted. In addition, there is an awareness of the new reality of the teacher who, in addition to training in digital skills, will require different counselling as they will be working from home in very different conditions to those encountered on campus and in the traditional classroom. Also, BUAP will keep in mind the need to seek alternative resources in the face of a possible decrease in public funding. Lastly, it is fundamental to keep strengthening the resilience, innovation, and the entrepreneurial capacity of the university ecosystem.

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Rodolfo Zepeda Memije obtained a master's degree in Public Opinion and Political Marketing from the Benemérita Universidad Autónoma de Puebla. He received a degree in Environmental Engineering from BUAP. He is currently the General Coordinator of Student Affairs at the aforementioned university.

Roberto Quintero Vega is a doctoral candidate at Centro Internacional de Prospectiva y Altos Estudios, with an MBA and a master's degree in knowledge management.

He has postgraduate studies at Columbia Business School, IMDOSOC, and IPADE's AD2 program.

He has a law degree and a specialization in international law from UDLAP. He is currently an ENDEAVOR global entrepreneur and was awarded the National Entrepreneurship Award in Mexico.

He is also a former National President of the Social Confederation of Businessmen of Mexico and an international lecturer on entrepreneurship and corporate social responsibility.

Chapter 10
Academic Continuity During the Covid-19 Global Health Emergency: Education 4.0 and the Flexible-Digital Model of Tecnologico de Monterrey University in Mexico Supporting Secondary Education

Arturo Molina, Beatriz Villegas, César Pavel Ochoa, and Jhonattan Miranda

Abstract Today, new teaching-learning models, methods, and programs are emerging to guarantee academic continuity in response to the current situation caused by the global health emergency (Covid-19). This work presents how the Flexible-Digital Model of Tecnologico de Monterrey University in Mexico was designed and implemented during this emergency in this institution. This work also addresses the relevant role that technology has taken during this situation, and the concept of Education 4.0 is offered as a framework to model the presented study. Finally, two case studies that were applied at the secondary education level are presented as an example of how higher education is supporting academic continuity at the secondary level.

A. Molina · J. Miranda (✉)
School of Engineering and Sciences, Tecnologico de Monterrey,
Mexico City, Mexico
e-mail: armolina@tec.mx; jhonattan.miranda@tec.mx

B. Villegas
Bilingual Secondary School, Carlos Darwin, Irapuato, Guanajuato,
Mexico
e-mail: beatriz.villegas@tec.mx

C. P. Ochoa
Bilingual Secondary School, Tec de Monterrey, Ciudad Juárez,
Chihuahua, Mexico
e-mail: pochoa@sectec.mx

10.1 Introduction

The global emergency caused by the new coronavirus (SARS-CoV-2) detected in China at the end of 2019, which has been identified as the cause of the Covid-19 disease, has triggered the greatest health crisis of the modern age of humanity. This has brought with it devastating social and economic effects, which will be adversely reflected in practically all sectors of society during the subsequent months and even years. Education has been one of the most affected sectors. Consequently, during the first quarter of 2020, most countries had to stop all face-to-face academic activities. For example, in Mexico, these activities were suspended in late March 2020 during the national health emergency declared by the Mexican Government, affecting about 40 million students at all educational levels, both public and private (Forbes México, 2020). Due to the uncertain outlook, most academic institutions acted immediately to provide a quick response to address academic continuity at all the educational levels.

The Tecnologico de Monterrey University in Mexico (Tecnologico de Monterrey) used its available infrastructure and, most importantly, its valuable previous experiences in digital and virtual education to provide a quick response to this extraordinary event to guarantee academic continuity, using distance learning as the main strategy. Tecnologico de Monterrey is the largest private non-profit educational system in Mexico and includes secondary school, high school, undergraduate, and postgraduate education levels, with a presence in 26 cities in Mexico. Currently, Tecnologico de Monterrey has about 90,000 students and more than 8600 professors and teachers across all educational levels.

Tecnologico de Monterrey's 30-year experience in the design and delivery of digital education programs, for both academic and continuing education, combined with the current advances in information and communication technologies (ICTs) being applied to the education sector have facilitated the design and implementation of effective distance learning programs during the last few years. Programs included the Online Postgraduate Program (9917 students reached), the Flexible and Interactive with Technology, known as "FIT courses" (7129 students reached), Continuing Online Education Programs (73,943 students reached), the MOOCs (829,165 students reached), the Telepresence Courses (1668 students reached), and more recently the Hybrid-Flexible Model, which was applied to guarantee academic continuity on the Mexico City Campus during the emergency caused by the major earthquake in 2017 (8472 students reached). Hence, experience gained by implementing these programs was used to propose a new learning model to guarantee the academic continuity during the Covid-19 global health emergency in 2020–2021.

Another relevant element to highlight is the role that technology has played throughout this situation. Today, technological evolution in digitalization, virtualization, and connectivity is playing an essential role in the generation of new learning models and education programs. Also, different factors, such as social dynamics, social challenges, access to technologies, and demography, are considered when implementing various techniques. The concept of Education 4.0 has been used as a

reference to understand available and affordable technologies in education in terms of capacities and capabilities. Therefore, the four core components of Education 4.0 are considered during the design process of the proposed implementations and models presented in this work.

With this goal, teachers, researchers, and specialists in distance education and educational innovation at Tecnologico de Monterrey considered the current components of *Education 4.0* (ICTs, key competencies, novel teaching-learning methods, and infrastructure) and related them to the current education model of Tecnologico de Monterrey (TEC21). They also drew upon previous experiences in digital and virtual education to design and propose the model called "Flexible-Digital Model (FDM)." This is an online distance program intended to guarantee a timely and effective deployment of educational services to maintain academic continuity at all educational levels at Tecnologico de Monterrey (Tecnológico de Monterrey, 2020; Miranda et al., 2019).

In this work, the concepts of Education 4.0 and the FDM are used to explain how technologies and learning methods are implemented. This work will also present two case studies from the secondary education level in two different institutions to show examples of how higher education is supporting academic continuity at the secondary level and to illustrate how the proposed FDM works.

10.2 The Education 4.0 Concept Applied for Academic Continuity

The term "Education 4.0" comes from the well-known concept of "Industry 4.0," which refers to the different industrial revolution periods that have taken place throughout history, with the fourth industrial revolution bringing with it a technological evolution. This technological evolution has had positive effects in different sectors, improving processes and optimizing the use of resources (Ma et al., 2019; Keser & Semerci, 2019). Therefore, in the case of the education sector, these improvements and technological evolution are known today as Education 4.0 (Miranda et al., 2019). Figure 10.1 illustrates this concept through examples of relevant technologies and learning methods that took place in the different periods of Education 4.0.

Currently, Education 4.0 has an essential role in the design of new teaching-learning programs, especially for online distance programs, since new programs are integrating the four main components that characterize this period:

(i) **ICTs.** Implementation of current and emerging ICTs as resources to support the teaching-learning and operative processes. Currently, the education sector is mainly taking advantage of technologies that are powered by the Internet of things (IoT). Today, these implementations can be found and analyzed in two categories: (a) type of tools (devices and platforms) and (b) type of technology used, such as artificial intelligence, machine learning, data science, data ana-
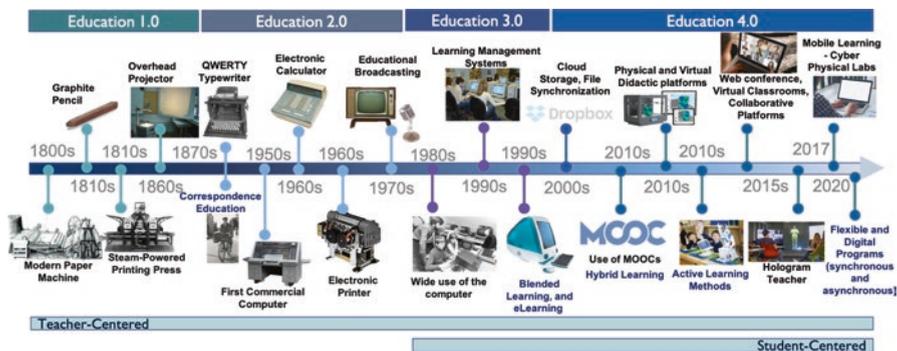
Fig. 10.1 Evolution of technologies and learning methods according to the four periods of Education, leading to Education 4.0—Timeline

lytics, cloud computing, and mixed reality, among others. In digital learning programs, these tools and technologies are essential. They are not limited only to software systems but also include physical systems such as assistant robots and cyber-physical systems, among others.

(ii) **Key competencies.** Training and development of key competencies, including both soft competencies and hard competencies. Examples of relevant soft competencies are innovation, leadership, creativity, critical thinking, collaboration, cooperation, and communication. Relevant hard competencies are related to the training for the use of new artifacts, tools, techniques, and emerging technologies, as well as the application of knowledge for the generation of new technologies, methods, practices, etc.

(iii) **New learning methods**. The incorporation of new learning methods is a crucial component for emerging teaching-learning programs since the combination of adequate infrastructure, technology, and instruction with teaching/training times are essential for an optimal teaching-learning experience. As a result, some suitable learning methods have emerged not only to take advantage of available resources and times but also to improve teaching and learning processes. Recently, many learning techniques and methods have emerged to answer current learning problems; it has also been observed that the combination of these techniques/methods with the right technologies can considerably improve the learning process of students. Some relevant learning methods that are applied in this period are problem-based learning (PBL), challenge-based learning (CBL), learning by doing (LBD), and active learning (AL). Diverse learning methods specifically for hybrid and digital learning are also applied, such as blended learning, flipped classroom, and synchronous/asynchronous learning, among others. More recently, the incorporation of learning methods based on gamification has been widely used in digital-based learning (DBL) and flexible-digital learning (FDL).

(iv) **Infrastructure.** The use of innovative facilities, services, and systems is considered to improve teaching-learning processes. New infrastructure can be considered at two levels:

  (a) **Institutional level**. Here, adopting technology-based infrastructure and environmentally sustainable practices is considered. Examples of these facilities at this level are smart schools, virtual/digital schools, and environmentally sustainable schools. These institutions seek to provide not only better learning environments but also seek to offer spaces and best practices for recreation, comfort, sustainability, and accessibility.

  (b) **Classroom level**. Here, infrastructure priorities include providing adequate and innovative furniture, equipment, connected tools, distance teaching tools, and other educational resources and services. Also, at this level, immersion environments and specialized laboratories are considered. In many cases, these classrooms are equipped with high-level technologies and are prepared to carry out learning through use of new learning methods.

  Today, these four components can be used as a reference in the design of new learning programs, models, and projects in educational innovation. Once these components have been considered, designers can consider current social issues and make the best decisions about the type of resources to be implemented in new learning-teaching programs.

Tecnologico de Monterrey is currently implementing a new educational model called "TEC 21." Through use of the four main strategies, this model is reaching the vision and concept of Education 4.0 (Educational Model (Modelo Educativo) Tec21, 2019): (i) *Challenge-Based Learning* that promotes the engagement and motivation of students by performing challenging activities; (ii) *Flexibility* in the ways in which students are learning; (iii) *Inspiring Faculty:* faculty not only accompany the students in their learning process but also promote the use of emerging technologies to teach; and (iii) *Memorable University Experience*: this strategy promotes the use of innovative infrastructure to offer students not only an adequate learning environment but also activities for culture, sports, and recreation, among others. Consequently, by applying the vision and concept of Education 4.0, it is possible to utilize its main components to guarantee academic continuity during the global health emergency (Covid-19), taking advantage mainly of the virtual infrastructure that applies adequate learning methods. Therefore, the main strategy for academic continuity at all educational levels of the Tecnologico de Monterrey was the implementation of virtual classrooms, applying synchronous and asynchronous distance learning under the Flexible-Digital Model created specifically for this purpose. Figure 10.2 illustrates the four core components of Education 4.0 adapted to the different educational levels of Tecnologico de Monterrey.
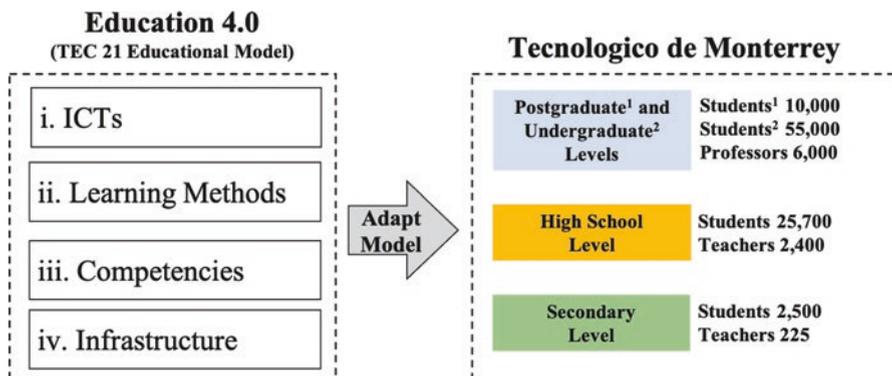
Fig. 10.2 Education 4.0 adapted to the different educational levels of Tecnologico de Monterrey

10.3 The Flexible-Digital Model for Academic Continuity During the Covid-19 Global Health Emergency

The Tecnologico de Monterrey was the first Mexican University to declare a contingency plan for its academic community. Therefore, with just 1 week of preparation and suspension of academic activities for students, the institution launched the Flexible and Digital Model (FDM) to guarantee academic continuity. The FDM is a learning model that integrates innovative teaching strategies with cutting-edge technologies. One of its main benefits is that it enables academic continuity to be guaranteed through a flexible and digital education strategy (Tecnológico de Monterrey, Educational Innovation Department, 2020).

Flexible: It is flexible because it ensures that the teaching-learning process can be adjusted to different needs and situations regardless of time or space factors.

Digital: It is digital because it takes advantage of educational technology to generate hybrid or distance learning experiences.

The FDM proposes the design of a flexible and digital learning experience that combines the following five core components:

(i) *Technological tools*. Utilizing emerging ICTs such as web-conferences, remote interaction tools, and technological platforms for content and learning management and technological applications for active learning.

(ii) *Interaction*. Three main didactic activities for interaction: (i) live sessions via web-conference based on active learning (synchronous), (ii) on-demand and remote advice (asynchronous), and (iii) supporting students using interactive tools.

(iii) *Content*. Didactic resources such as readings, presentations, websites, infographics, videos, and simulators, among others.

(iv) *Learning activities*. Including activities such as live sessions via web-conference for supervised activities and collaborative work, and remote-
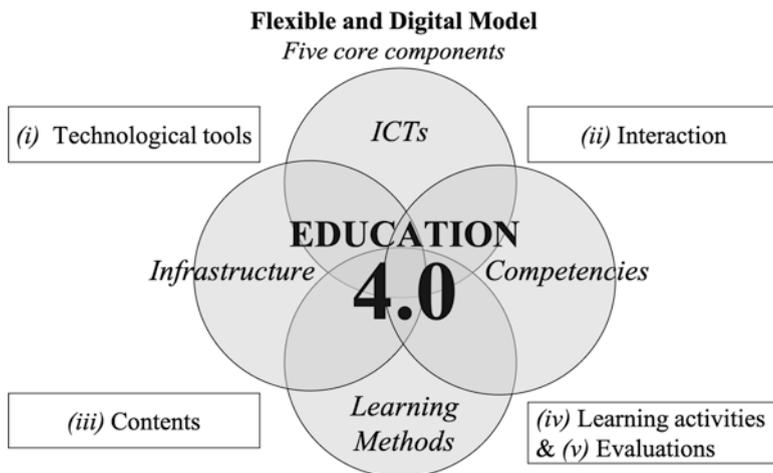
Fig. 10.3 The five core components of the FDM of Tecnologico de Monterrey

assisted work for activities such as self-directed individual work, guided collaborative work, and interactive activities using different technologies.

(v) *Evaluation*. The implementation of digital evaluation resources and multi-modal feedback (video, audio, and/or text).

Therefore, using the four main components of Education 4.0, designers and teachers can apply emerging technologies and new learning-teaching methods, as well as make use of online infrastructure for knowledge generation and information transfer. Using this structure, the training and development of student competencies can be ensured. Figure 10.3 shows the FDM composed of the five core components proposed by the Tecnologico de Monterrey.

10.4   The Implementation Process of the Flexible and Digital Model

During the week before the continuation of classes, basic training for teachers on the FDM was launched through the national network of Centers for Teaching Development and Educational Innovation of Tecnologico de Monterrey with the collaboration of experts from areas such as Educational Innovation and Technologies for Education.

In addition, an overview of the FDM, guidelines, and a suggested methodology were defined so that teachers could adapt the organization of the course and consider the main aspects for its delivery. Table 10.1 summarizes these activities.

Finally, as part of this process, a technical support strategy was deployed. Different activities and programs were performed during the previous week to

Table 10.1 The five stages of transforming a course into an FDM for academic continuity (Tecnológico de Monterrey, 2020)

Stages	Recommendations for teachers
1. Initial recommendations	*1.1.* Get ready to start (checklist of the minimum infrastructure required) *1.2.* Explore the digital options that you have available to continue your course *1.3.* Plan how to continue your course *1.4.* Communicate with your students *1.5.* Update your course on a technology platform
2. Platform organization	*2.1.* Identify the technological platforms assigned by the institution *2.2.* Select the content to be integrated onto the platform *2.3.* Design the structure of your course on the platform *2.4.* Validate that your course is published correctly on the platform
3. Flexible, digital teaching	*3.1.* Share your calendar settings *3.2.* Define the operational policies during academic continuity *3.3.* Ensure effective communication *3.4.* Establish timetables and counseling services *3.5.* Teach your classes by web conference platforms *3.6.* Promote cooperative work *3.7.* Schedule exams on the platform you use *3.8.* Ensure timely follow-up *3.9.* Reinforce your students' learning through effective feedback *3.10.* Enrich your students' experiences
4. Formats and tutorials	*4.1.* Access to supporting resources *4.2.* Access to support for classes design by web-conference *4.3.* Access to the design of didactic resources *4.4.* Tutorials for flexible-digital teaching
5. Open resources	*5.1.* Access to a repository of open resources that can be used during classes

initiate the model and, during the application, implement it. Therefore, training programs for teachers related to educational technologies, pedagogy advice, and teaching-digital practices were provided. Also, additional support, such as online courses and websites, were enabled. Lastly, a support and accompaniment scheme for teachers was defined, and a communication strategy was established to keep the academic community informed.

10.5   Case Studies: The Flexible-Digital Model Applied in the Secondary Education Level

As part of its educational offerings, Tecnologico de Monterrey also provides secondary level education. In Mexico, the secondary education level is comparable to the lower secondary education or middle school, which is equivalent to three academic years. Students range in age from 12 to 15 years old. Currently, Tecnologico de Monterrey has seven secondary institutions located in different cities across

Mexico with about 2500 students and 225 teachers. The proposed FDM that was implemented in higher education was also transferred to these institutions. In this section, two case studies are presented to show the understandings gained from the implementation of the FDM in two secondary institutions of Tecnologico de Monterrey.

10.5.1   The Experience of the Bilingual Secondary School, Carlos Darwin, Irapuato, Guanajuato, Mexico

Context The Bilingual Secondary School, Carlos Darwin—located in Irapuato, Guanajuato, Mexico—is part of the Tecnologico de Monterrey Educational System. This institution has about 370 students divided among three grade levels and 36 teachers. The FDM was implemented and adapted according to the institution's nature. Furthermore, FDM was compatible with the school's primary objective to continue with schoolwork and learning activities to fulfill the academic programs established for the 2019–2020 school year.

Implementation The implementation process for this model utilized the five stages recommended for the transformation of a course into an FDM for academic continuity, and adopted the practices and tools recommended by the Tecnologico de Monterrey University. Because the program was designed for upper-level education, the decision was made to mainly use asynchronous formats in the form of previously video-recorded classes stored in learning management systems (LMSs). This choice was made due to the prioritization of the protection of information regarding interactions with minors, and it prevents the minors from appearing in front of a camera. At the same time, the students could consult the pre-recorded sessions as many times as necessary. However, there were also synchronous meetings—mainly to highlight a specific subject or for students to receive advice—carried out with appropriate measures in place so that these events could occur with adult supervision.

As the period of home confinement was extended, some changes had to be made in the academic schedule as well as the way teaching was delivered to the students. Consequently, in some subjects—due to their complexity—more synchronous online classes were enabled to guarantee student understanding of the subjects. In the case that students could not attend these online classes, they could access the recorded classes, and the teachers always supported them via message, mainly through e-mail and instant messaging mobile apps. Special sessions were also held for low-performing students to require them to deliver work, due to the lack of completion of work during regular sessions.

Evaluation of Students The secondary education level has three formal evaluation blocks during the academic period. The contingency plan started with the beginning

of the third evaluation block. Usually, exams serve as the main mode of assessing knowledge; in this case, exams were replaced by academic assessment projects, which were requested for all topics to complete evaluations in this last block. So then, by mainly using LMSs, students were able to find information, deliver their projects, get feedback, and receive evaluation results.

Given the nature of the subjects of *Curricular Autonomy and Personal Development*, the institution decided that teachers would be taught through activities designed and planned, with face-to-face sessions, if the students requested them.

Regarding the subjects of *Curricular Autonomy and Personal and Social Development*, lessons were carried out in three stages.

- *First stage*. Weekly activities were assigned (without a fixed schedule, but with an assigned day) that facilitated student learning according to what is expected in the subject, putting at their disposal the advisory service through web conference platforms.
- *Second stage*. The way of working on these types of subjects was modified so that the activity was delivered the same day assigned in the academic schedule.
- *Third stage*. To provide greater structure of student activities, a fixed class schedule was established on the assigned day, during which the student had to work and deliver their activity within the established schedule.

For *Extracurricular Classes*, the Student Leadership and Training Department, called "LIFE," contributed weekly to the area of sports. The LIFE department shared access links to allow others to see the activities corresponding to the disciplines of the students. In the cultural field, the sessions were personalized only at the beginning, while later the LIFE department sent out pre-recorded classes for the entire community.

Learnings and Experiences The main learnings and experiences are presented below:

- Keeping preteens and teens engaged with virtual activities has been complicated, and the academic administration and the emotional monitoring of these students carried out by the tutors was exhausting.
- Distance-format support and services for parents were complicated due to their lack of habit of use and lack of training on technological platforms, such as on the use of web conference platforms. Likewise, there was dissatisfaction from many families regarding the use of technological platforms as they believed these tools put minors' safety at risk.
- As the platform did not have a service that allowed the restriction of entry to only official participants, intruders in virtual classes occasionally prevented the class from taking place, annoying teachers and students.
- Little previous training for teachers, students, and parents complicated the development of many activities.
- The technological implications regarding the availability of suitable platforms for teaching classes must be fully analyzed.

- Free-use platforms have limited functions; most of the time, full access is required, and most teachers did not have full access.
- Constant failures in Internet and electricity services in the city was a barrier for both teachers and students.
- Compliance with the requirements and provisions of the Secretary of Public Education of Guanajuato, as well as simultaneous compliance with the requirements and standards of Tecnologico de Monterrey, was a complicated activity for the staff.
- All institutional staff gave service and attention with an unlimited schedule, including on weekends, to meet the quality of service that has always distinguished the institution.

Challenges The challenges identified for this institution are summarized in Table 10.2.

10.5.2   The Experience of the Bilingual Secondary School, Tec de Monterrey, Ciudad Juárez, Chihuahua, Mexico

Context The Bilingual Secondary School, Tec de Monterrey—located in the city of Ciudad Juárez, Chihuahua, Mexico—is part of the Tecnologico de Monterrey System. The institution has about 452 students, divided among 20 groups in three grade levels and 65 teachers. This institution also applied the FDM to guarantee academic continuity during this global health emergency.

Implementation The pandemic originated days before the Easter holidays. Therefore, the institution used those days (1 week) to plan and prepare the virtual modality, attending to the proposed model (FDM) of the Tecnologico de Monterrey

Table 10.2 Challenges identified by the Bilingual Secondary School, Carlos Darwin, according to the defined three main stakeholders at this educational level

Role	Identified challenges
Teachers	Constant teacher training
	Access to emerging platforms (full access)
	Challenge of migrating from the face-to-face classroom to digital formats
	Avoid intruders in virtual classes
	Ensure that students have acquired the expected knowledge
	Availability of suitable platforms
	Evaluation methods and tools to make online exams
Students	Constant failures in internet and electricity services
	Emotional attention
	Adequate use of tools
Parents	Lack of habit and training of technological platforms
	Flexibility in guidance of parents
	Parents being co-responsible for the learning process

University. The main strategy implemented to guarantee academic management, student monitoring, and academic continuity was the use of virtual classrooms with web conference platforms. This institution was also supported by "PrepaTec" campus Ciudad Juárez (high school of Tecnologico de Monterrey) since that institution has specific areas for teacher's training and information technologies support. Also, during the preparation week, a training program for the teachers was carried out to apply the stages that are recommended to transform a course into an FDM. This training program was mainly focused on the use of different technological tools and platforms.

Evaluation of Students As part of academic continuity, virtual classes were implemented. Nevertheless, classes were reduced by 75% to leave space so that the students were not connected all day (considering that they range in age from 12 to 15 years old). Teachers delivered online content and support through web conference platforms. Outside school hours, there were spaces available for advising in the subjects of mathematics and science. As was previously mentioned, there are three formal evaluation blocks during the academic period at the secondary education level. The contingency plan began with the beginning of the third block, so students completed projects to be evaluated in this last block. The delivery of activities has remained 90% delivered on time, another 6% delivered late, and about 20 students were irregular with their deliverables for a variety of reasons. Finally, some additional virtual platforms, such as Socrative, Quizlet, and Formative, were used to support these processes.

Learnings and Experiences The main learnings and experiences are presented below:

- There was good participation and attitude on the part of the teachers in the face of the challenge of migrating from face-to-face formats to digital formats.
- The variety of teaching tools used was increased.
- Most of the students, supervised at home or not, were aware of their classes and the delivery of their activities.
- Most student developed skills and competencies for handling and organizing many tasks.
- Better use of class time improved student discipline.
- It worked to check if the students were fine and to give them a little encouragement and hope when they needed it (improving their mood).
- There are teachers who have been unable to adapt and restructure their programs, giving too much "homework" work and giving long explanations in one session.
- Unfortunately, the student with the greatest need was not physically close, and his academic follow-up was difficult. Students with less maturity and little organizational and self-management skills were the most affected due to the large number of distractions they have at home as well as the lack of accompaniment.

Challenges The challenges identified for this institution are summarized in Table 10.3.

Table 10.3 Challenges identified by the Bilingual Secondary School, Tec de Monterrey, according to the defined three main stakeholders at this education level

Role	Identified challenges
Teachers	Find the ideal balance between remote connections and activities
	Evaluation of platforms for the application of exams
	Implementation of a specialized IT department
	Better management of class time
	Monitoring the mental health and well-being of teachers
Students	New engagement methods (due to the large number of distractions they have at home and the lack of accompaniment)
	Improve academic monitoring strategies
	Programs for attend anxiety and frustration on students
Parents	Attend parent anxiety and frustration
	Lack of a digital culture of parents
	Student discipline support during classes

10.6   Discussion

Great challenges continue to arise not only in pedagogical practices but also in academic management processes. That is why today the design of new teaching-learning models and the design of good academic management practices—that incorporate emerging technologies in combination with appropriate activities, learning methods, and practices—need to be strengthened. Similarly, special attention is required for the key stakeholders in educational processes, including not only students and teachers but also parents and staff. Consequently, many areas of opportunity may emerge to serve the needs of key stakeholders, primarily at the elementary and secondary education levels. Finally, an opportunity is opening in research and development for the improvement of existing platforms, as well as the development of new technological tools and implementations considering areas such as remote labs and cyber-physical labs.

10.7   Conclusions

ICTs in Education 4.0 and specifically the use of virtualization and digitization tools in this sector have taken a relevant role, due to the global health emergency in 2020–2021 which has caused most students to re-join their classes through a distance learning format. Therefore, it was possible to design the Flexible-Digital Model (FDM) to ensure academic continuity in the different educational levels of this institution. Although the FDM was designed to be implemented in higher education, it was possible for it to be replicated in high school and secondary education levels. Due to the nature of each education level, the proposed model had to be adapted. The main reason is related to the different stages of life that students cross. In the case of the secondary level, some activities were redesigned to adapt to the

requirement of students at this level and at these ages (12–15 years old). However, three relevant issues were observed to necessitate improvement during the implementation of the FDM at the secondary level: (i) the lack of connectivity and tools, (ii) the lack of a digital culture of teachers, students, and tutors/parents, and (iii) the lack of standard security programs related to minors in front of a webcam.

A general evaluation presented by the Tecnologico de Monterrey about the implementation of the FDM shows that most of the students (63%) are very satisfied with the interaction with their teachers. Regarding the model and their learning experience, 44% of the students said they were very satisfied or satisfied, 35% gave a neutral opinion, and 21% were unsatisfied or very unsatisfied. The most frequent comments of dissatisfaction were about the workload and the duration of the classes.

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Arturo Molina is Vice-Rector of Research and Technology Transfer and Researcher Professor at Tecnologico de Monterrey University in Mexico. He received the B.Eng. Degree in computational systems and the M.Eng. degree in computational sciences from the Tecnologico de Monterrey and his Ph.D. degree in Manufacturing Engineering at the Loughborough University of Technology and a University Doctor Degree in Mechanical Engineering at Technical University of Budapest, Hungary. He has co-authored more than 300 research articles and several inventions. His current research interests include concurrent engineering technologies and manufacturing, enterprise integration engineering, and technology management. He has applied research and development for the economic sectors of automotive, construction, and energy. He is a member of the Mexican National Researchers System, the Mexican Academy of Science, and the Mexican Academy of Engineering.

Beatriz Villegas has worked for the Tecnologico de Monterrey for the last 30 years in different academic areas from higher education to secondary school level. For the last 18 years, she has been the School Principal of the Secundaria Bilingüe Carlos Darwin of the Tecnologico de Monterrey in Irapuato, Mexico. She received a bachelor's degree in Communication Sciences, and a master's degree in Education specialized in cognitive processes. She is certified as an Ontological Coach from the Newfield Consulting Group.

César Pavel Ochoa has a professional career at Tecnologico de Monterrey for 15 years, collaborating at the secondary level where he held positions of teacher, group tutor, coordinator of the IT area, admissions, and school control. He is currently the Director of the Bilingual Secondary School, Tec de Monterrey, Ciudad Juárez, Chihuahua, Mexico. He graduated as a Computer Systems Engineer from the Autonomous University of Chihuahua and has a master's degree in Telecommunications Administration from the Tecnologico de Monterrey. In his career, he has participated in the academic quality committees at the Tecnologico de Monterrey Campus Chihuahua and the implementation of the Olweus and Character Education programs at the Chihuahua Campus and Ciudad Juárez Campus.

Jhonattan Miranda is a Researcher in the Product Innovation Research Group at the Tecnologico de Monterrey University in Mexico. He received the B. Eng. degree in Mechatronics from the Tecnologico Nacional de México, Ciudad-Hidalgo Campus, Michoacan. His postgraduate studies were carried out at the Tecnologico de Monterrey, and he received an M.Sc. and a Ph.D. in Engineering Sciences with a concentration in Manufacturing Systems and Product Design, respectively. During his postgraduate studies, he was a visiting scholar at the Tecnologico de Costa Rica and the University of California, Berkeley. His current research interests include product design, open innovation, entrepreneurship, and educational innovation. He has co-authored different research articles in Manufacturing and Education and has a patent in micromachining. He is a member of the National Researchers System of Mexico.

Chapter 11
University of Guadalajara: Transforming and Innovating Through Stronger Collaboration Between Higher and Upper-Secondary Education During the Pandemic

Carlos Iván Moreno, Cesar Barba Delgadillo, Miguel Ángel Sigala, and Ernesto Herrera Cárdenas

Abstract This chapter examines the context of higher education and upper-secondary education in Mexico, focusing on the role of the University of Guadalajara – the second largest in the country – and its response to the pandemic by strengthening collaboration with the upper-secondary system.

During the pandemic, the lack of articulation between higher education and upper-secondary education posed a challenge for the transition to online education in the University of Guadalajara. This chapter discusses how the different initiatives advanced by the University to face this unprecedented situation helped to reduce the barriers between these levels and led to academic innovation, resulting in valuable discussions on the educational model and teaching practices for the post-Covid-19 world.

Finally, the authors reflect on the views of faculty regarding the need for an innovative educational model, concluding that a closer collaboration between systems is needed for the benefit of students and faculty.

C. I. Moreno (✉) · C. B. Delgadillo · M. Á. Sigala · E. H. Cárdenas
Universidad de Guadalajara, Guadalajara, Mexico

11.1 National Context of Mexican Upper-Secondary and Higher Education

Mexican education authorities have made important efforts to widen access and improve the quality of higher education in recent years. As a result, from 2012 to 2018, enrollment in Mexican universities increased by almost 800,000 students (ANUIES, 2019). Additionally, a constitutional reform in 2019 made higher education compulsory and free by law. Although full gratuity and coverage are not near realities due to national fiscal constraints,[1] this legislation is a milestone toward complete access to higher education in the future (Tuirán, 2019).

However, the higher education accessibility gap among the Mexican population remains one of the most pressing challenges for the country, as higher education excludes millions of young people and enrollment rates remain comparatively low. In fact, among OECD countries, the average higher education enrollment rate is 59%, while Mexico's is only 39.7% (Secretaría de Educación Pública, 2019); in the Latin American (LATAM) context, Mexico performs 6 percentage points below the regional mean of 45% (OECD, 2020). The magnitude of the challenge is exemplified in that only 56.3% of the inhabitants hold an upper-secondary education diploma and just 26% of young adults are expected to obtain a bachelor's degree. Moreover, 83% of those between 25 and 64 years old have not attended a higher education institution (OECD, 2020).

11.2 Challenges for Higher Education Institutions

Besides the tremendous disruption caused by the Covid-19 crisis, higher education institutions worldwide face a series of challenges that require urgent attention. On one hand, automation and advances in artificial intelligence are expected to change the future of work in a significant way, and as a result, 14% of jobs could be automated in the next 15–20 years. This means that 375 million workers worldwide will be forced to change occupations by 2030 (McKinsey Global Institute, 2017). Thus, higher education institutions must prepare a greater number of students in STEM areas. Careers in STEM offer higher salaries than many traditional careers (OCDE, 2016). Increasing enrollment in these areas is both urgent and necessary; with better-paid graduates, universities can better fulfill their mission to facilitate social mobility. However, despite career guidance efforts, students continue to enroll in traditional careers, for which there are fewer available jobs. In Mexico, for instance, 43% of enrollment is concentrated in Social Sciences, Law, and Administration (ANUIES, 2019). Those same fields represent 35% of the total enrollment in Argentina, 42% in Brazil, and 47% in Colombia, indicating a structural problem in LATAM (OCDE, 2016).

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[1] According to the Ministry of Finance, fiscal revenue in 2020 was projected to reach 13.4% of GDP, one of the lowest rates in Latin America and other OECD countries.

A hypothesis for this discrepancy between supply of graduates in various fields and occupations and demand for such graduates is the lack of structural connection between higher education and upper-secondary schools, which is a characteristic of Mexican and other LATAM countries' educational systems. Often, students do not know about higher education alternatives until they are enrolled in a particular career, at which point it is too late because transfer across careers is very challenging, if not impossible. The chronic disconnection between higher education (HE) and upper-secondary schools (USE) is the topic of this chapter, in which we present a case of collaboration between these two systems at the University of Guadalajara to better face the challenges from the Covid-19 crisis on teaching and learning practices.

11.3 The University of Guadalajara's Context

The University of Guadalajara (UdeG), also known as the University Network of Jalisco, is the second-largest public university in Mexico and considered to be the best public state university in terms of academic quality and relevance (according to QS and THE rankings). Its geographically distributed network of campuses allows the university to cover 109 of the 125 municipalities of Jalisco, therefore meeting the educational needs in nearly every region of the state. Like many universities in Mexico and LATAM, the University of Guadalajara also includes an upper-secondary system, and as is the case with other universities, there is a lack of systemic collaboration between the higher education institutions and their associated schools within the same university.[2]

With 15 campuses and 71 upper-secondary schools across the state of Jalisco, and an Online University System, UdeG enrolls a total of 291,600 students (161,357 upper-secondary students and 130,243 undergraduate and graduate students) (Universidad de Guadalajara, 2020a). The upper-secondary system (SEMS, its acronym in Spanish) is the largest system in the country at this level; it constitutes around 25% of the *public* enrollment nationwide and 50% of the *total* enrollment in the state of Jalisco (ANUIES, 2019) (Fig. 11.1).[3]

SEMS is also one of the most quality-oriented upper-secondary systems in the country. Since 2008, the Mexican government implemented a policy of quality certification for upper-secondary schools, measuring the status of teacher training, infrastructure, and procedural consistency. By adopting this national policy, SEMS became a leader of these standards, with active participation both in the discussions for what would later become the Common Curricular Framework and in the design of the national training strategy to standardize the pedagogical competencies of teachers at this educational level. Notwithstanding the quality credentials of SEMS,

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[2] More than half of public state universities in Mexico, along with the National Autonomous University (UNAM), run upper-secondary schools.

[3] Calculations based on: ANUIES. (2019). Anuarios Estadísticos de Educación Superior 2018–2019. Available from: http://www.anuies.mx/informacion-y-servicios/informacion-estadistica-de-educacion-superior/anuario-estadistico-de-educacion-superior
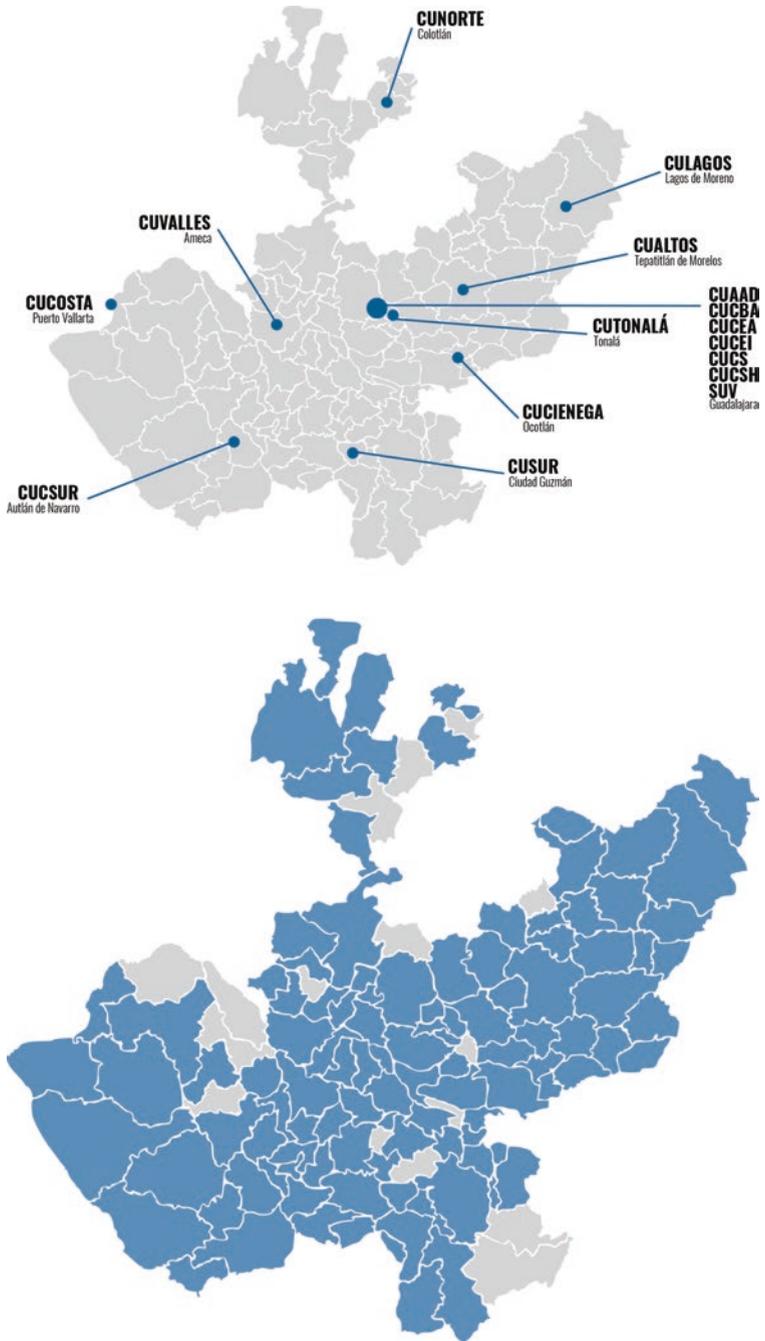
Fig. 11.1 University of Guadalajara, the University Network of Jalisco

this case study's theory of action is that increased structural collaboration between higher education and SEMS can help mitigate the negative consequences of the pandemic.

11.4 Internal Governance and Collaboration Within UdeG

One of the main challenges for the university was the initial lack of systematic academic collaboration between the upper-secondary and higher education systems; although they are both part of UdeG, they do not usually cooperate. Ironically, both systems are recognized for their academic quality and relevance *individually*, but they seldom launch joint academic endeavors.

Part of this situation is due to internal governance. The University's organizational structure is composed of two main governmental bodies: The University Senate and the Council of Rectors. The Senate gathers representatives from three main groups: students, faculty, and administrative staff. Furthermore, each university campus and upper-secondary system has its own Council or Senate to deal with their affairs.

On the other hand, the Council of Rectors is the main executive body, comprised of rectors (chancellors) from each of the 15 campuses, the online system, and the upper-secondary system (SEMS). Unlike the Senate, the decisions made by the Council of Rectors are not legally binding, although its planning and consulting powers make this Council essential for university affairs. The Council of Rectors' mechanism of decision-making operates under the logic of one-person one-vote. While a democratic concept, it also highlights institutional inequities between the upper-secondary system and the higher education system, as the higher education level holds 16 out of 20 votes compared to one vote for the upper-secondary system.

Inequality, inconsistency and insufficient communication characterize the relationship between the two systems, producing other problems such as reduced collaboration between professors and students and loosely connected academic models. However, the pandemic triggered more systems-level collaboration to mitigate negative impacts on teaching and learning and incentivize innovation and alignment of educational models for the benefit of students and their academic success.

11.5 The Impacts of Covid-19: Online Transition in a Macro University

In Mexico, universities led the implementation of drastic measures to face the Covid-19 pandemic. On March 13, 2020, with only 15 confirmed cases in the country – and during uncertainty regarding the federal government's crisis response – the University of Guadalajara decided to cease face-to-face activities and announce the transition to online instruction. It was the first public university to implement this drastic but necessary decision. Following suit, other Higher Education Institutions

(HEI), including the National University (UNAM), announced the suspension of in-class instruction. As a result of the health emergency, more than 4.3 million students nationwide transitioned to the online education model. None were prepared to do so, and the most negatively impacted students were in the upper-secondary system.

The challenge was significant for a macro university. The disruption migrated roughly 60,000 courses to online instruction. The transition exacerbated some of the problems that already existed at the university, such as the insufficient Internet and technology access and skills to use them for teaching and learning among the academic community of professors and students. For instance, 32% of university students do not have a computer at home. In the upper-secondary system, 43% of students do not have a computer, and 23% do not have an Internet connection. These gaps in technological skill and Internet access presented a tremendous challenge for a successful transition to online education.

The University of Guadalajara launched a myriad of initiatives to face the pandemic and mitigate its negative effects within the university and in the broader context of Jalisco (see Table 11.1). However, the focus of this case study is the pedagogical intervention with upper-secondary professors, to mitigate the impacts of the pandemic on teaching and learning practices.

Table 11.1 Projects and initiatives of UdeG to face the pandemic

	"From Home" This project loaned laptops and tablets to students without a computer. In 3 months, this initiative allowed the university to distribute approximately 2100 computers to students from across the state of Jalisco, around 800 of which were distributed to upper-secondary school students. Thanks to this initiative, students successfully completed the semester online
For students	**Portal "The University vs Covid-19"** This portal was created to keep the academic community and broader society informed about the development and status of academic and administrative activities and useful teaching resources such as webinars, tutorials, and online courses for teachers and students. Site: http://www.udg.mx/es/tics-covid19/udgvscovid19
	Guidelines for the semester's evaluation The university implemented flexible criteria to assess students, especially those more affected by the Covid-19 crisis. The heterogeneity of the students' social, economic, and geographical backgrounds compelled the institution to adopt flexible standards within vulnerable populations
For faculty members	**Online training program for faculty** Developed by UdeG's Online University System (SUV), the training program provided professors and students the tools to face the transition to virtual teaching. This portal includes a series of tutorials to help professors design their online courses – introducing online platforms such as Moodle, Zoom, Google Classroom, Google Hangouts, and Google Meet, among others – and upload material, projects, and as well as register their students and schedule videoconferences
	Educational Innovation Network 360 (RIE) Nine Mexican Higher Education Institutions supplemented the existing Network for Innovative Education (RIE), a repository that gathers the universities' educational resources, teaching tools, online courses, digital collections, and libraries with open access for professors around the country at all educational levels. Site: http://rie360.mx/

Table 11.1 (continued)

For the community at large	**Webinars UdeG** As the pandemic's health complications have drastically affected the world's economic and social ecosystem, UdeG has offered a series of webinars focused on the educational, economic, and social impacts of Covid-19. Through these webinars, UdeG sought to mitigate the impact of the pandemic on different sectors of society. At least four of these webinars are focused on strategies to help education systems and professors cope with the pandemic. Site: http://www.webinars.udg.mx/
	UdeG's Covid-19 Situation Room The Health Sciences Campus of UdeG implemented the *UdeG's Covid-19 Situation Room*, comprised of academics and specialists in several fields including epidemiology and molecular biology. Its main purpose was to disseminate timely communication with the community about Covid-19 statistics and preventative measures. The Situation Room's recommendations to "flatten the curve" influenced the state government's virus prevention strategies and decisions
	Jalisco Active Radar Detection System (in collaboration with the state's government) This initiative aimed to offer 500 Covid-19 tests per day, with up to five thousand free tests sponsored by the university. UdeG set up a call center for people with Covid-19 symptoms, giving them the option to book an appointment at one of the multiple testing sites, which were associated with three diagnostic laboratories. This public health initiative through the university represented a paradigm shift in the detection of new cases
	Voluntary Isolation Center (in collaboration with the state's government) This center, located in UdeG's Villa Primavera Hotel, was available only for those with asymptomatic or mild cases of Covid-19 who cannot live at home due to their circumstances. Through this initiative, UdeG and the state's government aimed to reduce the risk of spreading the virus
	Campaign "Help others to stay at home" UdeG invited its academic and administrative staff to donate part of their salaries to purchase necessities, such as food and cleaning products, to the families of the students who lived in vulnerable situations due to the pandemic (Universidad de Guadalajara, 2020c. The community of UdeG responded enthusiastically, and soon approximately 10,000 workers had made their donations, raising approximately 13.5 million pesos (around 600,000 USD), and assisting 30,000 underprivileged families. The State's government joined this initiative, publicizing and supplementing it, through the program "Jalisco Without Hunger," doubling the number of donations to reach 60,000 households

11.6 SEMS's Academic Response to Online Transition

Within the University Network, the SEMS pandemic response was quick and based on the specific characteristics and needs of their students, but generally independent from the higher education system. In this regard, SEMS's community took an eclectic approach by using some courses from other preparatory schools and communicating with students on social media such as Facebook and WhatsApp.

In addition, SEMS's Office for Teacher Training and Research launched the course "Tools for Distance Learning," informing professors on the means and resources for distance learning and emphasizing the main aspects for implementation of online courses. Over 1450 teachers from SEMS enrolled in this course.

To understand the situation of each preparatory school's academic in the transition, SEMS carried out a follow-up process and created two perception surveys: one for students and another for professors. These surveys revealed the specific conditions that the respondents were facing and their opinions regarding the abrupt online transition and the pandemic initiatives. These surveys revealed that 84% of the professors were using a digital platform for the development of online courses, although 62% stated that they have had some difficulties in using the different tools to continue their courses. The difficulties perceived by teachers underscored their stress levels resulting from insufficient prior experience and skills using technology for teaching. Likewise, in the student survey, 86% of respondents stated that their teachers established strategies to continue the class remotely; however, 64% said that they had difficulties in carrying out their activities online, while 44% expressed that they did not know how to use the different platforms.

The training initiatives offered permanently to faculty members of UdeG support the adaptation to the new educational challenges, aiding their adequate response and flexibility to new circumstances throughout this health emergency. Nonetheless, it is important to note that the online transition has not only required the use of computer tools and training faculty in this regard, but also required an ambitious process of teacher training to achieve the development of pedagogical strategies that allow for quality interactions between students and teachers.

11.7   Academic Innovation Through Collaborative Teacher Training Between Higher Education and SEMS: Rethinking Our Educational Model in the Face of the Pandemic

The pandemic represented an urgent challenge to rapidly re-train faculty to manage the online teaching transition, especially at the upper-secondary level. As a university network with decentralized campuses and systems, the heterogeneous responses resulted in some campuses better prepared than others to cope with the virtual teaching environment. The pandemic also represented an opportunity to rethink the academic model, with renewed collaboration between the upper-secondary schools and higher education campuses to potentially reduce the cultural and imaginary barriers between the two systems.

By the end of March, during intense discussions regarding rapid trainings for our professors and academic model restructuring, we decided that the situation involved a massive scale. UdeG has over 17,000 professors, 8000 of which are at the upper-secondary level. Of those, approximately 6000 are full-time professors; 1700 of those work for SEMS. We needed a rapid and substantial intervention to reach the full-time professors as the first stage.

With those considerations, the Chief Academic and Innovation Office of UdeG and the directorate of SEMS proposed an online training program to our University President, one that could reach 6000 full-time professors. This program was

designed in collaboration with one of our key international partners, Arizona State University (ASU), which is regarded as the most innovative university in the United States and a leader in online and digital learning. This six-week online academic program, called "The Era of Active Learning," was an unprecedented initiative for massive training for both higher education and upper-secondary education faculty. It was the first time our two systems were discussing and rethinking the academic model and challenges of the University *together,* as a single institution.

"The Era of Active Learning" program was facilitated by experts from ASU and supported by 160 UdeG's academic advisors and mentors, especially from our Online University System (SUV), to support more than 3000 professors from the first of two cohorts of this program.[4]

This program was aimed at encouraging reflection and discussion around active and adaptive learning in online educational contexts, blended models, and in situations where the use of technology is either not possible or not even an option. Most importantly, this course was not made for professors with previous experience in the use of technologies but for any faculty members interested in better navigating the online transition.

Roughly 1000 SEMS professors and 2000 higher education professors registered in the first phase. The joint experience has allowed professors to interact and share ideas, experiences, and practices about teaching and online education. In addition, the learning environment created in Google Classroom encouraged professors to discuss important topics on the future of higher education, the relevance of their job, and the focus on student achievement. *The important lesson of this case study is that, for the first time in many years, a teacher-training program was designed without separating SEMS and the higher education system, instead promoting their joint discussion on the pedagogical and organizational challenges to better face the pandemic's disruption* (Fig. 11.2).
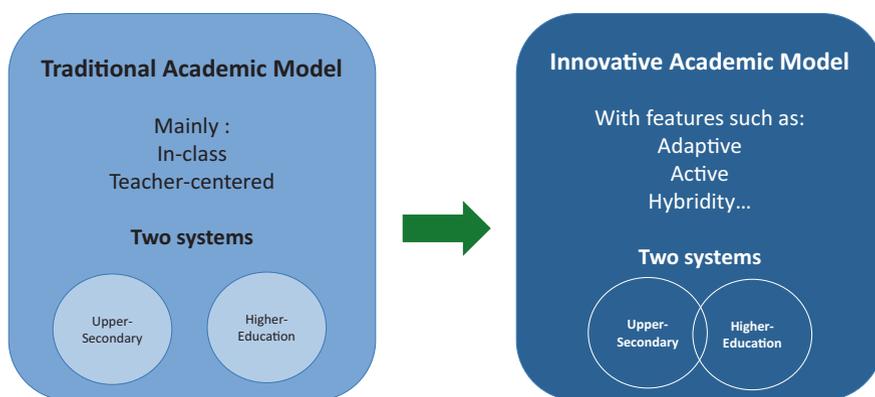

Fig. 11.2 An innovative academic model for UdeG

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[4] The 2nd cohort will be offered in August to the remaining 3000 professors.

11.8 What Does Our Faculty Think? The Emerging Discussion Over an Innovative Educational Model and the Articulation Between Systems

The discussions and dialogues occurring throughout this learning experience have been a reminder of the urgent need – and convenience – to transform our model for the "new post-pandemic normal" through deeper collaboration between SEMS and the higher education system for the benefit of our students in the transition from upper-secondary to higher education.

To collect empirical evidence for this case study and to support institutional decision-making processes, we implemented an evaluation through a survey and a focus group. In this section, we present some results on the perception of faculty from both systems. During the Fall 2021 semester, we will survey the students to gather data on the impacts of this learning intervention.

Four important findings resulted from this exercise: an emerging discussion over an innovative educational model, a consensus on the need for closer collaboration between the two systems, an idea of generating equal and similar training programs for all faculty, and an identification of some challenges and subsequent proposals. The consensus is that the pandemic has forced the university to better integrate these two systems for the benefit of both SEMS and HE students and professors. More importantly, this determination is supported from the bottom up, not just from the top down.

A. **"The Ideal Class for Every Student": The Emerging Discussion over an Innovative Educational Model**

The environment created by the teacher training programs has prompted a discussion on how to innovate the University's academic model. The traditional in-class, teacher-centered approach has garnered criticism due to its inefficacy in online teaching.

Moreover, the current academic breakthrough has allowed many professors to communicate for the first time with educational technological resources such as Moodle, Google Classroom, and Zoom, and therefore begin discussions on different ideas and concepts related to academic models and online education. Furthermore, thousands of teachers who have at least some backgrounds over online and blended education are taking the reflections further toward the reconceptualization of dominant pedagogical strategies.

Thus, the discussion has been centered not only on how to attain a more innovative academic model with adaptive, active, and hybrid features, but also on how to better articulate the upper-secondary and higher education systems. Naturally, the new model is expected to allow UdeG to improve the quality of the education delivered and therefore to graduate more competent students across all academic levels.

According to some professors, the characteristics of an innovative model are very relevant. For instance, Professor L.A.S. stated that:

Definitively, active, and adaptive learning is the present and future of education; it is not only important to make teachers' jobs easier, but mainly to influence even more students' learning in the subject they need most.

Likewise, Professor C.R.V.L. said that:

Adaptive learning is the ideal class for every student since adapting to each student's knowledge and skills will help them to achieve better learning outcomes.

In addition, J.E.R, complemented:

Adaptive learning is a very good option to help the students who did not develop enough skills in the previous academic level.

An academic model with hybrid and adaptive features facilitated the online transition caused by the Covid-19 crisis, and it is also transforming mindsets within the academic community:

S.O.V expressed that:

Adaptive learning models allow to meet the needs and exigencies of new generations of students.

On the hybrid model, Teacher A.R. believed that:

The hybrid model could be easily adapted to the context we are currently facing, and it will certainly become a very important system for the learning-teaching process soon. This model merges the best of the in-person and the online models, encouraging the students to participate actively in their learning process, developing self-study, autonomy, and the use of information technologies.

    This model leads teachers to use different platforms to structure their courses, implementing strategies such as the flipped classroom, where teachers change their leading role by solving doubts, organizing debates, and deepening knowledge, seeking to improve their students' learning.

Similarly, Professor M.R.G. stated that:

Implementing the hybrid model is both a challenge and a commitment for teachers since it requires professors to redesign their instruction strategies. It is not only about sharing concepts and definitions, but it also involves preparing students to face life and make the best decisions, prepare them for the labor market and, above all, encourage them to always have the desire to learn and excel, to be self-sufficient, and develop their knowledge and skills and put these aspects into practice.

Importantly, M.I. reflected about the teacher's role in this new model:

[Training programs] made me realize that professors must never stop learning and must apply different models according to the needs of their students. It is important to use the resources that are already available and be creative to face the challenges of education at our university.

B. **"Unite as a University": Closer Collaboration Between Upper-Secondary and Higher Education Systems Is Needed**

Although there was a structural disarticulation in the University, no internal joint efforts had been implemented yet to fix that problem. Instead, this lack of connection and minimal collaboration had reflected the separated educational levels (SEMS

is perceived as the younger brother of the HE system). The pandemic is changing that perception. As the following statements show, the professors who participated in the focus group emphasized the need to work together *as a single university* to better educate students.[5]

Professor T.T. stated that:

> The pandemic and its consequences in the educational sector, allowed us to unite as a university and share experiences with other professors to find out what works and what does not work, enriching thus the transition process to online education.

Likewise, according to Professor R.M.:

> Although this course was created to respond to the current situation, we are facing due to Covid-19, it has certainly been very significant for all teachers. The fact that there are both SEMS and higher education teachers in this course allows us to see what the successful experiences of higher education professors are, and which can be helpful for teachers of upper-secondary education.

Similarly, E.H. highlighted that:

> *Initiatives like the one implemented by the Academic and Innovation Office and SEMS* [common training programs] *promote the integration of learning communities inside the University of Guadalajara, regardless of the educational level.*

C. **"Break Down the Walls": The Generation of Equal and Alike Training Programs**

Despite the noticeable differences that feature upper-secondary education and higher education, the focus group's participants discussed the need to build common teaching capacities among the academic community of UdeG. Although this was an approach defended mainly by the professors of SEMS, the higher education faculty members supported it too.

Professors from the upper-secondary level spoke more profusely. In T.T.'s words:

> This confinement made us realize that both, SEMS, and higher education professors, are equals. I have experienced and perceived a significant disconnection in the past between these educational levels, even though we are in the same university, and when I started the course taught by ASU, I felt a little strange. However, when we are interacting with each other we are equals, we even require the same training and we have been equally affected during this contingency.
>
> If we are talking about teachers, no matter what level they are at, we must all have pedagogical strategies and technological tools to innovate. Therefore, these courses should be available for every professor at the University of Guadalajara, regardless of the area and educational level in which they are.
>
> Teacher training initiatives are important for the University of Guadalajara, particularly because they have proven to be useful to ensure that teachers act more as teachers regardless of their professional background.
>
> Teachers face the same issues, regardless of the educational level they teach. This course allowed us to communicate with other professors, sharing our experiences and problems faced during the online transition.

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[5] The professors' statements will be identified by their initials.

V.D., an upper-secondary professor, explained the idea in these terms:

> We must have pedagogical strategies and technological tools equally, both for professors of SEMS and those in higher education. We are all teachers of UdeG and have the same needs, and we need to be offered courses available for the whole academic community to teach us how to make a good video, how to make a good questionnaire or reflection questions, how to upload them to the platform for our students to answer them, which platform is the most suitable for our course, how to apply online exams, among other aspects. Likewise, it is important that all professors at the University of Guadalajara learn how to teach online, how to develop good skills and learning strategies, and how to write good instructions so that students answer correctly and do the activities that the professor asks for.

Two additional professors from higher education shared that:

> S.F.: There is a big gap in the use and knowledge of educational platforms between levels. However, the technological tools should be the same for all and the university should help professors to achieve this.
>
> M.H.: These training courses have been very helpful to prepare us and to break down these walls that exist between one level and the other. It was difficult for many teachers to migrate their courses to the online modality. It is important to note that what can be useful for the instruction at one level, can work on the other in the same way.

D. "Make the Transition Between Levels Easier for Students": Challenges and Proposals

To address the structural disconnection between the two educational levels, the focus group's participants noted several challenges and suggested some ideas to strengthen collaboration. Concerns related to the need for more leadership and involvement of the University's central authorities, common training programs for both levels, and joint efforts to improve the upper-secondary students' education.

In this sense, V.D. mentioned that:

> First, it is very important to me that a training course for both upper-secondary and higher education is being undertaken for the first time. I have taught at both levels and have experienced first-hand the low level of collaboration between systems. Despite the efforts of some prep schools to create links with the different university centers of UdeG, none have succeeded.
>
> I believe that the authorities of the University of Guadalajara should generate that synergy in which teachers at both levels can receive this type of training and engage in joint learning communities.
>
> This pandemic has shown us that teachers of all levels must have their courses available online. Those of us who lack the technological skills to have our courses online must have support. We need training. It is very important for the University of Guadalajara to continue offering massive training courses equally for upper-secondary and higher education professors.

B.V. emphasized the there is an opportunity to prepare prep school students better, increasing their access to higher education:

> I think that the joint work between upper-secondary and higher education systems is important. If we worked together at both levels, some areas of opportunity that have already been identified with respect to the students could be strengthened. Likewise, working together could make the transition between levels easier for students, allowing teachers to identify and give more attention to those students who need more help.

On training programs, T.T. stated that:

> A common program for professional development should be created for all teachers at the University of Guadalajara, regardless of the educational level at which they teach. SEMS has its own program of teacher training, which offers courses for the teachers at the upper-secondary level. We should integrate better.

Likewise, more specific strategies were mentioned, M.H.:

> By identifying the needs of both levels, the University of Guadalajara can create common repositories with the materials that could be helpful to fulfill these needs, making these materials available for all the academic community of UdeG, including faculty and students.
>
> Communication channels could be created in collaboration with the upper-secondary level so that not only the weaknesses of the students that we identify at the higher education level, but also the weaknesses that have been identified before by the upper-secondary professors can be addressed, allowing us to create a balance among our students.
>
> Furthermore, higher education teachers could help upper-secondary ones to create materials that can be useful in their classes. In that sense, the creation of common repositories could be a very good opportunity for our university.

11.9   Conclusions

No single institution worldwide was prepared for the Covid-19 pandemic. Universities are solving problems and learning in the process. One current ongoing challenge is to develop academic continuity strategies for the fall semester to minimize risk and maximize learning experiences. But this immediate concern must not obscure the most important one: the mid- and long-term transformation of our universities for the benefit of our students and society at large.

Crises are superb opportunities to accelerate necessary changes. At the University of Guadalajara, we face the same difficulties as before Covid-19, but those challenges have become more pressing. One of those challenges is the one presented in this case study: the need to improve the learning outcomes and the academic transition of our students through a better collaboration between higher education and preparatory schools. The pandemic presents a unique opportunity to overcome resistance and persistence in addressing a situation that needed attention long ago.

The case study presented is only an example of the many areas in which SEMS and the HE system of UdeG must work closer together for the benefit of our students and professors. A collaborative path has been presented by a teacher training program, aimed at improving the learning experiences of both upper-secondary and higher education students during the pandemic. It is now our responsibility as executives to build on this momentum and develop more structural approaches for irreversible articulation. UdeG is a single university, and we need to develop a coherent academic model, one that is more active, adaptive, and technologically rich. Our preparatory and higher education students, as well as our professors, need to have the same educational experience. In this sense, we simply cannot return to the "status quo."

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Dr. Carlos Iván Moreno earned his B.A. in finance at the University of Guadalajara. He also holds a master's degree in Public Administration from the University of New Mexico (USA) and a Ph.D. in Public Policy from the University of Illinois-Chicago. He was a doctoral fellow at the Harris School of Public Policy in the University of Chicago and at the Kellogg School of Management in Northwestern University. He is a professor of Public Policy and Organizational Studies at UdeG-CUCEA and a National Researcher (SNI-I). He has held different positions at the University such as Executive Vice President, and now he serves as Chief Academic and Innovation Officer.

Cesar Barba Delgadillo holds a Bachelor and a master's degree in Law with a specialization in Administration of Justice and Public Security, from the University of Guadalajara. He is currently a full-time professor at the University of Guadalajara and director of the Upper Middle Education System (SEMS). In the University he has also served as General Coordinator of University Services, member of the General University Council, the highest governing body of the University of Guadalajara, and president of the Federation of University Students, the largest student organization in Latin America.

Miguel Ángel Sigala holds a master's degree in Social Science, as well as a bachelor's degree in International Studies, both from the University of Guadalajara. He has developed his professional career in that University as professor but also as project leader in the administration. Currently, he is the Technical Secretary at the office of the Provost and worked in the international office (2016–2019) as program coordinator and vice-provost. Also, he is professor at the Department of International Studies, teaching Comparative Politics and International Relations Theory (IR); among his relevant publications are book chapters about Constructivism in IR Theory and about universities as international actors.

Ernesto Herrera Cárdenas holds a master's degree in Politics and Public Management from ITESO and a PhD in Education for Integration and Sustainable Human Development from the University of Valladolid, Spain. At the University of Guadalajara, he has served as Academic Secretary and Internal Auditor of the Quality Management System of the University Center of La Ciénega (CUCIENEGA). He is currently a Professor at CUCIENEGA and, since 2013, has served as Academic Secretary of the Upper Middle Education System.

Chapter 12
University as State Agent or Social Actor: Al Akhawayn University and Social Responsibility

Mohammed Dahbi and Hassane Darhmaoui

Abstract University Social Responsibility (USR) has been addressed in the academic literature and in professional educational meetings only in the last 10–15 years, but it is far from being unanimously accepted as part of a university's mission. A university is all about serving society anyway; its mission has always been to educate people, to train professionals, and to prepare young men and women for their roles as good citizens of their countries and of the world. So, what other social role is a university to serve that it does not? This issue becomes more acute and compelling when society's expectations of service from higher education institutions has to do with K-12 school education, as is the situation for the Covid-19 pandemic. The chapter considers the case of Al Akhawayn University (AUI) in Ifrane, Morocco (AUI), a university that has been established by the State as the first public, autonomous, non-governmental institution of higher education in the country. We describe several social roles that the university has taken on in its host region as well as nationally, most notably during the Covid-19 pandemic, and we argue that AUI has been able to do so because of its autonomy and its special legal status. We claim that non-autonomous state universities are not able to use the full potential of their sophisticated faculty and staff to contribute to the development of the country, and we call for the transformation of state universities into autonomous institutions that are able to serve their full Social Actor role and comply with their University Social Responsibility duties.

12.1 Introduction

Al Akhawayn University in Ifrane (AUI), Morocco, was inaugurated in January 1995 (www.aui.ma). In the poor, mountainous, rural area where the university campus is located, several student and faculty-led projects have aimed to alleviate

M. Dahbi (✉) · H. Darhmaoui
Al Akhawayn University in Ifrane, Ifrane, Morocco
e-mail: M.Dahbi@aui.ma

poverty and exclusion, especially in K-12 education. Many of these projects have benefited primary schools in the area, and some have even had a national impact, including the context of the current Covid-19 pandemic crisis. The chapter describes a few of the projects that have had an important impact and have continued to serve the needs of K-12 populations during the pandemic. The chapter addresses the following questions:

- Do these projects fit the role and purpose of a university?
- What objectives have these actions had, and what are the motives that moved faculty and students to act this way?
- Are these motives part of the declared mission of the university? Are they stated explicitly or are they part of unstated societal expectations?

In addition to these questions, the chapter will construct a coherent response that may be placed within a theoretical framework that considers a university's mission in a developing country like Morocco. Considering the varying statuses of higher education institutions in Morocco, from government universities to traditional and religious schools, and from non-profit institutions to private for-profit ones, one notices a clear change in the mission and outlook regarding the role of higher education in serving social needs. We propose to look at some of these outlooks as covering a continuum of social functions, ranging from a role as "State Agent" to a role as "Social Actor" depending on their affiliation with the government or their degree of institutional autonomy.

12.2   Al Akhawayn University

AUI's campus is in the Middle Atlas Mountains in the small town of Ifrane. It is surrounded by a thick forest with different varieties of oak and cedar trees. Economically, this mountainous area has benefited only from national tourism for its cool weather in the summertime and its snowfalls during the winter, which have been lighter and more irregular lately due to climate change. The rural communes in the area usually make a living from small to medium-size fruit tree agriculture, vegetables for local demand, sheep farming, and forestry. The lack of significant industrial and commercial activity has caused the area to suffer from poverty and economic stagnation. The decision to implant a national university with a large land endowment and a legal status that allows it to charge student tuition and fees has made a big difference in the region. AUI employs around 600 people, giving priority to hiring from the local workforce for small administrative, technical, and support needs. It has a student, faculty, and staff population of about 2500, representing different nationalities and coming from different parts of Morocco. As such, AUI is serving as a development engine contributing to empowering the economy of its host area while accomplishing its academic and scholarly mission.

The interest in K-12 education came naturally to AUI students and faculty because of the large contrast between a relatively rich and well-endowed institution, functioning with state-of-the-art levels of equipment and organization, on one hand,

and the poorly endowed public-school institutions in the area, on the other hand. Several student-led initiatives by student associations like Hand in Hand, a solidarity association, and clubs such as Rotaract helped build public school classrooms, repaired and equipped others, bought fully supplied school bags for children, and developed a good knowledge base about primary education. An example of a faculty-led project is CITI (Center for Information Technology Innovation), later renamed CLT (Center for Learning Technologies), led by a physics professor[1] who won a grant from the Korean International Cooperation Agency (KOICA) to develop distance education course materials for science subjects in public middle school. That was followed by a subcontract for national online teacher training course material supported by a USAID grant. Through these initiatives, the CLT and the university's distance education recording studio and post-production lab were developed and became available for the promotion of learning technologies in general and distance education projects. Other relevant projects include a student solidarity association building a rural school compound in the region, which includes a school, housing for staff, and a shop whose revenues serve to cover some of the basic needs of the school. A larger initiative led by a university president consisted of establishing a community development center in Azrou, the neighboring chief town with a much larger population and a much longer history in the area. The social contribution of the ACCD (Azrou Center for Community Development) will be covered in a separate section below.

AUI has had an affiliated K-12 school since day one; this is worth mentioning because it is an innovation in Morocco. ASI (Al Akhawayn School in Ifrane) has served and continues to serve the families of AUI faculty, staff, and other families in the region. It has also adopted an international model, closely related to the American school system in its organization and curriculum. It has no organic relations with the K-12 education system in Morocco except that it must observe some basic curricular requirements. The school is funded by student tuition and heavily subsidized by AUI for the benefit of its own faculty and staff.

These initiatives are unique in the higher education landscape in Morocco. AUI was designed to be a different university that functions in accordance with the requirements of new models of international higher education: "… a new university, whose organizational, pedagogical and scientific structures are inspired by the most effective models, and which is meant to be a forum for the creation and confrontation of human progress in all fields of knowledge as well as a framework for cooperation and understanding among peoples and civilizations."[2] This has led to a fully autonomous institution that escapes the control of the government department in charge of education. It is endowed by the state from public resources, but it is not managed as a public administration. As such, it does not need to abide by rules and regulations specific to public schools. It hires and fires its own faculty and

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[1] Prof. Hassane Darhmaoui, one of the two authors, continues to lead the Center for Learning Technologies.

[2] Quote from University Charter or *Dahir*. Last accessed at http://www.aui.ma/en/about/general/history-mission.html

administrative staff, and it is responsible for its own student outreach and recruiting. As a result, the university's mission and vision is in accordance with international standards, which has led it to pursue and gain international accreditation.[3] The autonomy and freedom of management that AUI has enjoyed have enabled its students and faculty to be innovative in the various ways a Moroccan university can serve its social responsibility.

12.3   University Social Responsibility (USR)

What is the role of universities in the development of their host country? There is a consensus that a university's mission is the production and dissemination of knowledge, otherwise referred to as "teaching and research." Usually, the social service expected from universities is to educate citizens in the arts and sciences and to train the professionals that society needs. This is especially true of public universities funded largely by state budgets. In Morocco, the state provides for university education just as it provides for pre-school, primary, and secondary school education. This has led to tightly delineated administrative territories where public schools and universities are not necessarily expected to cooperate. Each institution must keep to its own mission and attempt to reach defined objectives within the many constraints that it must operate in. University academics are especially expected not to "interfere" with school education. Academics are reminded that they have not been trained or licensed as teachers, and that their job is very different from the job of schoolteachers. Often, higher education and school education have different government administrations. Even teacher training colleges, which are part of post-secondary education, have often been integrated into ministries in charge of school education to keep university academics away from school management. The mission of public universities and public schools is decided in the ministerial decrees that establish them, and their scope of operation is expressed in terms of age, grade level, or even geography. To achieve their mission, universities are allocated the material, human, and financial resources needed, and they are usually rather limited in the number of resources that they can get from outside government allocations.

Therefore, in this context, the debate about University Social Responsibility (USR) seems quite irrelevant. On one hand, the university has a social role, which is its academic mission. The rest of the needs of society are the responsibility of the state. The university serves society in its role as a State Agent in charge of higher education.

The view from the European Union Commission is quite different. The final report of the EU-USR Project (see https://www.eu-usr.eu (2015))[4] puts very strong

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[3] AUI is fully accredited by NECHE/NEASC, and its engineering and business schools both acquired international program accreditations (ABET and EPASS).

[4] EU-USR Project. (2015). University Social Responsibility: A Common European Reference Framework FINAL PUBLIC REPORT OF THE EU–USR PROJECT, 52709–LLP–2012–1–RO–ERASMUS–ESIN FEBRUARY 2015. Accessed at www.eu-usr.eu 12 August 2020.

emphasis on the social dimension of higher education institutions. Although a European university's mission has always included the education of good citizens engaged for the good of their societies among its objectives (Zgaga, 2009 in www.eu-usr.eu),[5] the additional objectives that are part of USR now include direct action to contribute to community development. Reporting on a survey of a large variety of European universities to find out how higher education institutions have been involved concretely, Nejati et al. (2011 in www.eu-usr.eu)[6] says, "[o]ur thematic analysis reveals that 'community involvement and development' is the most frequent focus […]." The second most frequent focus the survey found is "the environment," followed by "human rights" and "organizational governance."

AUI seems to be developing as a USR-oriented institution. Some of the initiatives we describe below, we argue, could not have been performed by state universities because of their design, their culture, and their administrative and financial structures. State universities act as State Agents who lack the autonomy and the social personality that would allow them to act differently. We will use the example initiatives presented below to describe some of the mechanisms that could work for AUI as a Social Actor and that were unavailable for state universities as State Agents.

12.4   Digital Science Materials for Middle Schools

The CITI (Center for Information Technology Innovation) project developed a platform that houses middle school science teaching materials available nationwide to students and teachers and continues to update the materials with mediated contributions from teachers. The platform with the digital materials has proved to be a very good resource for online education during the pandemic.

The CITI project objective was to foster ICT (Information and Communications Technology) expertise by bringing ICT into middle school classrooms in Morocco. The foundation of this work is a joint project between the Center for IT Innovation for Human Development laboratory at Al Akhawayn University in Ifrane, KOICA, the project "Generalization of New Information Technologies for Education" (GENIE) of the Moroccan Ministry of Education, and two pilot schools in Ifrane and Fez. The project agreement was signed in July 2006 and implemented from 2007 to 2009.

The specific choice of focus for this project was motivated by the very low level of exposure of Moroccan students and most instructors to IT tools in their secondary science education, the low performance of these students in scientific subjects in international rankings as compared to peers of the same educational level, the high dropout rate at the secondary and high school levels, and the national goal of

[5] Zgaga, P. (2009) Higher education and citizenship: 'the full range of purposes'. *European Educational Research Journal, 8*, 2, 175–188.

[6] Nejati, M., Shafaei, A., Salamzadeh, Y. & Daraei, A. (2011) A study of top 10 world universities' websites. *African Journal of Business Management, 5*, 2, 440–447.

increasing the number of graduates with IT skills to drive industrial development in certain key technological areas. This project has explored how IT-based education could improve both the motivation and performance of students in middle school.

Within the objectives of this project, CITI developed several math and science resources and tools for teachers and students in middle school. This development, which was carried out with the close participation of middle school teachers, was based on identifying and implementing best practices from IT-based education literature. The content design and development had a high degree of involvement from middle school teachers.[7]

The teams of teachers from the pilot schools, along with the pedagogical inspectors, have worked to develop content for courses using Microsoft Word and PowerPoint formats, conforming to the official educational programs for the 3 years of middle school. The content development task was divided among the teachers from the different pilot schools. The content defined by the teams is validated by the inspectors and AUI researchers and submitted to AUI software engineers and technicians. The task of the university area experts was to revise and convert the content to an adequate format, as well as to develop simulations corresponding to the different chapters. The developed material was returned to the teachers and then sent to the National Center for Innovative Pedagogy (CNIPE), who validated the developed materials.

The AUI team then placed the different materials developed online through a distance education platform (http://citi.aui.ma/). This website offers a variety of tools and applications that help students and teachers use ICT throughout the learning process. These include white board, class lectures, interactive exercises, online quizzes, simulations, video clips, virtual labs, educational podcasts, forums, and more. The implementation and experimentation phase in 10 pilot schools was followed by AUI researchers.

This experiment was the first of its kind in Morocco, and now our educational website (citi.aui.ma) is already listed on the platform of the Ministry of Education called TilmidTice (https://soutiensco.men.gov.ma/Home), which provides online support to students during the pandemic. CITI gives access to 853 digital resources that cover the science and mathematics subjects of the 7th, 8th, and 9th grades (Physics/Chemistry, Life and Earth Sciences, Mathematics). The content covers a total of 149 chapters, which is nearly the whole school program for mathematics and science in Grades 7–9. These resources are mainly PowerPoint presentations, simulations, video clips, course plans, online quizzes, and exams. Recently, a CD containing these resources was shared with public school colleagues to make it available to students who do not have Internet access, as well as to their instructors who have ideas on how to make use of the materials and how to develop further content. The link to the CD is: http://citi.aui.ma/Down/citi.aui.ma.zip (It requires

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[7] See Omar Alj, 2014. *Etude de l'intégration des TIC dans le Cadre du programme GENIE marocain : Attitudes des enseignants et impact dans les pratiques d'enseignement scientifique.* Doctoral dissertation. Fes, Morocco: FSDM, Université Mohammed Ben Abdellah.

Flash player). The link has also been shared for downloading the content on the CITI-association Facebook page: https://www.facebook.com/citi.association/.

What has enabled such an initiative? We can cite a few aspects dealing with the faculty member's status, the legal status of the institution, and the relationships between the university and the middle schools in the project. First, faculty members have the freedom of action and the incentive that allow them to apply for a grant and to negotiate such a project. Faculty are expected to be active in research and are evaluated and promoted on that basis. They are also allowed to have additional income from projects. Second, institutional donors such as KOICA or USAID are ready to fund such actions in the framework of the aid that they have planned for the country. However, they avoid dealing with public administrations since these administrations lack the administrative and financial autonomy to negotiate a contract and act as a fully responsible legal entity. A state university would have had difficulty observing the various requirements for the management of the cost center of the grant, including the accounting, the invoicing, the separate bank account, which is sometimes necessary, and all the different forms of auditing that a donor may require. Third, a state institution would have difficulty compensating the school-teachers and other personnel involved in the project, and even when compensation is allowed, it is regulated by state rules and cannot be freely negotiated.

12.5   A Center for Community Development

The Azrou Center for Community Development serves as Al Akhawayn University's social arm in the region.[8] In addition to adult literacy and other educational programs, a Non-Formal Education (NFE) program helps provide second chance education for school-age children who are uneducated or who have dropped out of the public school system. It is provided by Al Akhawayn University in partnership with the Ministry of Education and private donors such as the Pistorio Foundation, since 2009.

As the Ministry of Education in Morocco has announced the temporary suspension of schools starting from March 16, 2020 to reduce virus propagation, all schools decided to move to distance/online learning. Non-Formal Education programs at the Azrou Center were not an exception. Several measures were taken in the center to ensure that learning continues for all the students enrolled in the Non-Formal Education program.

Students and their trainers were all contacted about the program's necessary continuation via social media tools and through many distance learning options, such as the different platforms offered by the Ministry: https://soutiensco.men.gov.ma; https://telmidtice.men.gov.ma. Most of these sources make it possible to download

material to be used offline. Students were also encouraged to follow educational programs broadcasted by the ministry on national TV channels.

WhatsApp groups corresponding to real instructor and student class groups were formed to facilitate the interchange between students and their teachers. WhatsApp groups were created for every subject, and they were monitored by the program supervisor. Accompanying classes of introduction to handiwork (sewing, embroidery, gardening, weaving) were interrupted, as access to the workshops by trainers was not allowed.

Use of Microsoft TEAMS was made possible by the ministry, but most of the students, coming from a disadvantaged background, do not have the required tools (such as computer and Internet connection) to use it. They preferred to use WhatsApp, as they are accustomed to using it for their daily communication. Teachers either send audio or video presentations and send materials with exercises for students to complete and send back. Others prepared videos, used Adobe software with the help of the center staff, and when necessary, they arranged a one-to-one audio interchange with students.

The weekly schedule has been adjusted in a more flexible way for students to be connected each day with one teacher on one subject. To keep the programs going during these difficult times, the center continued to hold regular online meetings with the teachers to be informed on their new experience, to discuss the difficulties they meet, and to inform them of decisions taken by the provincial delegation of the Ministry of Education.

The center also tried to stay informed about any social problems that may hinder student learning, and as a result, decided to help first with paying for the mobile data fees for all the students who have access to a smartphone. All three national providers, as a rule, make it possible to purchase data online, so the center was able to provide limited online time for many students. It also provided food donations for families, especially during the concurrent holy month of Ramadan. Support for these actions came from individual donors and from a faculty, staff, and student fund-raising initiative by the university.

Teachers reported that teaching remotely has had, in general, a positive impact on most of the students, especially on those who used to spend most of their time in the streets to earn a living or beg for money and return home at night. Now, they stay mostly at home because many of the street markets and other commercial gatherings are closed. However, online teaching has been very challenging for students who could not afford to have the technological tools, nor have access to the Internet. 65% of the students, who have access to a smart phone, attended regularly, while the others were contacted by phone and advised to regularly watch the educational and literacy programs broadcast on national TV channels. As far as end-of-year exams are concerned, only continuous assessment grades that were assigned during the school year and until lockdown were counted.

Azrou Center for Community Development (ACCD) is another feature of AUI's autonomy. This is a center that was established with initial funding from private donors. The upkeep of the physical plant and the salaries of the permanent staff are supplied from the university's budget. Its operating budget and a modest capital

budget are provided by the university, as well as by donations from the Ministry of National Education and by private donors, including the Italian Pistorio Foundation (www.pistoriofoundation.org). The entire national Non-Formal Education program is based on a public-private partnership, whereby NGOs would provide a home for the NFE classes, would recruit students mostly by door-to-door visits in specific neighborhoods, and would recruit volunteer teachers. The ministry would, in exchange, provide the NGO with an allocation calculated according to the number of registered students that the NGO declares. The salaries of the volunteer teachers are extremely modest, and they generally attract young university graduates who would like to become teachers and who seek to have some classroom experience before joining the public system when there are openings.

Because the NFE program does not partner with public institutions such as state universities, which are not known to have centers such as the ACCD, Al Akhawayn University has created an NGO called ADMA (Association de Développement du Moyen Atlas), which serves as the intermediary between public administration and AUI administration. Thus, AUI acts as a Social Actor deciding on a social initiative, making plans, and implementing them. Whereas the Moroccan government would not transfer funds to AUI for the ACCD activities, it approves of the Center and finds it extremely useful. ACCD is highly regarded, and it is used by the Ministry of Education as a reference center for Non-Formal Education due to its organization and serious pedagogy, as well as for the additional funds that the university and its private partners provide to make this school of a second chance more attractive and more successful.

12.6   Crowdsourced Production of Children's Stories

The Arabic Language Unit at AUI has initiated a crowdsourced competition to produce stories for children to promote reading and educational skills and values. A platform is being developed to provide stories for children that can be used for the purposes of reading and other language arts activities.

The group, which has been involved in this initiative, is the recently established Center for Arabic and Literacy Education (CALE),[9] a faculty research and development group within the School of Humanities and Social Sciences (SHSS). The mission of CALE is to engage in research to support Al Akhawayn University's years-long efforts in the teaching of standard and dialectal Arabic for the benefit of its students, Moroccan and international, and for members of the AUI community. It also aims to promote scientific research on the Arabic language, literature, and culture, as well as to encourage artistic creation in this language. The center aims to bring together national and international scholars to share their expertise and scientific research to improve understanding of the Arabic language, literature, and

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[9] Abdellah Chekayri, Professor of Arabic, is the initiator and leader of the project; his contribution to the presentation of the project is hereby acknowledged with gratitude.

culture, and develop the most effective methodologies of Arabic literacy and language arts education in K-12 and university levels. It is set to provide an auspicious educational environment for millennials and other learners, designing and mobilizing state-of-the-art digital technologies to support learning and teaching for time-saving and quality Arabic literacy acquisition.

Leveled readers, classroom library corners, and illustrated stories are best practices in and out of schools and are considered excellent materials to help develop students' literacy. In Morocco, however, textbooks assigned by the Ministry of Education are the only materials usually available to public school students. School teachers closely follow these textbooks; as a result, children do not experience reading time for enjoyment, nor the freedom to read stories on their own without being constrained by teachers, curricula, and textbooks. The objective of this year's second edition crowdsourced contest in Arabic short story writing for children is to develop story reading resources that can be distributed and used by schoolchildren and their parents. This year's slogan is "achieving the sustainable development goals," and the overall objective is to develop children's reading skills by providing them with meaningful opportunities to engage with oral language and written texts. CALE aims to champion raising awareness about the 17 goals set by the United Nations Development Program (UNDP) so that Moroccan citizens can be acquainted with the challenges facing their future at an early age and to learn about Sustainable Development Goals (SDGs) through stories. The project also plans to involve university students in reading stories and discussing SDGs with early-grade children in schools in the Fez-Meknes region, an experience to be scaled up to other regions in Morocco. K-12 teachers would also benefit from an introduction to the best practices in language teaching and in promoting reading and writing within school communities.

This initiative is supported by a small seed grant from the Humanities and Social Sciences Dean and the university. It is in its second year, and it has already been able to attract the attention of national and international donors, but it needed the initial support from the university. A state university would not have been able to provide that support because there are no lines in its budget that would allow it to spend money on a similar project. Even if it did, the line would have to be quite large because of the many such research and development initiatives that its large and highly sophisticated faculty would require. This is another example of the freedom of action that an autonomous Social Actor university such as AUI enjoys. Providing for the development of reading skills in primary schools is the purview of another department, not for a state university who, as a State Agent, needs to spend its funds only on its tightly defined mission objectives.

12.7   PING Project: One Million Tablets – The Digital Leapfrog of the Moroccan Public Education System[10]

The PING Project is an ambitious NGO-initiated project, supported by the Ministry of Education and hosted and implemented by Al Akhawayn University. The project, which is likely to last, offers a unique opportunity to leapfrog the digital transformation of the public education system in Morocco. This is what the Morocco PING Project has aimed to contribute through the deployment of 1,000,000 tablets to students at public schools across the country, starting with 10,000 tablets as a pilot phase. The tablets, loaded with available content, will serve as a virtual school during the pandemic and will help bridge the digital gap inside the classroom when normal schooling resumes.

The Covid-19 situation offers a unique opportunity to promote creative solutions that have been facing resistance in the past. Moving the education system to a digital era is a theme that has seen a tremendous amount of effort and funds deployed. There is, therefore, a wealth of information (content) and assets (platform, training, etc.) that exist and which, with the support of the Ministry of Education, this project will leverage upon. The tablets will be a virtual school while the pandemic is ongoing; it will then move to education portals and support for students to be used both in and outside of the classroom.

In the long run, the PING Project intends to promote a model that will need to be economically sustainable by ways yet to be identified, albeit supported by the Ministry of Education through direct and indirect subsidies. There are several avenues to achieve the business model sustainability, such as reinforcing the content platform and creating a "market" between content providers (e.g., course provider, tutoring, etc.), bandwidth providers (telecom operators), and end users (the student). A public-private partnership is proposed as part of the pilot and will be part of the evaluation process pre-PING launching.

Experience pleads for a strong involvement by all stakeholders. Children and their parents are pivotal to the success of the initiative. As such, it is paramount to envisage a contribution of the parents in the project, even if only symbolically. We have set said symbolic contribution to 10–40 MAD[11] per month (depending on the student's grade level). Similarly, we could envisage a contribution of other public stakeholders (e.g., the Assembly of the Region) to widen the stakeholder basis.

The leaders of this project are distinguished past public administration executives who knew that they could not partner with a state university for all the reasons mentioned above. They sought AUI as another Social Actor that has the autonomy to decide on joining such a project, negotiating its own role in it, and taking the liberty to support it at its pre-pilot stage.

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[10] Younes Maamar is the leader of this project; we acknowledge with gratitude his contribution to the presentation of the project.

[11] The rate of exchange for the Moroccan Dirham (MAD) has been, on average for many years, 10 MAD to 1 USD.

12.8   Conclusion

The above examples are some of the relevant initiatives that are currently active and that reflect the university's vision of its social responsibility. Beyond its academic and scholarly mission, AUI has been designed as a liberal educational system that promotes a model of the university graduate as a citizen of the world, aware of their responsibilities to actively engage in promoting change. All undergraduates need to satisfy the requirement of ca. 40% of credits in General Education, and no student can graduate without having satisfied the obligation of social service for a minimum of 60 hours. The Covid-19 pandemic has come as an unexpected test of how autonomous, reactive, and socially responsible a university can be. AUI immediately set up a Covid-19 Efforts Donation Fund subscribed to by faculty, staff, students, and the university budget. This has been useful to alleviate some poverty needs of the local population in the Ifrane Province. In addition, with uninterrupted synchronous online classes, continuing outreach, admissions and hiring activities, and with strategic planning and other administrative and financial activities going on, AUI will have passed the test of being a useful Social Actor. It continues to learn to be a socially responsible university which is developing a model to be emulated by private higher education institutions and later by state universities, having managed to become more autonomous.

Mohammed Dahbi's academic expertise is in language, linguistics, and literacy. He taught high school in England and in Morocco, and he spent a large part of his career teaching at Mohammed V University where he was also involved in teacher training and in many educational policy reform efforts. He participated as a consultant in the design of Al Akhawayn University and was appointed as the first dean of Humanities and Social Sciences. He also directed the Center for Academic Development and the Social Science Research Institute and served as the Chief Academic Officer (VPAA) of Al Akhawayn University. He directed several research projects in the areas of classroom discourse, conversation analysis, courtroom discourse, doctor-patient discourse, literacy acquisition, and language variation. He served as President and long-time member of the Moroccan American (Fulbright) Commission for Educational and Cultural Exchange, as member of the TOEFL Board, as member and chair of the TOEFL Grants & Awards committee, as member of the King Abdulaziz Foundation for Humanities and Islamic Studies in Casablanca, and he continues to serve on the board of the American Cultural Association in Morocco. This long career has helped him develop expertise in research design, project management, and human resource management, and gave him access to an extensive professional network in Morocco and internationally. He holds an MA from the University of Southern California (1974) and a PhD from Georgetown University (1984).

Hassane Darhmaoui holds a PhD in Physics from the University of Alberta, in Canada. He joined Al Akhawayn University in Ifrane (AUI), Morocco, right after his graduation in 1997. He is currently an Associate Professor in the School of Science and Engineering and Coordinator of the AUI Center for Learning Technologies. His research in education focuses on ICT integration in science education, distance learning (eLearning, mLearning, MOOC), and Serious Games. He led to success several projects in the field; the latest were the ITQANE eLearning targeting teacher trainers, and the CITI-project about ICT integration in middle school science teaching. Dr. Darhmaoui's R&D research in physics and engineering mainly focuses on renewable energies applications. His current focus is on the development of simple energy-efficient systems easy to build and integrate

in the local environment. Dr. Darhmaoui was a Fulbright scholar at the National Institute of Standards & Technology, Boulder, Colorado, in the USA during summer 2002. He was also a visiting research scholar at the University of South Carolina, USA, during summer 2000. Dr. Darhmaoui is a co-author of more than 62 research papers and has more than 100 presentations in various conferences and scientific meetings. He is an active member in several scientific societies and groups.

Chapter 13
Taking a Strength-Based Approach: Bringing Student Homes into Schools During a Pandemic

Jodie Hunter, Roberta Hunter, John Tupouniua, and Generosa Leach

Abstract The COVID-19 pandemic has caused new ways of doing and being, both in education systems and beyond across the world. In the context of Aotearoa/New Zealand, the widely supported government approach focused on the well-being of the nation with a position that saving lives was more important than maintaining an open economy. As researchers and educators, we supported teachers as they worked with their students in their home settings. This provided us with an opportunity to explore a vision of a reinvented system of mathematics education beyond institutional and formal structures of schools. In this chapter, we present the analysis of the responses from 24 educators mainly from low socioeconomic urban settings as they reflected on how they enacted mathematics teaching and learning during the lockdown while connecting with students and their families as well as their subsequent learning from this experience. Results highlighted that the mathematical learning of students went beyond what was accessed by digital means and included parents drawing on rich everyday opportunities. A key finding was that by supporting and privileging the well-being of students and communities, the connections and relationships between educators and families were enhanced.

13.1 Introduction

The COVID-19 pandemic, across the world, has caused a new way of doing and being in a world that has suddenly become less safe and reliable. It is something that has never been experienced by the people of Aotearoa/New Zealand. This exposed our small, closely interconnected island nation of people to a reduced set of choices. Our widely supported government approach took a moral and ethical position in which saving lives was deemed more important than the economy. A collective national focus was placed on the well-being of the nation. Taking this relentlessly

J. Hunter (✉) · R. Hunter · J. Tupouniua · G. Leach
Institute of Education, Massey University, Auckland, New Zealand
e-mail: j.hunter1@massey.ac.nz

positive perspective enabled us as researchers and educationalists with a unique opportunity to support teachers as they worked with their students in their "lockdown" home settings. It also provided us with opportunities to explore how a reinvented system of mathematics education might look like beyond the institutionalized and formal structures of schools and classrooms.

Being able to learn how mathematics teaching and learning can be reinvented beyond classrooms is particularly important for Māori and Pāsifika, the group of diverse students we focus on in this paper. This is because this vulnerable group of students have a long history of being underserved in mathematics classrooms in Aotearoa/New Zealand (Hunter & Hunter, 2018). While Māori are indigenous to Aotearoa, Pāsifika peoples are first cousins from neighboring Pacific island nations. This multiethnic, heterogeneous group of people include those born in New Zealand and those who have migrated from the Pacific Islands. Anae et al. (2001) outline how this encompasses all those who identify themselves with the cultures of Samoa, Tonga, Cook Islands, Niue, Tokelau, Fiji, Solomon Islands, Tuvalu, and other Pacific Island countries.

Māori and Pāsifika learners, for too many years, have had concerningly low levels of mathematical achievement in Aotearoa/New Zealand schools. The poor outcomes for these indigenous and close cousins correspond directly to the many structural inequities they encounter in mathematics classrooms in this country (Hunter & Hunter, 2018). The long reach of the negative effects of colonization across the past two centuries are many, but one clear link can be connected to the cultural and ethnic heterogeneity of twenty-first-century classrooms. Most teachers come from higher socioeconomic backgrounds and represent the dominant cultural group. This contrasts sharply with many of their Māori and Pāsifika students who represent both lower socioeconomic and culturally and ethnically diverse groups. Rubie-Davies (2016) suggests that such cultural mismatches cause cultural misunderstandings and the construction of deficit perspectives by teachers of their students. Therefore, there is an immediate need for these teachers to engage with these diverse students to develop rich understandings of their home lives and contexts.

In order to provide active support for teachers to engage positively with Māori and Pāsifika learners in the recent past, we have built on culturally sustaining practices promoted by Paris (2012) and incorporated strength-based approaches (González et al., 2005; Hunter & Hunter, 2018). In our ongoing professional learning and development work, we have taken explicit actions to deepen teacher knowledge of the lived realities of the home contexts of many of their students (Hunter et al., 2019). However, the novel situation created by the COVID-19 pandemic gave us an additional positive opportunity—the chance to place the home clearly into, and within, the school community and the mathematics classroom. In this chapter, we report on how we, as university lecturers and teacher educators, supported school leaders and teachers to engage in a range of new and different ways with students and their whanau (close and wider family members) as they engaged in mathematics during the lockdown. As we did this, we examined and explored the opportunities this provided all participants with to develop richer understandings related to

the students' funds of knowledge. The question we aimed to explore was: what is the learning for all of us when homes are integrated into a school context in relation to constructing and sustaining a strength-based mathematics pedagogical approach during the lockdown in a pandemic?

13.2 Culturally Sustaining Mathematics Pedagogy

Our adoption of culturally sustaining mathematics pedagogy (CSMP) was based on our search for a form of teaching that supports both culturally responsive practices and could include a dynamic view of culture (Gay, 2002, 2010; Ladson Billing, 1994, 1995). Such multiculturalists as Banks & Banks (2009) and Nieto & Bode (2011) suggest that the pedagogy needs to support an education system both culturally diverse and equitable. Within this frame, Johnson (2014) describes an education system in which all interactions take place across racial and ethnic lines in ways that enhance student learning and achievement and support outcomes equitably. Embedding the critical aspects of culturally responsive pedagogy in CSMP allowed its reframing as a strength-based or asset-based approach in which the "linguistic, literate and cultural pluralism as part of the democratic project of schooling and as a needed response to democratic and social change" is sustained (Paris & Alim, 2014, p. 88).

Our goal in adopting this framing of CSMP supported us to consider how we could ensure the empowerment of the whole community who are involved within our mathematics classrooms. At the heart of such empowerment is the development of relationships and trust (Bonner, 2014; Civil & Hunter, 2015; Hodge & Cobb, 2016; Powell et al., 2016). In this chapter, we aim to explore and explain how building trust and respectful relationships across the families and their communities supported empowerment and power sharing across the different participants, including the students, their families, their teachers, and us, as university staff.

Considerable research has shown that both teaching and learning which matches the cultural values and experiences of the learners along with parental involvement is a key factor in ensuring equitable outcomes for all (Averill, 2012; Bonner, 2014; Hunter et al., 2016; Robinson et al., 2009). In our work, we pay close attention to the values enacted by the communities we are working with. Our first consideration is given to our indigenous core Māori values such as "whanaungatanga" (sense of belonging), "kotahitanga" (oneness), "tuakana/teina" (relationships), "kaitiakitanga" (reciprocity), "whakapapa" (family lineage), "aroha" (love), "wairua" (spiritual well-being), and "hauora" (Berryman & Eley, 2017; White, 2011). These closely align with the values of Pāsifika peoples. Although a heterogeneous group, these people share a common set of values (Ministry of Education, 2013). These include such values as belonging, family, inclusion, leadership, love, reciprocity, relationships, respect, service, and spirituality. Clearly, both sets of values are underpinned by those of a collectivism society's and strongly focused on the well-being of the collective as a whole. In our recent research, we showed that students

named family, respect, and collectivism as particularly important educational values they drew on as they engaged in mathematics in classrooms (Anthony, 2013; Hill et al., 2019; Hunter, 2021).

A key aspect of CSMP, which we implement in our professional learning and development work with teachers, is the understanding of the importance of incorporating the cultural and social contexts of their students into their mathematics teaching and learning. A number of studies have shown the importance placed by parents and the community on pedagogical practices which support diverse and often marginalized students to build strong cultural identity as they learn mathematics (Bonner, 2014; Ladson Billings, 1994, 1995). An important aspect of this is teacher awareness of student and family funds of knowledge. In reference to funds of knowledge, Moll and his colleagues (1992) describe how all cultural groups hold historically accumulated bodies of knowledge and skills, which serve to support both individual and household functioning and well-being. We argue that it is important for teachers to know the family and community funds of knowledge. This is critical as a tool that can be mathematized in ways that support student engagement and achievement.

For schools and teachers to develop deep understandings of their students' funds of knowledge, they need to be closely connected. Many studies show the significant effect on mathematical achievement when parents are involved and connected in authentic and culturally appropriate ways (Barton et al., 2004; Civil & Bernier, 2009; Monson, 2010). To achieve authentic connections, Barton et al. (2004) caution that parent involvement needs to be seen from a wider lens than that from what is traditionally prescribed by schools. They argue that the widened lens would avoid schools from labeling parent involvement as minimal. As Civil and Bernier (2009) argue, this needs to include consideration of language and individual differences as well as the promotion of parents as essential partners in their children's education. A study conducted in Aotearoa/New Zealand with parents during the COVID-19 pandemic lockdown also promoted the need for improvement in home-school partnerships (Riwai-Couch et al, 2020). Riwai-Couch et al. (2020) stated that "finding ways of developing such partnerships and valuing the learning that happens across the boundaries between homes and schools, seems an important step in expanding our view of what counts as quality education, making schooling more equitable, and in honoring the Tiriti o Waitangi" (p. 7). In this paper, we suggest that the COVID-19 pandemic lockdown provided the background for possibilities for changing these partnerships when the students' homes were brought directly into the school setting.

13.3   Massey University

Massey University is based in Palmerston North but has significant campuses in Albany and Wellington. It has approximately 30,883 students of which 13,796 are extramural or distance learners, making it Aotearoa/New Zealand's second-largest

university. Research is undertaken at all three campuses. Albany Campus, where this research has taken place, was opened in 1993 and has around 7,000 students. In the QS rankings, Massey University was ranked 287th and the Institute of Education was ranked in the top 150 universities for education in the world.

The researchers who wrote this chapter are on the Albany Campus and belong to the Institute of Education in the College of Humanities and Social Sciences. They are also lead members of the Centre for Research in Mathematics Education (CERME). CERME brings together experts to work on a common theme: the place of mathematics education and its transformational potential in Aotearoa/New Zealand, the Pacific region, and the world. A focus on equity and cultural responsiveness underwrites our research projects and the developmental work we engage in with teachers, postgraduate students, and new researchers. Our strong tradition of collaboration with international and national researchers enables us to contribute to scholarly debates, in both the research and professional fields.

The research which informed this chapter was part of a multimillion-dollar funded and ongoing collaboration with Massey University and the Aotearoa/New Zealand Ministry of Education. This is based around a professional learning and development research-based program across many communities within Aotearoa/New Zealand and includes two Pacific nations, Niue and the Cook Islands. The research has a background of fifteen years of research-informed professional development in schools.

13.4   Developing Mathematical Inquiry Communities

Developing Mathematical Inquiry Communities (DMIC) is an evidence-based comprehensive professional learning and development (PLD) model founded in equitable outcomes for *all* students (Civil & Hunter, 2015; Hunter et al., 2018). It is a model of best practice for teaching and learning mathematics and integrates culturally sustaining pedagogy, ambitious teaching, and complex instruction (Paris, 2012; Kazemi et al., 2009; Featherstone et al., 2011).

Our goal within this model is to reposition traditionally marginalized students (e.g., Māori, Pāsifika, and other diverse students) to have equitable opportunities to learn mathematics with deep reasoning using a range of mathematical practices (Hunter & Anthony, 2011). This includes the use of mixed ability grouping and a focus on student and family wellbeing. It is also inclusive of promoting a positive cultural identity as well as a positive mathematical identity in our learners and users of mathematics (Alton-Lee et al., 2011; Hunter & Hunter, 2018; Hunter et al., 2019, 2020a, b).

In the focus on community building within and across schools and their local communities, DMIC involves 210 schools and a team of 35 researchers and teacher educators from Massey University.

13.5   Methodology

The data included in this study examined the experiences of school leaders and mathematics teachers as they work with their students and families and grappled with the unknown during the COVID-19 pandemic lockdown. Our first case of COVID-19 was reported on February 28th, 2020. By March 21st, 2020, with a rising number of cases, a four-level alert system was introduced by the Aotearoa/New Zealand Government. On March 23rd, 2020 with over 100 cases and evidence of community transmission, New Zealand moved to a higher alert level 3, and educational facilities were closed. On March 25th, 2020, the country moved into the highest alert level 4. All nonessential businesses closed, and people were instructed to stay home for a minimum of four weeks. Schools closed from March 25th, 2020 with partial reopening on April 28th, 2020 of approximately 5–10% children of essential workers. Full reopening occurred on May 18th, 2020.

During the lockdown period, Massey University staff supported teachers by running online workshops on digital learning, providing in-the-moment coaching during Zoom sessions as teachers taught groups of students. In addition, the staff provided sets of mathematical tasks suitable for online or remote learning. In this chapter, we focus on the responses of 24 educators as they were supported by Massey University staff to continue to engage with their students and their families. This included 19 teachers and five principals/deputy principals representing 24 schools and more than 500 students. The teachers and principals/deputy principals (n = 18) were from urban schools in low socioeconomic areas or (n = 6) at schools in rural locations. The data was comprised of audio-recorded interviews or written responses to 14 interview questions which focused on how they connected with students and their families, how they enacted mathematics teaching and learning over the lockdown period, and their learning as a result. A grounded theory approach supported the development of codes that described patterns that emerged (Strauss & Corbin, 1994). For instance, the data was initially coded in relation to the responses to each question. One question as an example was: "What are the things that you need to consider when using Zoom or a digital platform with your students at home?" Themes that were developed in relation to responses to this question included well-being, relationships, respect when "entering" the home, privacy, pedagogical actions, and information technology skills. We then identified the common themes that appeared across different questions and began grouping these together to develop patterns. Reliability was ensured through cross coding the data independently by two researchers and member checking. Where contradictions emerged, the wider research team reviewed the data to reach a consensus. Insights from the data are presented in the following sections.

13.6   Findings and Discussion

We begin by examining the themes which emerged which related to how the Massey University researchers and teacher educators provided mathematics support to the homes. We show how the well-being of students and communities was supported and privileged and ultimately enhanced connections and relationships across all participants.

13.6.1   A Well-Being Orientation to Building Relationships

The clear digital divide in access to devices and connectivity was the first concern of the Massey University staff. Rewai-Couch and colleagues (2020) describe such inequities related most often to Māori and Pāsifika learners in low socioeconomic communities. Our educators, cognizant of this factor, immediately and proactively ensured that families were provided with culturally sustaining mathematics activities at home. Half (n = 11/24) of the educators described how they physically supplied their school community with hard copies of culturally appropriate learning packs. Their immediate deep concern and support were evident to the community and showed their awareness of what Moll et al. (1992) describe as family funds of knowledge. Such actions as Bonner (2014) suggests, provides a central component of relationship building: teacher awareness of their family's funds of knowledge. A clear focus was placed on well-being within a holistic view of family need before considering mathematics teaching. As a teacher explained, "Teachers all made family group phone calls and emails to follow up on contact, wellbeing, connectivity throughout lockdown time – this point of contact has been effective for the big picture" (J. Hunter, personal communication, May 9, 2020). In terms of maintaining both a sense of security and wellbeing of the child, as they engaged in mathematics lessons, she went on to explain: "The same teacher takes a progression of two to three lessons so they build and students get used to each teacher's different approaches (three to four teachers taking turns fronting the workshops). Having another adult (teacher or teacher support worker) in the Zoom room for support and security helps with more open teaching as there is always someone else watching to give feedback" (J. Hunter, personal communication, May 11, 2020). Such action could best be described as encompassing the Māori concept of "hauora." The teachers' attention to the physical, mental, and emotional, social, and spiritual well-being of communities began what Barton et al. (2004) argue is needed—a changed school-home partnership. The relationships were changing, and as Riwai and colleagues (2020) explain, through such relationships the possibility of a shared power relationship was being constructed. At this point, the Massey University staff were able to attend to mathematical learning in a new space where they needed to go into their students' homes through remote means.

13.6.2 Opening Spaces for Mathematics Learning

Although the pandemic was at the top of the school communities' minds, the teachers also wanted to continue working with the university and continue their professional learning journey in mathematics. Despite the prospect of a prolonged shutdown and the possibility of having to learn and adopt digital tools to teach mathematics, they outlined their need to: "make necessary changes to the *way* we deliver, but not what we deliver." (J. Hunter, personal communication, May 8, 2020). In order to support the educators, Massey University staff provided schools with a set of cognitively demanding mathematical tasks which matched the lived reality of the students' home world and were able to engage families to work together on them through drawing on their collective funds of knowledge and mathematizing it (Moll et al., 1992). The tasks, designed by Massey University staff, were intended to scaffold the teachers to maintain culturally sustaining mathematics pedagogy (Paris & Alim, 2014).

Although the teachers drew on the provided tasks at the same time, they (n = 12/24) noted that the parents were adept at drawing on and using day-to-day community-based activities. These included a range of both indoor (for example, cooking) and outdoor activities (for example, collecting and selling firewood or mixing petrol and oil for a motorbike). *C*learly the teachers were being exposed to, and learning about, their student's funds of knowledge within mathematics (Moll et al., 1992). Entering the students' homes changed the home–school partnership as the teachers viewed the way in which parental knowledge of mathematics was drawn on and used in their home settings. As Civil and Bernier (2009) show, such respectful observations are required if parents and the other members of the local community are ever to be perceived as real education partners.

13.6.3 Taking Mathematics into Homes Through Digital Means

Although there was a digital divide, many schools obtained and delivered IT equipment to those who needed it, and others were already online schools. Where online teaching and learning were possible, teachers used many different methods. Most commonly, Google classroom (n = 16/24), synchronous teaching Zoom (n = 15/24), or Google meet (n = 6/24) were used. For both forms of online teaching, educators (n = 9/24) described the need to provide students with different means and ways to explain reasoning including photos of solution strategies, videos of students explaining, threads or chat functions, and online whiteboards or annotation tools to support the continued focus on developing mathematical practices. The different teachers described their goals as having students engage in such practices as providing a mathematical explanation, justifying, generalizing, and representing reasoning. For example, one teacher explained her new perspective as she adapted her

expectations: "being able to do a 'connect' at the end- what did you do that helped you solve this problem? Me writing their thinking took away the mechanics of putting their thinking out there, and also helped to model a way to record mathematics thinking for others to follow." (J. Hunter, personal communication, May 13, 2020). It was evident that the teachers were seeking ways to maintain a focus on having students as mathematicians wherever and however they could. A significant amount of research from Massey University supports the need for these diverse students to be supported to engage in these practices in order for them to see themselves as mathematicians (Hunter & Hunter, 2018; Hunter et al., 2018, 2019).

For over a decade, Massey University researchers have maintained focus on developing mathematical practices in a collaborative setting with Māori and Pāsifika learners as a clear equity issue (Hunter & Anthony, 2011; Civil & Hunter, 2015; Hunter et al., 2018). Some teachers (n = 6/24) specifically identified the opportunities the breakout rooms in Zoom provided. Others (n = 8/24) described the importance of preexisting relationships between students and the establishment of norms to support discursive interactions. One teacher explained the value of students' voices in these rooms compared to writing their explanations: "I like the kids to voice record their explanations because typing it out is tricky-our kids sometimes struggle with justification and it's difficult for them to record them" (J. Hunter, personal communication, May 12, 2020). Clearly, this teacher expected to maintain ambitious forms of mathematics as described by Kazemi and her colleagues (2009) while working in an asynchronous form of online teaching. However, in the online environment, some teachers (n = 6/24) described the introduction of either new norms or adaption of existing ones to manage the virtual environment. For example, a teacher explained how the use of "talk moves as hand signals and use of the reactions tool on Zoom helps the flow of conversation and sharing of ideas" (J. Hunter, personal communication, May 8, 2020). Hunter and Anthony (2011) describe the carefully considered approach teachers need to take to develop these social norms to ensure that all their Māori and Pāsifika students engage confidently. Here, the teachers had continued to carefully consider the importance of these social norms in the digital environment.

The shift from ability grouping to mixed ability grouping is an essential but challenging part of DMIC for many teachers (Hunter & Hunter, 2018; Hunter et al., 2020a, b). The educators were challenged to consider this working in an online community when multiple family members were present. However, the digital environment and the lockdown provided the educators with space to reflect with their Massey University partners and develop a changed view of what it meant. As one educator recounted: "well we always talk about mixed ability groups, and when they have got older siblings around, in a way that is a mixed ability group" (J. Hunter, personal communication, May 14, 2020). Many teachers described their positive experiences with parents and other household members joining in and interacting during the different IT platforms used to connect. This matched what Riwai-Couch et al. (2020) described as needed by the Māori and Pāsifika parents they surveyed. The parents asserted a need for a change in the home-school boundaries. We suggest

this was happening in an open and trusting environment, and mathematics was the tool used by both teachers and parents to achieve it.

13.6.4 Growing Relationships Through Changing the Boundaries

Most educators (n = 18/24) viewed synchronous online mathematics lessons as a relationship building process. They (n = 16/24) noted how engaged family members were in the learning: "Having parents working alongside their children during teacher-led lessons on Zoom is great. We are hearing really rich conversations and seeing parents actively supporting learning" (J. Hunter, personal communication, May 14, 2020). COVID-19 had positively positioned teachers and our team at Massey University to see rich and engaging across community conversations. Paris and Alim (2014) talk about asset-based pedagogy, and this had come alive in the power-sharing collaborative mathematical conversations.

The teachers (n = 16/24) affirmed the welcome they received as they went online and into their students' homes: "We have been welcomed into the homes of our whānau and have learned about real-life for them." (J. Hunter, personal communication, May 13, 2020). Here, the educators had opportunities to walk in the world of their students and between all participants construct a real and positive partnership. As Riwai-Couch et al. (2020) suggest, relationships were changing into a form of real home-school partnership and with the possibility that these could endure beyond the lockdown. The teachers (n = 12/24) also noted the warmth of relationships being offered to them and between family members*:* "We have built strong working relationships between school and home which I wish to continue fostering and developing as I have seen a huge growth in some students. It is also very special to see those relationships between parent and child working during Zoom workshops. We don't normally get to see that" (J. Hunter, personal communication, May 8, 2020). Others (n = 5/24) described the importance that their school communities placed on mathematics. One principal described their learning about the value parents and communities placed on mathematics and how popular the online sessions were. Clearly, bringing the home into the school provided important opportunities to counter the deficit views many school educators construct. These often occur through what Rubie-Davies (2016) describes as cross-cultural misunderstandings. Hunter et al. (2019) and the Massey University team have completed significant work with teachers in schools to combat deficit thinking recognizing the direct link it has to changing teacher expectations.

Engaging with and observing families as they collaboratively work on mathematics together further pressed some teachers to revise their views of their students. Independent and online learning for mathematics gave them a window into their student's mathematical dispositions. Some teachers (n = 5/24) described how the students managed their own mathematical learning: "they are actually pretty

resilient; they have just gone on with it" (J. Hunter, personal communication, May 8, 2020). Within the well-being focus most educators applied, resilience was often observed. Other teachers noted what happened when students were given opportunities to manage their own mathematics learning. For example, one teacher described how she allowed choice and how this opportunity taught her a lot:

> So, I chucked easy medium hard…choose the right ones that you think that are just right for you to be able to solve. Now some of my kids are regrouping decimals and whoah, that was something I had no idea they could do. And I even sent one of our kids, he had done phenomenal work and sent it to the other teacher to ensure she put it into his folder for evidence. So, seeing my kids were more capable than I realized. Those who are not as visible, and I was able to see how much they could do-seeing a wider range of strategies (J. Hunter, personal communication, May 12, 2020)

Here again we can see important teacher learning but also, we are presented with lowered school-based expectations. Despite involvement in culturally sustaining professional learning and development with Massey University staff, this illustrates how long deficit expectations take to combat.

For all of us, other learnings also occurred during online teaching and learning. Bringing home into the school context taught us and them (n = 18/24) that an assumption that parents understood the changes within school mathematics was erroneous. The educators described how initially there was: "A lot of focus on the answer rather than the process. As we have gone along, I have noticed a family sitting to the side (further away but still present) and not pressing so hard for answers but responding to the teacher and more promotion of math practices and understandings" (J. Hunter, personal communication, May 11, 2020)

The lockdown journey caused by COVID-19 had gradually supported a better balance in the partnership. Many teachers (n = 14/24) described the increased awareness of parents in what it means to learn and do mathematics successfully in the twenty-first century: "Nearly every child on Zoom has an adult (parent or family member) sitting next to them who helps them out throughout the lesson. Parents obviously share the ways that they know how to work out maths problems (using algorithms, etc.) but very quickly adapted to realizing that the students were going to need to explain the strategy so just working it out for them or using a calculator was not going to suffice" (J. Hunter, personal communication, May 13, 2020). Increasing parental and community knowledge related to the importance of increased mathematical talk and practices gave them insight into the life of their children in mathematical classrooms. The possibility of more effective partnerships promoted by Civil and Bernier (2009) had become a very real possibility.

Teachers being taken into student homes through the online sessions also supported more effective partnerships. Many teachers (n = 12/24) recognized the need to take a considered approach to enter their students' homes as visitors. Home is considered "vā," a sacred space for most Pāsifika people, and this was mentioned by a number of educators. One teacher in talking about her privileged position in entering the home via Google hangout referred to a recent academic article in thinking about her student's responses:

> …their perceived reluctance to turn their cameras on cannot be assumed as being a sign of disrespect or defiance. This is a classic example of delving deeper into the why in terms of cultural responsiveness to understand what else is impacting the decisions that learners are making about the way that they are learning, or the way that they are willing to learn. As an educator, I have a duty to demonstrate complete mindfulness for the whole learner, and all of the variables impacting the learner, if we are to connect with learners in a way that shows reciprocal shared learning, as outlined in the pedagogical practice of Ako and manaaki-tanga. (J. Hunter, personal communication, May 13, 2020)

Clearly, the work she had done with Massey University educators had encouraged her to reflect and apply a respectful lens. Others (n = 5/24) reflected on the need to maintain respectful relationships including thinking about how they spoke and timing the mathematics lessons to suit families. One educator acknowledged that they avoided synchronous platforms such as Zoom given that: not all kids are in a position to have a quiet space where they can join a meeting. Such actions illustrate the importance these teachers took. Furthermore, a number of researchers promote these actions as important in the building of relationships, trust, and respect (Averill, 2012; Bonner, 2014; Powell et al., 2016).

Looking towards schools reopening, all educators wanted to find ways to continue the positive relationships they had across their home communities. They described how important they considered the power-sharing partnership was and how they wanted it to extend into the future when schools reopened. It was evident that taking the home into the school community had empowered all participants. Crossing boundaries had given possibilities to developing balanced power-sharing relationships as described by many researchers (Bonner, 2014; Civil & Bernier, 2009; Hodge & Cobb, 2016; Powell et al., 2016). The possibility of more equitable mathematics education was evident.

13.7   Conclusions and Implications

We argue that rather than positioning the disruption in schooling caused by the COVID-19 pandemic as a wholly negative experience, instead we can also view the opportunities for learning that occurred. It was possible both with the support of the New Zealand Ministry of Education and Massey University to facilitate educators to learn about mathematics within diverse learners' homes as strengths and assets during the lockdown. Both educators and the Ministry of Education took a key role in providing mathematical resources to the school community while also privileging both the well-being of students and their families. The mathematical learning of students that took place went beyond that accessed by digital means and included parents drawing on rich everyday opportunities. In turn, this provided teachers and school leaders with opportunities to learn about students' funds of knowledge.

We have illustrated that it was possible to continue with a strengths-based culturally sustaining approach to teaching mathematics through the lockdown period. Teachers engaged in deep reflection and took actions to ensure that they drew on opportunities both for asynchronous and synchronous mathematics teaching. A

clear focus on well-being arguably led to strengthened relationships. This was echoed through teachers' statements, and many referenced their wish to further build and develop relationships with parents and the community after the lockdown. In the new post-COVID-19 world, we argue that there needs to be ongoing consideration of how we, as teacher educators, can build on the disruption and use this as an opportunity to grow and learn about the communities within which we work.

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Dr. Jodie Hunter is an Associate Professor in Mathematics Education at the Institute of Education at Massey University and a Rutherford Discovery fellow. She began her career as a primary teacher in New Zealand before working as a Research Fellow at the University of Plymouth in the United Kingdom. Recently, Jodie was a Fulbright scholar at the University of Arizona studying the use of funds of knowledge models to accelerate the achievement of diverse students. Within New Zealand, Jodie coleads a large-scale professional development and learning project focused on culturally sustaining and ambitious mathematics teaching. Her research interests include early algebra, student voice, and drawing on funds of knowledge models within the classroom.

Roberta Hunter is a Professor of Pāsifika education studies at Massey University in New Zealand. She received her B. Education, Masters of Education, and her PhD in Education from Massey University. She is currently the codirector of a large multimillion-dollar New Zealand Ministry–funded research and practice-based project developed to support teachers to construct mathematics classrooms that are founded on best pedagogy within culturally sustaining practices. Her current research includes inquiry learning in mathematics classrooms, teachers developing mathematical practices within classrooms, culturally sustaining pedagogy within mathematics, and equity and social justice in mathematics. She has a long history as an expert advisor to the Ministry of Education in New Zealand on issues related to mathematics and equity for Māori and Pāsifika learners.

John Tupouniua is a Lecturer in Mathematics Education at the Institute of Education, Massey University in New Zealand. His current research works towards enhancing Maori and Pasifika students' achievement in mathematics, as part of the Developing Mathematical Inquiry Communities (DMIC) initiative. John's other research interests include analyzing advanced mathematical thinking and teaching and learning discrete mathematics (more specifically, the algorithmatizing approach).

Generosa Leach is a Lecturer in Mathematics Education at the Institute of Education, Massey University in New Zealand. Her current research includes teachers developing equitable learning environments in mathematics classrooms, inquiry learning in mathematics classrooms, and status and positioning in mathematics classrooms. Generosa's other research interests include culturally sustaining pedagogy within mathematics and social justice in mathematics.

Chapter 14
Supporting Schools in Times of Crisis: A Case of Partnerships and Networking with Schools by the Institute of Education at the University of Lisbon

Estela Costa, Monica Baptista, and Nuno Dorotea

Abstract This chapter examines the Institute of Education at the University of Lisbon (IE-ULisbon) and its engagement with schools during the current COVID-19 pandemic. We aim to supplement knowledge about responses to unanticipated crises impacting schools, factors influencing schools' coping strategies, and IE-ULisbon's actions in this unfolding context. Therefore, this case study follows two IE-ULisbon experiences with school clusters (totaling 1700 students and 160 teachers), meeting the challenges posed by the pandemic. Both examples relate to longer-term projects aiming to improve students' learning through innovative practices and teachers' capacity-building. However, the crisis instigated new difficulties for teachers, and researchers responded by empowering and enabling teachers to create learning environments to facilitate educational consistency and foster academic achievement.

14.1 Introduction

Crises such as COVID-19 are unpredictable and create widespread challenges for all sectors, particularly, to public authorities who must develop the appropriate responses to protect society. Crises are ambiguous in their causes, effects, and ways of resolution (Farazmand, 2007; Wart & Kapucu, 2011).

Due to COVID-19, 80% of the world's students were affected by school closures in 138 countries – including Portugal – according to UNESCO's Section of Education Policy. School closures caused enormous concern and anxiety among school actors, students, and parents. The Ministry of Education (ME) and the *Rádio Televisão Portuguesa* (the State television) offered television classes under

E. Costa (✉) · M. Baptista · N. Dorotea
Instituto de Educação da Universidade de Lisboa, Lisbon, Portugal
e-mail: ecosta@ie.ulisboa.pt

the name #*EstudoEmCasa* [#Studying at home]. The ME also developed a website called "*Apoio às Escolas*" [Supporting Schools] with information about exams, guidelines for using various platforms, distanced assessments, and a platform for teachers to share practices. Likewise, for each level of schooling, the ME distributed each subject's topics, essential learning checkpoints, and work proposals to aid teachers.

As teaching moved online, teachers adapted their methodologies within a short timeframe, providing their classes via electronic platforms and implementing new teaching strategies in an unprecedented way. However, some teachers found it difficult to take advantage of technology; instead of changing their practices to suit distance learning, they tended to overload students with homework and use archival (rather than discussion-based) platforms.

These circumstances reinforced the importance of a support system for schools relying on the existing networks with some higher education institutions (HEI). The Institute of Education at the University of Lisbon (IE-ULisbon) capitalized on existing partnerships to provide intensive assistance to schools. This case focuses on IE-ULisbon's engagement with schools and the factors impacting schools' coping strategies. We seek to answer the question: How did existing partnerships and networks help IE-ULisbon respond to the challenges of contemporary education systems during the pandemic?

In the first part of the paper we describe the school and university partnerships within the Portuguese context, especially related to school change and improvement. Then, we describe IE-ULisbon, the study's methodology, and the university's two examples of support during the pandemic. We close the article by discussing the results and presenting some challenges to consider in future scenarios.

14.2   An Overview on School/University Partnerships

Traditionally, a "network" is defined as a set of actors (individuals or organizations) joined by links, formally or informally (Borgatti & Foster, 2003). In its most basic form, it is a group of interconnected people from different sectors, suggesting the exchange of knowledge, skills, and resources for a common goal and the mutual benefit of all involved.

The Education and Training 2020[1] Working Group on Schools considers interinstitutional networks an effective approach: supporting horizontal decision-making; solving complex problems; sharing responsibilities; creating synergies between stakeholders; promoting knowledge-sharing and the dissemination of practice; enabling innovations to evolve more quickly; enhancing the professional development of teachers; supporting capacity-building in schools; optimizing the

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[1] https://ec.europa.eu/education/policies/european-policy-cooperation/et2020-working-groups_en

use of time and resources; and mediating between different levels of the system (European Commission, 2017).

Hadfield et al. (2006) define networks as "groups or systems of interconnected people and organizations (including schools) whose aims and purposes include the improvement of learning and aspects of well-being known to affect learning" (p. 5). Muijs et al. (2010) suggest a more comprehensive definition for educational networks, meaning "at least two organizations working together for a common purpose for at least some of the time" (p.6). According to the authors, networks aim to achieve goals related to school improvement, expanding opportunities, and sharing resources. Likewise, Muijs et al. (2010) state "school improvement partnerships frequently involve LEAs, universities, or external consultants" (p.19).

Our understanding of university-school partnerships and networks aims to create a space for the construction of educational knowledge that favors nonhierarchical, dialogic, and complementarity interactions among the various participants in the network, each one mobilizing "their own knowledgeability" and agency (Wenger, 2009; Westheimer, 2008). As stated by the EC (2017), "collaborative networks, whether online or face-to-face, enable innovations to evolve more quickly and are more effective as more people are involved in testing and improving new approaches given that diverse views help collaborators" (p.9).

Since IE-ULisbon has been fostering synergies and common interests with schools, we use the aforementioned conceptual framework to consider networking as an enterprise that can favor collaborative work and innovative learning and to research opportunities on current educational challenges, which should be relevant and useful for the diverse members of the network.

14.3 The Policy Context: Supporting Portuguese Schools' Efforts to Innovate and Improve

In Portugal, the extension of compulsory schooling up to the 12th year (Law no. 85, August 27, 2009)[2] accompanied high dropout rates and school failure, instigating authorities to push policy initiatives eliminating grade retention (Decree-Law no. 17, April 4, 2016)[3] and improving educational quality. The ME instituted pilot programs to improve student academic achievement and decrease grade retention and dropout rates (e.g., the More Success Program (2009–2012): the Early Bilingual Education Project (2010–2015) and the Pilot Project on Pedagogical Innovation (2016–2019), etc.). Therefore, current educational policies in Portugal focus on broadening the pedagogical autonomy of schools (Decree-Law no. 55, July 6, 2018),[4] allowing them to have greater flexibility in curriculum management

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[2] https://dre.pt/pesquisa/-/search/488826/details/maximized

[3] https://dre.pt/pesquisa/-/search/74007250/details/maximized

[4] https://dre.pt/home/-/dre/115652962/details/maximized

(Ordinance 181, June 11, 2019),[5] more inclusivity (Decree-Law no. 54, July 6, 2018),[6] and interdisciplinary articulation practices.

As schools have more autonomy and public authorities prefer school-based management, schools are requested greater accountability to respond to problems in each educational context (Costa & Almeida, 2019; Costa et al., 2020). Therefore, IE-ULisbon has been responding to a growing range of school clusters for intervention and support, monitoring and evaluation, and consolidation of teaching and research. Additionally, IE-ULisbon has been supporting the innovations that schools desire to achieve objectives such as intensification of collaborative relationships with organizations and education professionals; collaboration with education organizations and professionals in public programs to improve educational offerings and practices; interventions with education organizations and professionals for organizational and professional development; and creation, mobilization, and dissemination practices to promote educational quality. Briefly, IE-ULisbon's mission concerns school educational practices and organizational processes at the center of dynamics that generate intentional interrogation to feed processes of renewal and improvement of knowledge and action based on a culture of inquiry (cf. Fullan, 2001).

14.4   An Overview of IE-ULisbon's Mission: Networking to Improve the Education System

The University of Lisbon (ULisbon) is the largest and most prestigious university in Portugal. Seven centuries old, it is comprised of 18 schools, connecting science, technology, social sciences, arts, and humanities. IE-ULisbon is the University of Lisbon's graduate school of education, which is committed to research in education and training. Research is a central activity of the institute, combining fundamental and applied research in key domains of education and training. In 2019–2020, there were 1000 students enrolled in IE-ULisbon programs, including students from 17 countries, especially from countries where the official language is Portuguese.

As stated in the Director's *Action Program,* IE-ULisbon's mission is associated with the expansion and intensification of continued relationships with educational sectors and significant interlocutors. The goal is to improve the country's education system and generate knowledge for effective support to public education policies through research, training, intervention, and support (Carvalho, 2018). However, despite offering research and training activities in undergraduate and graduate programs, IE-ULisbon also creates and maintains meaningful partnerships and networks with different stakeholders located at different levels of the education system.

Organizations of different natures benefit from cooperation and joint responses to impactful issues around success and equity in the education sector. Following

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[5] https://dre.pt/home/-/dre/122541299/details/maximized

[6] https://dre.pt/home/-/dre/115652961/details/maximized

UNESCO's understanding that "the challenge for HEIs is to engage with society in an integral manner as a way of improving teaching and research and collaborate in social transformation," (PRIA, 2015, p.2), the Director's Action Program makes IE-ULisbon's social engagement evident, which is comprised of collaboration with various stakeholders in the definition and implementation of local educational policies and the development of new educational projects within the framework of decentralization policies (PRIA, 2015, p.2; Carvalho, 2018). Through what UNESCO called a "Multi-function Focus Engagement," which covers the three functions of HEI (teaching, research, and outreach/practice), IE-ULisbon outreach comprises activities such as research and intervention projects, consultation and evaluation services, and training activities, among others (PRIA, 2015, p.6). Furthermore, this outreach relies on networking by establishing partnerships of different kinds and operating through a multidisciplinary approach in the areas of curriculum, didactics, ICT, assessment, school evaluation and improvement, teacher education, and school administration.

14.5   Methodology

The case study is an in-depth exploration of a bounded system based on extensive data collection. "Bounded" means that the case is detached from research concerning time, place, and physical boundaries (Creswell, 2009). According to Cohen et al. (2007), contexts are unique and dynamic, and they examine and report on "the complexity of dynamics and interactions of events, and social actors and other issues in unique instance" (p.317). In this sense, the present study is focused on contemporary events, with experiences in real contexts related to daily life at schools. The case shares IE-ULisbon's activity to provide more accurate contributions to foster knowledge-based change and improvement in education. Specifically, it focuses on how the existing partnerships and networks of collaborative work and reflective processes helped the Institute to respond to the challenges of contemporary education systems, particularly during the current COVID-19 pandemic. Here, two IE-ULisbon school cluster experiences are followed throughout the challenges posed by the pandemic. Both relate to broader projects aiming to improve students' learning through innovative practices and teachers' capacity-building.

As each of the experiences vary based on their environmental context and the skills of those who work within the organizations, different data-gathering instruments were used (Fischbacher-Smith, 2016). In the first experience, data were collected from interviews to identify the school staff's understanding of IE-ULisbon's support. After interview protocols were developed, interviews were conducted with school principals, teachers, and coordinators. The transcripts were then subjected to content analysis (Bardin, 2009). In the second experience, we interviewed the school management and the project coordinator. Additionally, data were gathered from audio recordings of teacher training sessions throughout the time of COVID-19 and written reflections from teachers after the training program.

14.6   The Collaborations with Schools

14.6.1   *Networking to Support Teacher Needs on Assessing Students*

This first experience addresses the support to a school cluster located in Lisbon district by the IE-ULisbon's "Centre for Competence in Technologies and Innovation" (C2TI). Before the pandemic, the C2TI researchers had already developed outreach and follow-up work with teachers to promote their digital competencies. More specifically, the C2TI team intended for teachers to collaborate and develop their digital competencies based on the Digital Competence Framework for Educators (DigCompEdu).[7] DigCompEdu's focus on the digital competencies of teachers is useful to assess the digital competencies of the organization.

Therefore, to understand the extent to which digital technologies were integrated into teaching and utilized by teachers, the C2TI researchers developed a project whose results defined priority areas for intervention in the school cluster. As the results were not satisfactory, the C2TI team developed and implemented an organizational Digital Action Plan. The school management prioritized digital competencies, and the Digital Action Plan was built collaboratively with the school management team, teachers, and students. Its implementation included the provision of training resources, process monitoring, and evaluation and was funded by the ME, involving approximately 100 teachers and indirectly about 900 students.

When the pandemic began, the IE-ULisbon C2TI team was developing the Digital Action Plan with teachers. At the same time, the team also offered a training program about the integration of digital technologies in teaching and learning and their incorporation in STEM activities with programming and robotics. However, the COVID-19 crisis necessitated rethinking about how to work with teachers in this new scenario. The face-to-face sessions switched to distance training sessions using digital platforms, and the Digital Action Plan changed to a Distance Learning Plan (DLP – Plano E@D).

In this context, one important aspect for school actors was that they could count on the IE-ULisbon C2TI team, which guided and helped them modify the planned actions. As mentioned by one of the interviewees, "In the situation of COVID-19 (…) there was always support from the Institute of Education in the construction of the plan E@D of our school" (Interview, Teacher 1). In addition, during the crisis, teachers requested specific support to make changes to the training plan in response to the difficulties they were experiencing. The adjusted trainings relied on teamwork. Specific training on student learning assessments in distance learning was shared with teachers and implemented as quickly as possible. As one of the teachers told us: "It is worth mentioning the capacity for almost immediate response to the

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[7] European Framework for the Digital Competence of Educators: DigCompEdu. JRC (2017).

school cluster in a completely unexpected and anomalous situation and which, in our opinion, reinforced our sense of belonging" (Interview, Teacher 3).

The pandemic provided a window of opportunity for schools to develop organizational learning through training and joint reflection. Likewise, the intervention of the IE-ULisbon researchers promoted synergy among school actors, who pushed their school to be a center of change with flexibility to adapt to sudden circumstances and respond to subsequent challenges. As stated in a teacher's words: "The synergies we have generated between ourselves and with our partners, namely IE-ULisbon, made us aware that a true educational community goes far beyond a physical space!" (Interview, Teacher 5).

The school principal valued the importance of this specific training and its impact on teachers' conceptions; in her words: "The IE-ULisbon researchers always were present and available for counseling on the various structures of our school cluster. And, since the way to assess students' learning would be in the E@D model, this has become a real concern in the context of the pandemic. The training carried out on Formative Assessment with Digital (…) had an extremely positive feedback" (Interview, School Principal).

This specific training enhanced professional development, and the shift in response to the teachers' needs became an opportunity for collective learning and reflection. Not only did the training mobilize the researchers' knowledge, but also it inspired new avenues for teachers to consider about students' assessments. The school principal stated that "The alerts given, the practical examples, the questioning, and the intentional provocation of doubts that emerged, created in the teachers the need to make a deep reflection on this whole theme, causing (I hope) changes in the way they face the students' assessment" (Interview, School Principal).

The COVID-19 crisis increased a general willingness for joint refection and debate throughout the researchers' intervention. Schools needed solutions for the pandemic's effects on teacher responsibilities and student achievement. Therefore, reflection generated from the discussions between schools and IE-ULisbon fostered a useful analysis of problems and aligned with the training designed before COVID. For instance, student assessments were reviewed and transposed to an online format through organizational and individual maturation processes. Moreover, the training empowered teachers and helped them "to understand the importance of formative assessment and how to do it through digital resources and diversified strategies (active methodologies), with an impact on student learning, which was a fundamental support in COVID times" (Interview, Teacher 2).

With concern for monitoring of the Digital Action Plan, a questionnaire was developed and given to teachers, parents, and students. This instrument helped ascertain their perceptions about the implementation of the Distance Learning Plan during COVID-19.

The results showed that all teachers followed the Distance Learning Plan guidelines implemented at the school cluster during the pandemic. Most of the respondents said they easily adapted to the use of the platform and digital technologies, and that the articulated work with IE-ULisbon was essential. As for parents, most mentioned that teachers supported them by responding to difficulties with the

digital platform during distance activities with their children. Students believed that they adapted well to distance learning, most valued teachers' support, and the diversity of weekly tasks they developed during this time.

14.6.2 Networking to Ensure Students Learning

This second experience is part of a research project called "Let's GoSTEM", funded by the National Agency (FCT) and coordinated by IE-ULisbon. Within its framework, an IE-ULisbon team developed a collaborative project with the management, coordinators, and teachers at a school cluster located in the center of the country. IE-ULisbon and this school cluster have maintained a lasting history of partnership and networking.

The project involved approximately 60 teachers and 800 students from 1st to 9th grade and aimed to assess the impact of a STEM approach on students' (i) grasp of physics, (ii) motivation to learn science, and (iii) interest in STEM careers. To achieve these goals, the IE-ULisbon team developed a five-phase training program for teachers: (1) creation of STEM activities in collaboration with teachers; (2) implementation of activities by teachers with the support of the IE-ULisbon team; (3) collection of information by teachers, regarding student learning, motivation, and interest; (4) development of instruments for collecting data by the IE-ULisbon team; and (5) teacher reflection about their experiences and student results. During Phase 1 (September 2019 – March 2020), a sequence of STEM activities included the following aspects: curriculum integration, curriculum and STEM content connection, and identification of a physics problem linked to the students' reality, i.e., their local context. This was the starting point for student engagement, leading to the development of an investigation – using technological tools, engineering, and mathematics –to answer questions. Phases 2 and 3 of the teachers' training program started before the pandemic in January 2020 but ended in June 2020 due to the pandemic. Phase 4 occurred entirely during the COVID-19 pandemic period.

Given the unexpected situation caused by the virus, IE-ULisbon and the school cluster adjusted the training program to continue the project. The first alteration of training sessions was the transition to online classes starting in March 2020. For this change to be possible, researchers and the school cluster project coordinator divided the teachers in the training program into three groups of about 20 teachers, so smaller groups would foster a better discussion about the necessary changes to STEM activities. Teachers recognized the quick Institute response: "I highlight the performance of the IE-ULisbon team, with their work, availability, and demonstrated understanding. They motivated everyone's participation and commitment and allowed the project to continue, by videoconference, under exceptional conditions, in a context of social confinement given the pandemic of COVID-19" (Written reflection, Teacher 1).

The second change was related to the STEM activities planned in Phase 1, intended as face-to-face activities involving local partners (e.g., the municipality

and the local biomass center). However, with the crisis, students needed to do the activities remotely. Teacher training and its contribution to student achievement deeply concerned the school principal, who had worked very closely with IE-ULisbon to guide and create effective directions for teachers.

Therefore, through a bottom-up approach, IE-ULisbon researchers empowered teachers to make their own decisions and have confidence in them. As a deputy principal said, "Each teacher, given his context and level of education, could decide how many synchronous classes he would take per week and which platform to use for classes" (Interview, Management). Thus, teachers became responsible for the adaptations based on the characteristics of their class, including if they had already started teaching the STEM activities before switching to the online platform.

All changes were discussed online with the IE-ULisbon team. Based on collective discussions, decisions were agreed upon, such as in the case of the activity of organizing an open discussion with the local community to debate the implementation of the region's Biomass Center. The activity started before the pandemic. As stated by a teacher, students had already been "divided into groups. We started by collecting information from websites. Then, before the visit to the Biomass Centre, we made its location. In addition, we scheduled a meeting with the Mayor, who received us and answered the students' questions" (Audio recording training session, Teacher 3).

Despite the pandemic's interruption, the activity had to continue, and students needed to prepare a discussion and collect information to make informed decisions. However, it was necessary to introduce changes to the subsequent facets of the activity. Consequently, the training sessions fostered the exchange of views and information, and a platform for reflection mediated by the IE-ULisbon researchers was created.

Furthermore, these were strategic moments to align teachers' actions. According to one of the teachers, "When we moved to non-face-to-face sessions, we had to move from students group work to individual. Then, the work was divided amongst students. (…) Everyone prepared questions for the debate" (Audio recording training session, Teacher 3). The group of teachers decided to keep an online discussion open to the community. In addition, other decisions enhanced the activity and valued the distance work developed by students – "a digital book with the students' productions" (Audio recording training session, Teacher 4). Interactions between all the participants were online but had not lost their significance because people were strongly committed to responding to the crisis constraints and subsequent complex problems.

Another change from the pandemic is related to the project monitoring. Before the pandemic, the IE-ULisbon team intended to assess the effects of the project on science learning, student motivation to learn science, and student interest in pursuing STEM careers. For this purpose, the researchers developed a questionnaire offered twice: once, before the start of STEM activities (pretest), and again after the activities' completion (posttest). In September 2019, the students took the pretest, and the posttest was scheduled for June 2020. With the pandemic, it was necessary to adjust data collection instruments to the new reality.

Therefore, monitoring students' learning was carried out in close collaboration with the school cluster, using three data collection instruments: written student responses about the activities altered during the pandemic to know about their science learning progress, written teacher reflections in June to learn about their evaluation of the project and student involvement in STEM activities, and an interview with the project coordinator to hear his perspective on the project development.

In general, through analysis of the students' responses, there was a gradual and progressive evolution of their learning about science and its processes, which required students to adapt to new ways of learning, persistence, and support systems. Also, the work was developed either asynchronously or synchronously under the essential guidance of teachers. During a training session, a teacher explained, "We know that not all students responded in the beginning in the same way to distance learning and that this was reflected in their learning. However, for everyone to be able to do the activities, I used different resources and more individualized support. I often called the students and talked to their parents to ask questions. Students learned differently" (Written reflection, Teacher 6). The project coordinator also highlighted that the students "made learning related to the project activities in the context of a pandemic. Through a questionnaire, students gave very positive feedback about the activities, a large part of whom identifying it as what they most enjoyed during confinement. Their degree of motivation and involvement with the project activities, even in the context of COVID-19, was high and allowed them to develop their autonomy" (Interview, project coordinator).

In addition, the project coordinator stressed that the continuity of "support from the IE-ULisbon team, even in the situation we live in, was essential for things to go well. Teachers knew they would be supported in the changes to be introduced and the project will continue, even under COVID-19 constraints, with the implementation of changes for nonclassroom teaching…and this motivated them to continue, involved them. This is reflected, of course, in the performance of students and their learning" (Interview, project coordinator).

14.7   Discussion

The case study follows two IE-ULisbon collaborations with school clusters that faced challenges posed by the COVID-19 crisis. Both are related to broader projects aiming to improve student learning through innovative practices and teacher capacity-building. The two collaborations also illustrate IE-ULisbon's activity in public action, thus contributing to social transformation and knowledge-building, as well as their aim to find common and meaningful responses to crisis situations.

Moreover, according to the strategy of IE-ULisbon, "the Education organizations and professionals are central to promoting quality public education and social development. More than recipients of the knowledge disseminated by IE-ULisbon, they are fundamental partners for the achievement of IE-ULisbon's missions" (Carvalho, 2018, p.4). In the strategic plan of the Institute, the processes of

contextual construction of knowledge and practices in basic and secondary education are encouraged. The engagement of IE-ULisbon researchers in the two collaborations examined corroborates the importance of an orientation towards the purpose of working "within the framework of an interaction between those involved in public programs to improve educational offerings and practices" (idem, p.5).

The engagement of researchers in the two collaborations also confirms the importance of a defined orientation by the IE-ULisbon leadership, whose strategic guidance is delineated and networking-oriented. Both collaborations show partnerships and networking benefits, which were particularly important during the pandemic in empowering teachers to create learning and formatively assess their students online (Borgatti & Foster, 2003; EC, 2017; Mujis et al., 2010).

The results show that collaborative work with the school clusters – understood as "joint activities between actors from different organizations within the network"– developed by the researchers before the pandemic was based on caring and trusting relationships (Mujis et al., 2010). One of the advantages of collaboration within networks is the promotion of mutual learning. Moreover, they also helped to mitigate the effects of the crisis by reducing uncertainty (Borgatti & Foster, 2003). This proved to be crucial for teachers, as they felt comfortable and willing to quickly adopt new practices associated with distance learning, thus, continuing the activities during the pandemic.

Additionally, the fact that teacher training has continued – changing from face-to-face instruction to distance learning – encouraged teachers, helping them believe that everything was under control and it was possible to implement the Distance Learning Plan and evaluate students learning at a distance (in the case of the first experience), or to adapt STEM activities to distance learning (in the case of the second experience).

HEI and school partnerships play an important role in crisis contexts. From an institutional point of view, the Institute's engagement with social priority areas and academic goals is clearly identified in its mission. The idea of partnership is highly valued, with the cooperation of various stakeholders to meet mutual needs, as referred to by UNESCO's report as a "mutual exchange of knowledge between the universities and communities in an attempt to produce an output which is of benefit to the larger society" (PRIA, 2015, p. 3). However, these were not isolated engagements but relationships built in a research-practice context that provides benefits for both IE-ULisbon and schools. Responding to such an emergency like COVID-19 has been easier because networking already existed and the HEI institutional mission and researchers were committed to the projects. The levels of engagement in both experiences are high because they operate within projects from the IE-ULisbon goal framework for the improvement of the education system.

The fact that IE-ULisbon teams and school actors co-built their own solutions instead of simply implementing proposals developed from the outside shows the potential of inside networking. As it was proved, in crisis situations, networking by means of research projects, intervention programs, and training activities are critical to assuage anxiety and achieve success.

The results of these two experiences are encouraging. It is, therefore, the intention of IE-ULisbon to continue to collaborate with the school clusters and accompany them on their journey next school year in the continued pandemic scenario.

14.8   Conclusion

These experiences lead us to conclude that there is a need for supporting teachers in the use of digital platforms and collaborative activity preparation together with researchers. Teachers then can teach in distance learning and systematically monitor students' learning.

Some questions arise from this case study: Based on these experiences, what characteristics should the training have? What kind of activities should we do with teachers in the future? How do we best monitor students' learning? Both experiences give clues for future situations. In a pandemic context, teacher training must mitigate risks. For this reason, it may be important to support teachers' development of digital skills and create collaborative groups for sharing and discussing their work, the exploration of new ideas, and evidence-based reflection about students' learning and difficulties through interactions and joint reflection. In the next year, C2Ti will collaborate with the ME in the promotion of several awareness-raising and training activities for 90,000 teachers to use technologies more efficiently and to design more meaningful and diversified assessment activities.

Another crucial aspect is students' learning and their motivation to learn in pandemic contexts. One way to ensure their motivation is through intentional and systematic data collection with teacher assistance. In this case, the role of middle-level management appears to foster useful communication and collective alignment around a common mission. Based on nonhierarchical relationships, networking can help to widen opportunities and solve problems in crisis situations, especially if school principals and middle-level management are focused on the instructional core of schooling, as evidenced in both experiences (cf. Leithwood & Louis, 2011; Hallinger, 2012).

Moreover, the assumption that leadership is one of the factors with a significant impact on education quality (OECD, 2013) was visible in this study. As it could be seen in the two experiences, school management teams were committed to teacher education and saw IE-ULisbon as an ally to help cultivate teacher alignment. Ultimately, as already studied, leadership for learning is a determinant to build school capacity to improve student learning outcomes (Hallinger & Heck, 2010).

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Estela Costa holds a PhD in education, in the specialization area of administration and educational policy from the Institute of Education, University of Lisbon (IE-ULisbon). She is a professor at the IE-ULisbon and a researcher in the "Research and Development Unit in Education and Training" (UIDEF). Presently, she is deputy director of the IE-ULisboa and coordinates the M.Ed. in School Management and Administration. Her research focuses on school management and leadership, innovation, education policy and school evaluation, and international large-scale assessments (ILSA).

Mónica Baptista holds a PhD in education, in the specialization area of science education, from the Institute of Education of the University of Lisbon, Portugal (IE-ULisbon). She is a professor at the IE-ULisbon and a researcher in the "Research and Development Unit in Education and Training" (UIDEF). Presently, she is deputy director of the IE-ULisboa and coordinates the master program in physics and chemistry teaching. Her research focuses on inquiry-based science education, STEM education, ICT in science teaching, and lesson study with preservice and in-service teachers.

Nuno Dorotea holds a PhD in education, in the specialization area of information and communication technologies in education, from the Institute of Education of the University of Lisbon, Portugal (IE-ULisbon). He is an invited assistant professor at IE-ULisbon and a member of the Network of Portuguese Centers of ICT Competences of the Ministry of Education. His research interests include technology-enhanced learning, online learning, assessment of learning with digital technologies, adaptive platforms in learning and assessment, and teacher training in digital technologies.

Chapter 15
Educational Continuity During the COVID-19 Pandemic at Qatar Foundation's MultiverCity

Check for updates

Buthaina Ali Al Nuaimi, Hend Zainal, and Francisco Marmolejo

Abstract Since 1995, the Qatar Foundation (QF) has played a key role in the development of Qatar through education, science, and community development. QF is an "umbrella" array of more than 50 entities covering the entire educational system from PreK-12 schools to doctoral higher education, in addition to a variety of related organizations supporting innovation, health, culture, and community development. This case study examines how the QF Multiverse-city (MultiverCity) model has created synergies between Higher Education and Pre-University Education, which have contributed to support educational continuity during the pandemic across the Foundation and beyond. All the programs shifted to the online delivery mode and new professional development programs and online resources were designed and delivered to teachers to support them in this sudden transition. Also, QF organized a series of virtual global conferences addressing the impact of COVID-19 on education, the responses of schools and systems, and how to reimagine education postcrisis. An electronic publication discussing the different experiences shared in the conference with policy recommendations is being released with the aims of informing policymakers and educators in Qatar and globally.

The unique ecosystem of QF has shown its advantages by witnessing a significant proliferation of initiatives devoted to supporting the continuation of elementary and secondary education both in QF schools and nationwide. One of the success factors of these initiatives is the strong links and partnerships that QF has established between its entities and all the education stakeholders nationally and internationally over the past 25 years. Community outreach and support to PreK-12 education have always been integral to QF strategy. At the same time, the pandemic has provided opportunities for further impact research, and for further learning

B. A. Al Nuaimi (✉)
Pre-University Education, Qatar Foundation, Doha, Qatar
e-mail: balnuaimi@qf.org.qa

H. Zainal
Higher Education Portfolio Management, Qatar Foundation, Doha, Qatar

F. Marmolejo
Higher Education, Qatar Foundation, Doha, Qatar

about the impact of contingencies, implementation of emergency plans, and best practices for more effective connectedness between different levels of the educational system.

15.1 The Role of the Qatar Foundation (QF) in the National Education Landscape

In recent years, Qatar has experienced a remarkable transformation towards the goal of becoming a knowledge-based economy and society (Ben Hassen, 2019, 2020; Weber, 2014). Since education is seen as a key enabler of such transformation, the overall educational sector has been undergoing rapid development and reform by a top-down approach supported with significant investment (Ibnouf & Knight, 2014; Koç & Kayan Fadlelmula, 2016).

In order to achieve such an ambitious aspiration, a key player working towards advanced education has been the Qatar Foundation for Education, Science, and Community Development. More commonly referred to as the Qatar Foundation (QF), it is regarded as the primary driver of change in the country, and as the key national facilitator for building capacity to prepare the nation to become a "knowledge society" (Weber, 2014; Powell, 2014). This means that QF sees itself not simply as a provider of specific education programs at all levels, but also as the enabler of innovation in society at large, as the country evolves into an education and research hub (Alraouf, 2018).

Founded in 1995, QF is a publicly supported nonprofit organization established by His Highness Sheikh Hamad bin Khalifa Al-Thani and Her Highness Sheikha Moza bint Nasser to realize their vision for the future of Qatar by investing in human capital and unlocking human potential. Unlike a typical university, QF is the "umbrella" organization comprising more than 50 entities covering the entire education range, from PreK-12 schools to graduate and postgraduate higher education programs, including programs at masters and doctoral levels. In addition, a variety of related QF entities support innovation, health, cultural, and community development.

The unique education and innovation ecosystem established at QF brings together education institutions with different missions, methodological approaches, and areas of interest. Leveraging the unique relationship with the government – its autonomous status, its role as a national driver for education and innovation, and its decentralized approach – QF has developed and established internal mechanisms to foster connectedness and collaboration between its different education institutions. In addition, QF collaborates with public and private schools that are not part of the "umbrella" and with related government entities, most notably the Ministry of Education and Higher Education.

The flagship initiative of the Qatar Foundation is a 3000-acre state of the art campus, known as "Education City." Education City is host to seven elementary and

secondary schools and has brought under its umbrella branch campuses of eight of the world's leading universities,[1] along with a homegrown university.[2] There are also research and policy institutes, community development centers, and, additionally, six schools located in different parts of the country. The combined enrollment of the education institutions housed at Qatar Foundation is approximately 10,000 students comprising more than 90 nationalities. Credited with being perhaps "the largest single educational project undertaken anywhere in the world," QF's Education City is an unprecedented development in the field of International Branch Campus (IBC) and global higher education (Alraouf, 2018; Crist, 2015).

15.2 Enabling Synergies Between Different Levels of Education

There are manifest benefits from strengthening collaboration between higher education institutions and elementary and secondary schools. For instance, the disconnect between high schools and universities is mostly an artifact of significant disparity between high school exit requirements and college entry expectations (Blackboard Institute, 2011). This could be addressed with more effective coordination and cooperation between these education levels. Likewise, school satisfaction is an important predictor of elementary school students' aspirations for higher education (Sabic & Jokic, 2019), and this can be enhanced by effective collaboration with secondary schools. Nevertheless, globally, communication and collaboration between higher education and elementary and secondary schools tend to be limited. The COVID-19 pandemic laid bare such shortcomings in collaboration and simultaneously, demonstrated the advantages in cases where such synergies between different levels of education were present.

The operational model adopted by QF has been established under the principle of multilevel collaboration. Referred to as "MultiverCity," QF's model offers a globally unique experience for its different stakeholders, with diverse and personalized pathways. To do this, QF brings together world-class education institutions at all stages of education, research entities, incubators, and supporting infrastructure in a highly integrated and flexible ecosystem. The model is aimed at enabling multiple synergies between the different parts of its ecosystem, for the benefit of the learner and with the aim of enhancing the student experience. To do this, QF's higher education institutions play a key role (see Fig. 15.1).

The MultiverCity model explicitly seeks to create linkages between QF's domains of work: Pre-University Education, Higher Education, Community

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[1] Partner higher education established at QF's Education City include Texas A&M University (TAMU-Q), Carnegie Mellon University (CMU-Q), Northwestern University (NW-Q), Georgetown University (GU-Q), Weill Cornell Medicine (WCU-Q), Virginia Commonwealth University (VCU-Q), University College of London (UCL) and HEC-Paris.

[2] Hamad bin Khalifa University (HBKU).
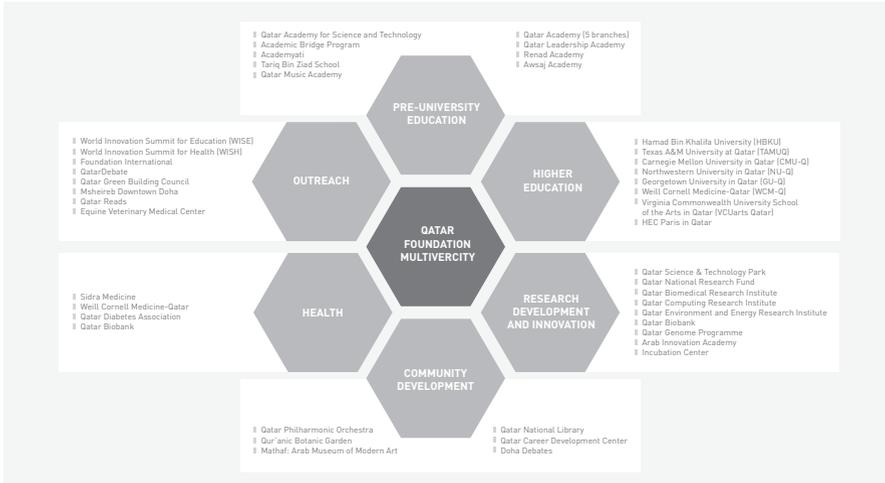
Fig. 15.1 MultiverCity approach at Qatar Foundation

Development, Research Development, and Innovation, Health, and Outreach. Students are at the center of the concept, and the community at large is the beneficiary. This model provides students greater flexibility towards a more personalized learning experience and provides them with opportunities to explore different learning modalities in a way that supports maximum learning outcomes, and for their development to become impactful to society.

15.3 Addressing the COVID-19 Pandemic Educational Challenges: A Multilevel and Multipurpose Response

This case study focuses on showcasing how the QF MultiverCity model has created synergies between its higher education institutions amongst themselves and between Higher Education and Pre-University Education, which have supported educational continuity during the pandemic across the Foundation and beyond (see Table 15.1).

Considering the varied assortment of institutions comprising QF, and the complexities associated with the simultaneous operations of many entities, it was expected that the COVID-19 pandemic could create a significant disruption after the closure of schools as mandated by the Government of Qatar, with effect from 10 March 2020. Evidently, each institution put in place an emergency action plan aimed at transitioning the delivery of courses into a virtual environment for their own students. At the same time, due to the number of collaborations already in place among QF institutions and the need to use available resources more wisely, several collaborative activities aimed at supporting students at all levels of education, as

Table 15.1 Typology of QF activities in support of elementary and secondary education during the pandemic

ACTIVITY	INSTITUTION	KEY BENEFICIARY TARGET GROUP				EDUCATIONAL LEVEL		TIMING		TYPE OF ACTIVITY				
		Students	Teachers	Parents	Educators and Policy Makers	Elementary Education	Secondary Education	New	Existing and Adapted	Online Delivery of Teaching	Online Resources	Professional Development	Research	Supporting Policy
Mobile app for mental health	HBKU	√		√		√	√				√		√	
Platform for autistic kids	HBKU	√	√	√		√		√			√		√	
Online Spring Language Course	HBKU	√				√	√		√	√				
Designing post-COVID Summer Program	HBKU	√				√	√	√		√				
IDEA Program	TAMUQ	√					√		√	√				
Creative Fusion	TAMUQ	√					√		√	√				
Online Robotics Program	TAMUQ	√					√	√		√				
MindCraft Virtual	CMUQ	√					√	√		√				
Game Developer Academy	CMUQ	√					√		√	√				
Summer College Preview Program	CMUQ	√					√		√	√				
Hoyacation: student-led tutoring	GU-Q	√				√	√	√		√				
Global Leadership Summer Program	GU-Q	√					√	√		√				
Pre-College Summer Program	GU-Q	√					√		√	√				
Global Challengers GC	GU-Q	√					√		√	√				
Virtual Studios Program	VCU-Q	√				√	√		√	√				
Summer Program	VCU-Q	√				√	√		√	√				
VCUarts Qatar Gallery	VCU-Q	√				√		√						
Online training on digital platforms	EDI		√			√	√	√				√		√
E-Learning Platform	EDI		√			√	√	√						√
Induction Program for Teachers	EDI		√			√	√		√			√		
LEAPS Summit	PUE		√		√	√	√		√			√		√
WISE Disruptive Education Conference	WISE		√		√	√	√	√				√		√

well as other institutions within and outside QF, and even outreach to the general public in support of the continuation of education, started to emerge.

Naturally, some of the collaborative initiatives described in this case study were already in place and have transitioned into remote delivery models to facilitate their continuation during the pandemic crisis. In addition, several new collaborative activities were rapidly designed and ready to be implemented for the following summer session.

In general, the varied assortment of activities conducted in QF, in support of school education during the pandemic, can be classified into the following categories:

15.3.1 Online Delivery of Teaching-Learning

As expected, an immediate priority addressed by universities was to assure the continuation of delivery of education to their own students, by transitioning to remote delivery using different technological platforms. The institutional leadership of QF also expressed the intention to implement a continuation transition not only in regular programs but also in those initiatives supporting other levels of education. Similarly, partner universities housed at QF rapidly evaluated the feasibility of offering in an online format the different initiatives already in place in connection with the pre-university engagement. Interestingly, new programs being designed before the pandemic for delivery using a traditional face-to-face approach were rapidly adapted to an online format. This is the case of the Robotics Program offered

by Texas A&M University-Qatar, which in its original format would bring together secondary school students to work in teams to assemble robots. Another innovation is the MindCraft Virtual offered by Carnegie Mellon University-Qatar, which rapidly transitioned to an online format in order to offer a series of six workshops during the summer, targeting a total of 200 students from more than 30 local schools. A pilot has been successfully completed, and there are plans to investigate ways by which the program can be scaled to reach a larger number of students during the Fall semester.

15.3.2   Development and Deployment of Online Resources

Universities at QF used their technological capacity to make available online resources in support of education. For instance, Hamad bin Khalifa University, the homegrown higher education institution at QF, quickly developed a mobile app to assess the mental health of students at home. Similarly, a platform to support the education of students with autism has been developed and launched. Also, QF set up the Pre-University Education E-Learning Platform with the goal of supporting teachers and parents by making available online pedagogical resources.

15.3.3   Professional Development

Despite regular efforts to keep teachers up to date and familiar with cutting-edge pedagogical methodologies and technology, the magnitude of the sudden closure required a rapid response to assure that all teachers would be able to transition successfully and effectively to online learning. Initiatives at QF, originally designed to support its own elementary and secondary schools, were identified by the Ministry of Education and Higher Education of Qatar as an efficient way to expand the scope of online learning to the entire country. As a result, structured online training on digital platforms was offered to elementary and secondary school teachers at the national level. Similarly, the typical Induction Program being designed for QF teachers was also made available to all teachers in the country.

15.3.4   Research

Considering the sudden closure of universities, most research efforts also were placed on hold. However, the pandemic offered an opportunity to align some related activities in support of elementary and secondary education. This is the case for a team at HBKU, which has worked on a mixed-reality (real-time teaching and virtual teaching) interactive educational platform, designed with the purpose of supporting

remote learning for children with autism. QF's Education Development Institute (EDI) has been conducting research on the teaching-learning process during the pandemic by collecting data from parents, teachers, and students; observing "classroom" interactions; and analyzing school logs and academic performance reports. Preliminary findings have been shared with schools and reports have been published afterward. In addition, the learning track at the QF-based World Innovation Summit on Education (WISE) has conducted research on skills gaps of learners in Qatar in connection with the pandemic.

15.3.5 Supporting Policy and General Outreach

The efforts conducted by universities and other education entities affiliated with QF are supporting the government of Qatar as it copes with the pandemic. Experts from different fields of work are regularly being called by government entities to provide technical advice, often with respect to education. Activities such as the training of teachers on the use of technological tools and digital pedagogies were designed and offered both to those teaching in QF elementary and secondary schools, and to teachers from all schools in the country. Policy discussions, for example, about the reopening of schools in the country are usually informed with perspectives from QF experts. In addition, QF-based entities, including the World Innovation Summit on Education (WISE), organized a series of virtual global conferences addressing the impact of COVID-19 on education, the responses of schools and systems, and how to reimagine education postcrisis. An electronic publication discussing the different experiences shared in the conference with policy recommendations is being released with the aims of informing policymakers and educators in Qatar and globally.

15.4 Institutional Actions in Support of Continuation of Elementary and Secondary Education

A more detailed explanation of the different activities conducted by QF-related universities and other relevant educational entities is included below.

15.4.1 Connecting Research with Educational Support: Hamad Bin Khalifa University (HBKU)

HBKU is a homegrown research and graduate studies university founded by QF in 2010. It aims to be a catalyst for positive transformation in Qatar, as well as having a global impact.

The involvement of HBKU in support of the continuation of education in pre-university institutions includes the development of apps and the delivery of courses remotely.

A good example is a mobile application quickly developed in the College of Science and Engineering that can analyze children's drawings using an Artificial Intelligence algorithm to assess the current state of a child's mental health. The mobile app was developed during the COVID-19 crisis to help parents engage with their children about their mental health during this especially worrying period. The app has been adopted by over 1000 local schools. Online drawings are classified into two categories representing positive or negative emotions, assessed, and categorized by a professionally trained art therapist. The platform was developed by considering the feedback of psychologists and school counselors from a number of QF schools. Using the app, parents can observe a historical trend of their child's state of mind, organized weekly or monthly, and are encouraged to discuss the emotional readings of the app with school counselors.

The Qatar National Research Fund (QNRF), another member of the Qatar Foundation, launched a fast-track research program to support Qatar in mitigating the impact of the pandemic on various sectors. HBKU was awarded a grant for a mixed-reality (real-time teaching and virtual teaching) interactive educational platform to support remote learning for children with autism. This project aims to develop, evaluate, and launch an interactive educational platform using mixed-reality to enable remote learning for children with Autism Spectrum Disorder (ASD), which is particularly challenging during the COVID-19 period. The concept is a product of HBKU's continuous collaboration with Shafallah, a center for people with disabilities, and Mada, an assistive technology center, which has previously developed an augmented reality (AR) vocabulary learning application in English and Arabic for children with ASD. The app supports learning the alphabet and words in an interactive environment. It is planned to extend this app to a full-educational platform using mixed-reality. The child will be learning in a real-time environment when a teacher, child, and parents are all online together at a given time; however, in the absence of a teacher, a 3D humanoid talkative avatar will support a child and its parents in a virtual environment. The platform will encourage teachers to create tailored content and individualized online learning plans. Teachers will also have the capability to communicate with the children and their parents through the platform. It will allow teachers, specialists, and parents to monitor the child's performance. The platform, which can be used via tablet devices, will be deployed at the centers and special education schools. It is currently in the development phase; prototypes will be ready soon for trial with teachers and children.

Regarding efforts towards transitioning from face-to-face to remote delivery of education, the Language Center at the College of Humanities and Social Sciences at HBKU transitioned their Spring language courses and workshops online. Over 400 students aged 5–15 years were enrolled in 34 courses.

More recently, HBKU launched the "Design Post COVID-19 Normal" summer program, which was created for "the new normal," to be designed fairly and effectively by youth. It comprised 4 weeks of human-centered design thinking workshops and inspirational talks with high-level speakers. Approximately, one hundred

students have participated in this course. The purpose is to develop products, services, and system (solution) ideas on a prototype scale that are effective and applicable to a defined problem related to the Sustainable Development Goals (SDGs). Teams developed action plans to address the problems they are working on.

15.4.2 Nurturing STEM Activities: Texas A&M University at Qatar (TAMUQ)

Texas A&M University at Qatar's STEM outreach activities continued in a virtual environment. More than 400 students in Qatar registered for a five-week program called IDEA (Innovate, Design and Engineer an App) in April–May 2020. This program taught the fundamentals of mobile app programming, and students developed apps within thematic areas each week.

A second program, Creative Fusion: Introduction to 3D Modeling, had more than 300 participants in grades 8–12 in a four-week sequence to learn about 3D modeling, CAD design, and rapid prototyping using 3D printers. This program was also linked to curricular requirements for students at QF's Qatar Academy for Science and Technology.

An online robotics program developed prior to the pandemic has been adapted considering the limitations of physical interaction of teams of students working towards the designing, building, and programming of robots for automated tasks. The redesign of the program required transferring the methodology into a simulated environment being used by virtual teams of participating students. This experience is extensible because students can transfer their designs and programming projects to real-life robots when it becomes safe to gather in groups.

15.4.3 Supporting Interest in Computer Science: Carnegie Mellon University in Qatar (CMUQ)

CMUQ has engaged in an online outreach effort with the creation and introduction of MindCraft Virtual. This event is a new online series of workshops designed for high school students to help them get exposed to computational thinking and Computer Science. During the first 3 months of the lockdown, a CMUQ's team worked remotely to develop these workshops offered as a series of six sessions during the summer, targeting a total of 200 students from more than 30 local high schools. After successful completion of a pilot, and based on the experience during the virtual offering during the summer, plans were made to investigate ways by which the program can be scaled to reach a larger number of students during the Fall semester.

Also, the HBJ Center at CMUQ has developed a "Game Developer Academy" aimed at students in Grade 8–12. This in-depth workshop, held over a two-week period, attracted 80 applicants from a wide range of schools in Qatar.

Additionally, a Summer College Preview Program has been designed to help secondary school students strengthen their academic profile, prepare for standardized tests (SAT/ACT), and understand the college admission process. The program was moved to a virtual environment and received over 250 applications for a class of 70 students from 30 different secondary schools in Doha.

15.4.4   A Focus on Civil Service: Georgetown University in Qatar (GU-Q)

Hoyacation is a voluntary program where GU-Q students are offering a range of classes to elementary and secondary school students. This was a new online program launched in 2020 to keep kids engaged through the summer while learning new skills. It also provided an opportunity for GU-Q students to offer a service to the community. This program has kept GU-Q students motivated, connected, and supportive of each other. The range of topics included in the program are creative writing, eco-learning, guitar classes, creative writing (poetry), Persian, German, MUN, events planning, Canva, and even cake baking and decorating.

Additionally, GU-Q recently offered a two-week Global Leadership Summer program focusing on leadership skills to grades 9–12 students. This program was created in direct response to students being home for the summer and was held entirely online. The program was free of cost and involved two cohorts, one in the morning and one in the afternoon, for 2 weeks in June 2020.

Also, the Georgetown Precollege Summer program (GPS) helps prepare students for the challenges of university life. The three-week program introduces Georgetown Qatar's curriculum, provides SAT/ACT preparation sessions, includes preparatory courses in English and math, and offers study skills workshops. This is a long-running program, offered in July every year. For summer 2020, it was offered in an online format.

Similarly, the Georgetown Global Challengers (GGC), which was launched in Fall 2019, is a monthly workshop where high school students (Grade 11 and 12) get the unique opportunity to delve deeper into world issues through a series of workshops and learning exercises. Due to the pandemic, the program transitioned into online delivery.

15.4.5   Creative Outlets: Virginia Commonwealth University, School of the Arts in Qatar (VCUQ)

VCUQ's mission is to cultivate a dynamic intercultural environment of diverse research, learning, and community engagement that propels the holistic development of exemplary artists, designers, and scholars to build vibrant communities and diversified economies.

In alignment with the aforementioned mission, VCUQ's Community and Continuing Education department acted quickly to transfer its outreach activities and community programs to the virtual classroom environment. The Community and Continuing Education department reached out and assessed the needs of elementary and secondary (K-12) students and were able to provide virtual programs to the community to support them in times of crisis:

In the midst of the pandemic, the Virtual Studios program offered six online courses. These short courses were designed for online platforms. They offered creative outlets to the public and helped them to be connected to VCUarts Qatar. The programs were designed for different age groups:

- Set up your Creative Home Office (16+ years)
- Design Thinking in Design and Entrepreneurship (16+ years)
- Art & Collective Conversations in Crisis (16+ years)
- Art in Support of our Heroes
- Encouraging your Child's Creativity at Home (for parents)
- 2D Animation for Kids (Age 10–13)

The program, offered during the months of April and May 2020, was well-received by the local community with 600 registrations. Involvement came from all age groups, and many provided positive feedback that showcased the professionalism of the instructors (a majority are of VCUarts Qatar Alumni), the depth of the curriculum, and most importantly, the value learned that they were able to transfer directly to help them cope with the pressure of the pandemic.

The second program that was offered in July 2020 was originally an annual program that offered 25 art and design classes for children and high school students (4–18 years). This year, the Summer Program was modified to an intensive three-week online course for high school students only, with an optional 1 week of portfolio development classes. The program's curriculum is designed to build the students' art and design skills and to assist them with developing their portfolios for applying to study at an art and design school. The students can design the program based on their interests and needs, which is one of the goals that the Community and Continuing Education department keeps in mind during the development of its programs. They are always student-centric and follow current trends.

The program is focused on offering student-centric and focused modules, based on the age group, to develop critical thinking through art and introducing participants to different types of creativity. This modified focus became a substitution for the traditional 25 classes that used to be offered. This strategic change was brought forward by the department as an answer to the ongoing understanding of their student's needs and wants, and to provide the best fit for the virtual classroom environment. In addition to the above four courses, the department is developing several other programs that are aimed at K-12 students.

Finally, the VCUarts Qatar Gallery has launched an interactive online learning guide for its exhibitions. The project is geared toward elementary school students, ages 6–9, who will be able to virtually engage with content exhibited in the VCUQ art and design gallery (e.g., color studies from the Spring exhibition). In

collaboration with VCUQ's Community Education program, this project engages alumni who will act as virtual docents.

15.4.6 Support Capacity Building: The Education Development Institute

The Education Development Institute (EDI) was established at QF in 2014 with the vision of advancing teaching and learning through quality professional development programs for educators, nationally and internationally. In addition to its in-house training programs, EDI offers programs in collaboration with leading educational organizations like the International Baccalaureate Organization, the Institute of Education of University College London, and the University of Bath. EDI supports continuity of education during the pandemic by providing training and professional development to elementary and secondary school teachers throughout the country. One means by which it does this is a series of three annual conferences:

The Teaching and Learning Forum: Attended by more than 1500 educators annually. It is a platform for teachers to share their best practices, exchange expertise, and network. The 2020 edition was held online in October and discussed the topic of Education for Resilience.

iSTEMed: A conference dedicated to Science, Technology, Engineering, and Mathematics (STEM) education, which brings together private and public entities in Qatar, as well as teachers and students, to learn more about the latest developments in this field and enhance STEM offerings in schools. It attracts around 250 participants annually.

The Heritage and Culture Forum: A platform for dialogue on learning initiatives around culture, heritage, and language. It brings together practitioners annually to discuss challenges and find innovative solutions.

- When COVID-19 interrupted education, and schools closed and transitioned to online learning, EDI promptly took action to support the continuity of teaching and learning.
- **EDI training on the use of MS teams for e-learning and online collaboration:** Training was delivered to more than 1800 teachers in the country (of which 205 are affiliated to QF pre-university schools) for "e-learning" and "e-collaboration" using MS-Teams, and for "distance learning" using GoTo Meeting. Instruction to teachers was offered both in English and Arabic. Satisfaction surveys conducted show a high level of impact across all participating teachers. Some initial findings from the survey indicate that in addition to the received training, teachers also want to receive training on: a higher level of MS Teams training with a special focus using apps such as Sway and interactive PowerPoint; exploring other online learning platforms such as Seesaw, Zoom, and Google Classroom; online teaching-learning tools for assessment, motivat-

ing students, certificates, and grade books; using tools related to student partici-
pation such as feedback online, communication with students and parents, and
student engagement; and understanding tools related to parents' participation,
including training for parents on how to use MS Teams to help their children.

- **E-learning platform:** One week after schools were closed due to the pandemic,
  EDI took the initiative to develop a bilingual platform through which resources
  can be shared with educators in and outside QF. The PU eLearning Site has since
  developed into a repository of resources for K-12 educators, where each posting
  is suggested by an educator and reviewed according to the following criteria:
  compatibility with the technology available in most schools in Qatar, relevance
  (alignment with the curriculum guidelines and pedagogical principles adopted in
  QF schools), display and formatting, intellectual property (assuring the respect
  of copyright and Creative Commons rights), and justification (by describing an
  adequate recommendation of its usefulness).
- **A new approach to induction**: EDI has gathered a considerable amount of data
  on the needs of elementary and secondary school educators in professional learn-
  ing, specifically to address the challenges of distance learning and the pedagogi-
  cal shifts that have become a mandate for a sustainable post-COVID-19
  educational model. To respond to this need, EDI has planned for a series of pro-
  fessional learning experiences in the following four areas:

  – Building a supportive and collaborative online learning community.
  – Fostering engagement through synchronous and asynchronous learning.
  – Online assessment of students' learning.
  – Digital citizenship: International Society for Technology in Education (ISTE)
    Standards and effective practices.

Online sessions were offered in August to provide educators with the pedagogical
tools and methodologies to be as prepared as possible for the new academic year.
Initially targeted at staff working in the pre-university schools of QF, the oppor-
tunity was later extended to other schools in Qatar.

15.4.7   Leading Educational Advancement Through Progressive Schools Summit (LEAPS Summit)

LEAPS is a first-of-its-kind international summit organized by Qatar Foundation
Pre-University Education (PUE) to bring together leading global progressive
schools to discuss issues and find solutions through partnerships and collaboration.
Progressive schools around the world share a vision to build the future of education
through innovation and disruption of the traditional models of teaching and learn-
ing. The pedagogical goals and approach of these schools also often differ from the
traditional schools in their countries. Consequently, the challenges and opportuni-
ties faced by these schools during the COVID-19 situation are also different.

The first summit was conducted in November 2019 as a preconference to the WISE Summit. Recognizing a need and an opportunity to feature the work of its newest progressive school, Academyati, and the other LEAPS partner schools share lessons learned and support each other through some of the unique challenges they face during the current crisis. Therefore, QF hosted the first LEAPS webinar in May 2020. Six leaders of progressive schools from five different countries came together to discuss some of the effects of the pandemic on their schools. The webinar was conducted on Microsoft Teams Live and offered the opportunity for the audience to ask questions and interact with the speakers. The LEAPS Webinar had 250+ participants from Qatar and abroad and received strongly positive feedback. Academyati and other participating progressive schools discussed several topics relevant for progressive schools, as well as others, ranging from maintaining and/or even furthering "Learning through Play," "Student Agency," and "Relationships between parent, children, and school" during the pandemic.

The LEAPS Summit aims at creating an ecosystem for progressive schools to support each other, share their learnings, and advocate for progressive education policy.

15.4.8   Access to Knowledge and Best Practices: The World Innovation Summit for Education (WISE)

During the pandemic, QF-based WISE has curated and organized two virtual convenings titled "Education Disrupted, Education Reimagined" addressing the impact of COVID-19 on education, the responses of schools and systems, and how to reimagine education postcrisis. The first virtual forum took place in April 2020 and was organized in partnership with Salzburg Global Seminar, with the participation of local and global policymakers, leaders, practitioners, and academics. This convening featured five sessions with 35 speakers from 21 countries. The second part of this convening was held in June 2020 in partnership with Salzburg Global Seminar and Holoh IQ. It ran over the course of 3 days and featured 30 sessions with more than 80 local and international speakers. Each forum was attended by more than 3000 participants from more than 90 countries.

Additionally, to help share knowledge about the school and system responses to the COVID-19 crisis, WISE has developed an electronic publication based on the sessions featured in its virtual convenings in April and June. This publication features articles from local and international speakers who contributed to the virtual events. The articles are focused on responses to the crisis and how to build back better in the near future. Also, the learning ecosystem track of WISE is curating a research report that investigates the skills gaps among learners in school and higher education settings in Qatar, while also looking at the recent implications of COVID-19. The report will inform how local formal and nonformal learning institutions can enhance inclusive, accessible, and effective learning opportunities that help build resilient individuals and communities.

15.5   Looking Ahead: A Unique Learning Opportunity for Educational Institutions Coping with Contingencies

Qatar Foundation, with its various entities, has supported PreK-12 education continuity during COVID-19 in every possible way. Related online support programs were built or inspired by existing outreach initiatives that have been running and refined for years. Others were new and designed specifically to address the needs of the students during the pandemic. These newly established programs have been fast-tracked into immediate implementation with limited time for a detailed conceptualization framework, and, in many cases, literally are a "work in progress" while being implemented.

In-person and online outreach programs have been and are being monitored and evaluated through several indicators, like the number of participants, levels of engagement, satisfaction surveys, and articulation. A comparison between the effectiveness of in-person vs. online outreach programs will be carried out to determine the best way forward. An important aspect to examine closely would be the nature of academic disciplines and how they adapt to online teaching and learning; while the humanities lend themselves easily to online learning, other applied fields such as arts and engineering might be affected by being on a digital medium.

In summary, the unique ecosystem of QF has shown its advantages by demonstrating a proliferation of initiatives devoted to supporting the continuation of elementary and secondary education, both in QF schools and nationwide.

At the same time, the pandemic has provided opportunities for impact research and for further learning about the impact of contingencies, implementation of emergency plans, and best practices for more effective connectedness between different levels of the educational system.

To have a sense of the magnitude and variety of activities supporting continuity of education during the pandemic, the Education Development Institute (EDI) at QF set up a mechanism to study the QF education institutions' responses towards COVID-19 and to evaluate its impact on learning and the well-being of students and staff members, as well as the relationships between staff, leadership, parents, and students. The approach used by EDI in its analysis (see Fig. 15.2) is useful to illustrate the different collaborative interventions adopted by each of the universities and pre-university institutions affiliated with QF in response to the COVID-19 pandemic.

To achieve meaningful results, a wide variety of sources have been used to triangulate the findings, including staff, students, and parents' surveys, as well as institutional leadership reports, school logs, and leadership round table discussions. The report was published at the end of the year and was a key resource that assisted schools to reflect on the impact of the pandemic on teaching and learning and how to address it.
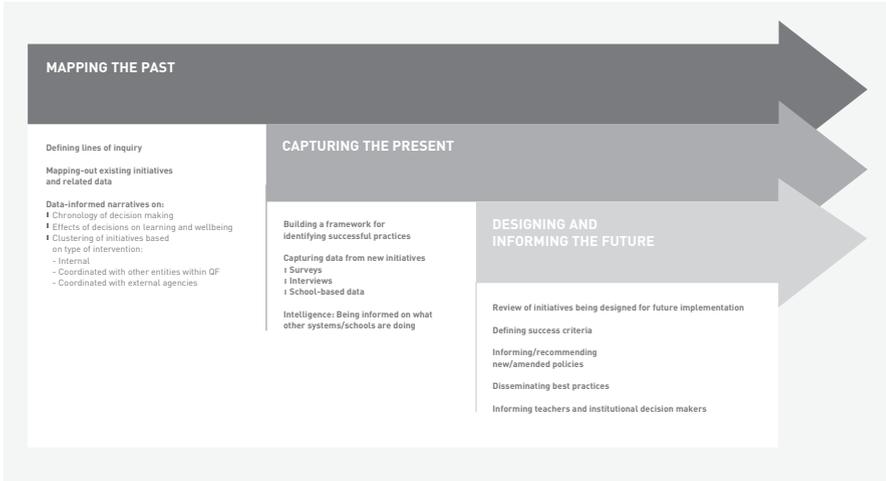
Fig. 15.2 Framework of analysis of actions at institutional level in response to COVID-19

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Buthaina Ali Al Nuaimi is the President of Pre-University Education at Qatar Foundation (QF). She joined QF in 2006 and led the expansion and development of the PreK-12 sector. She is a member of several national committees in the areas of educational strategy and accreditation. Prior to that, she worked at the Ministry of Education schools as a teacher, a trainer, and an administrator. She holds a bachelor's degree in education from Qatar University and an Executive MBA from HEC Paris.

Hend Zainal is a management expert specializing in transformation, innovation, and design thinking. Since May 2019, Hend has been managing Qatar Foundation's portfolio of higher education institutes. She has previously worked as a Consultant at the office of the Chairperson of QF and the office of the CEO of QF focusing on strategy, communication, and transformation projects. Prior to joining QF, Hend held various leadership roles in the government and private sectors in Qatar. She holds a BFA from Virginia Commonwealth University, an Executive MBA from HEC Paris, and is a graduate of Qatar Leadership Center's Current and Future Leaders program.

Francisco Marmolejo is the President of Higher Education at Qatar Foundation. Previously (2012–20), he worked at the World Bank as Global Higher Education Coordinator, based in Washington, D.C., and more recently, as Lead Higher Education Specialist for India and South Asia, in Delhi. During 1995–2002, he served as founding Executive Director of the Consortium for North American Higher Education Collaboration at the University of Arizona, where he also worked as Assistant Vice President. Previously, he was an American Council on Education Fellow at the University of Massachusetts, Vice President of the University of the Americas in Mexico, and International Consultant at OECD in Paris.

Chapter 16
Supporting Elementary and Secondary Education During the Pandemic: A Case Study from the National Research University Higher School of Economics

Kosaretsky Sergey and Likhatskikh Elena

Abstract The COVID-19 pandemic has presented a formidable challenge to the Russian school system. Such global challenges and crises highlight the significance of the National Research University Higher School of Economics (HSE)'s third mission: responsibility for the well-being of the community.

As one of the first universities to offer support to elementary and secondary education systems in Russia during the pandemic, the HSE relied on its ability to create new scientific knowledge and make it useful in practice to provide versatile and targeted aid for students, teachers, regional administrators, and parents across the country. There were two main vectors of HSE activity at the time of the pandemic: (1) promoting the development of the Russian education system through research, monitoring, and coordination of scholars and analysts and (2) direct work with secondary and high school stakeholders using contemporary approaches for talent development and digital tools.

The pandemic revealed the importance of developing new areas of research and analysis. In line with the first vector, the HSE focused on:

- Monitoring and studying the situation and collecting and promoting university and school case studies on organizing work during a pandemic
- Leading and participating in professional reflections and discussions regarding experiences and training practices in the context of a lockdown

K. Sergey (✉)
Pinsky Centre of School and Extracurricular Education, Institute of Education, National Research University Higher School of Economics (HSE), Moscow, Russia
e-mail: skosaretski@hse.ru

L. Elena
Primary and Secondary Education, National Research University Higher School of Economics (HSE), Moscow, Russia
e-mail: elihackih@hse.ru

The institution organized an array of surveys with students, teachers, parents, and representatives from regional and municipal education organizations and analyzed the results as quickly as possible. The main areas of research were problems of educational inequality and digital transformation. Based on the collected data, the Institute of Education managed to publish more than 30 analytical works between April and June of 2020.

For the second vector, the HSE developed programs that seek to expand its geographic reach, implement flexible recruitment, and digitize communication with school students. Such programs aimed at:

- Training personnel while consulting with administrators and educators on the technological and legal aspects of the work of schools.
- Providing online instruction and assistance for students learning software tools and preparing for exams.
- Helping parents arrange support for children in the transition to distance learning.

For this period, the HSE quickly and effectively expanded cooperation with schools in Moscow and regions around Russia that the institution developed over the last 15 years. Key current projects working in this direction are:

- The HSE School District
- The Lyceum Distributed Schools
- The Higher Students Academy
- The Higher School for Parents

16.1 Introduction

The COVID-19 pandemic presented a formidable challenge to the Russian school system. Most schools have shifted to remote learning. Under these conditions, some students face barriers to access, and most of them have seen a reduction in the quality of education. An important factor in making it possible for schools to meet this challenge has been the support provided to them by institutions outside the school system. The nature of the challenge pushed schools in the direction of greater openness. On the one hand, schools and teachers looked to bring in external resources. On the other hand, various stakeholders, such as civic organizations, volunteers, and universities, came to the schools' aid. The united efforts of federal and local governments, extraordinary work by teachers and school administrators, collaboration among teachers, and participation of parents have combined to help schools weather this difficult time.

The National Research University Higher School of Economics (HSE), a large research university, moved the programs for tens of thousands of students, as well as administrative processes, online. Thousands of personnel in Moscow and at branch campuses in three other Russian cities contributed to this effort. Nevertheless, the HSE did not focus solely on its own challenges but actively participated in supporting the Russian school system. This support involved direct aid to schools,

teachers, students, and their families through various training and methodological support programs, studies, and consulting projects as well as hosting discussion forums. Both faculty and students, including volunteers and alumni, contributed to these projects.

This case study demonstrates the role that a major national university plays in supporting elementary and secondary education in Russia during a pandemic. This study lays out the specific strategy adopted by the HSE reflects its status as a research university and reveals its greater mission and the role it plays in the Russian education system.

We look at how expertise, standards, and practices developed in the university, including modes of collaboration within the institution and with outside partners, aided the execution of this strategy. New solutions and approaches developed during the pandemic, considering their collaborative context, their effectiveness, and their prospects for future use. Special attention is given to integrating the experience of the pandemic into the HSE's future strategy in supporting elementary and secondary education, especially in terms of topics for future research and analysis. Overall, we seek to answer the question of how the university acted to fulfill its "third mission" during the pandemic.

16.2   The Higher School of Economics: Strategy and Groundwork to Respond to the Challenge of the Pandemic in Elementary and Secondary Schools

In this paper, we can see some of the vectors of HSE activity related to supporting schools at the time of the pandemic. Globally, it makes sense to look at the pandemic as just one phenomenon within a larger trend toward an age of increasing uncertainty. For this reason, the university's actions during the pandemic, including in the field of K-12 education, can be seen as a test of whether the chosen vectors of development are on the right track and of the university's readiness to act on them.

The *HSE* is the largest hub for social and economic research in Russia and one of the top-ranked higher education institutions in Eastern Europe (ranked in the top 3135 of the QS "Top 50 Under 50" ranking and the 57th of the «THE Young University Rankings»). Today, the HSE unites 4 campuses that employ 7000+ research and teaching faculty and enrolls 45,000+ undergraduate and graduate students. The HSE's academic portfolio numbers 270+ degree programs and 60+ PhD offerings, along with 170+ MOOCs that enroll 3+ million students from 190+ countries. There are no bachelor-level programs for teachers at the university; however, the institution offers master's degree level programs for teachers, principals, and district administrators.

In Russia, most universities are teaching universities, yet, while the HSE offers hundreds of bachelor's and master's programs, the university's mission is defined by its status as a research university. R&D is conducted at the HSE by 90+ research

centers and 30+ international laboratories. The Higher School of Economics has the top QS Ranking in Education in Russia, and it is regarded as the most significant contributor to evidence-based education reform and the improvement of national education policies in the country. The HSE's development strategy for research activities aims to broaden the impact of its research and increase its contribution to social development, including in the field of education. It seeks to spread the appreciation of new knowledge and the wide adoption of new techniques and technologies. There are several fields, including education, in which the HSE's mission both conduct this research locally and distribute it globally, integrating Russian research into the global conversation.

In addition to academic research, the HSE monitors studies in key areas of economic and social development and carries out analytical work for the Russian Government, the President of Russia, the Federal Assembly, and federal ministries and agencies. In 2020, the university instituted a new HSE Development Program, in effect until 2030, based on a structure of providing solutions to the most difficult challenges that Russia faces.

16.2.1   First Area of Support

The first area of the university's contribution in the context of the pandemic involved assisting the Russian education system through conducting research and monitoring and coordinating the work of scholars and analysts.

Launched in 2012, the HSE's Institute of Education (IOE) takes the lead in education research both within the university and in the country. The IOE's team comprises 250+ faculty, visiting professors, junior staff as well as 15+ centers and laboratories. Several large-scale education studies by the HSE are closely linked to issues that are central to the pandemic's impact on education.

One area of academic contribution is that of education inequality research. While this is a main topic of international research and education policy, it received only peripheral political attention in Russia for many years and lacks priority in education-related studies. The HSE has been purposefully promoting this direction for research, including developing international cooperation in this field. HSE publications on schools working in difficult conditions, the impact of social status on education outcomes and trajectories, and academic resilience have started to change this situation in recent years. The HSE engages in advocacy on these issues in the Russian political arena.

Another high-priority topic is that of digital transformation in education. The university quickly embarked upon a wide range of studies covering all levels of education, including K-12. Two years ago, the HSE launched a laboratory for the digital transformation of education.

The university prioritizes building wide-ranging partnerships with various stakeholders in the education system: public authorities in regions and municipalities, teacher training centers, private companies, and youth development institutions.

For example, HSE partners with leading Russian EdTech companies such as Yandex, Skyeng, UchiRu, and GlobalLab. The university consulted for some of Russia's most populous regions on topics of strategic development and education policy and developed several projects to support regions in their efforts to improve the quality of education.

Overall, the university is geared toward producing and applying new knowledge for developing the country and its regions. This strategy is a key aspect of the New Flagship Model (Froumin & Leshukov, 2016). The contribution of higher education institutions to regional development is a theme that has attracted growing attention in recent years. (Arbo & Benneworth, 2007; Pinheiro et al., 2012).

16.2.2 Second Area of Support

The second area of HSE focus is working with secondary and high school students, who are also potential enrollees of the HSE, using contemporary approaches to training and schooling. The HSE's development program seeks to expand its geographic reach, implement flexible student recruitment programs, and digitize communication with students. The development program also provides guidance for schools across the country to make use of the tools created by the HSE for integrating contemporary digital technologies into their work. Forming a large network of partner schools, the university established a specialized general education department to work with schools and regional education management bodies. Its key projects are the "HSE School District," the Lyceum Distributed Schools, and the Higher Students Academy.

The "HSE School District" is a community of schools that partners with the university and aligns with its approach to education and human development. These schools create academic pathways for admission to cutting-edge universities, including the HSE, for their graduates. Within the framework of partnering with schools, the HSE develops methods for improving school quality and introducing the latest educational technologies and organizational solutions.

The HSE lyceum opened as a part of the HSE to create individualized education pathways for 10th and 11th graders. As a result of the growing interest of students and their parents in the educational technologies of the lyceum, specialized lyceum classes and groups opened in 29 schools in Moscow and one of the regions ("HSE Distributed Lyceum School"). The "HSE Lyceum Distributed Schools" is an opportunity for high school students in Moscow to enroll in HSE Lyceum programs and in specialized tracks governed by HSE standards while attending other schools. The "Higher Students Academy" is a school project aimed at immersing middle and high school students in the research environment of the university for several years, leading up to admission. Academic support for school students is provided by university professors.

The HSE recognizes the value that parents' involvement can have on a young person's education and gives special attention to this phenomenon in both its

research and its practice-based projects. The final HSE initiative, "Higher School for Parents" project, supports parents in helping their children make good choices in educational and professional contexts. The HSE is one of the first Russian universities to implement wide-ranging volunteer programs. Its activities are coordinated by the Volunteer Center, which is part of the Center for Supporting Student Initiatives.

An important question to ask in the pandemic context is: what groundwork (knowledge and expertise, partnerships, networks, etc.) was already in place in the vectors of development that would become relevant during the pandemic when these dramatic events began to unfold?

16.3 Supporting Elementary and Secondary Education During the Pandemic: Context, Content, and Organization

16.3.1 Russian Schools During the Pandemic

Most countries were forced to take extraordinary measures to maintain their education system, keep classes going at all grade levels, and prepare students for college admission tests. Russia was no exception. In March 2020, students received a two-week suspension of classes, after which most school buildings in Russia (over 40 thousand) were closed. Most school students (approximately 15 million) transitioned to distance learning. This led to cancelling mandatory exit exams for ninth-grade graduates and postponing the USE (Unified State Exam) and reinstating it under augmented rules. The school year in Russia ended in May, with the next school year scheduled to start September 1st.

The federal structure of the state, and the specific way in which power is divided among levels of government, influenced the Russian education policy response to the challenge of the pandemic. Unlike many Asian and European countries, Russia did not create a centralized mechanism for organizing distance learning during the pandemic. Several methodological recommendations were issued at the federal level but left the decision-making to the regions.

The range of decisions made at the regional level was quite broad. The bulk of the responsibility for consulting and supporting the work of teachers lay with the regions, specifically with region-wide institutions of professional development and methodological support. However, in many regions, these institutions were not prepared to quickly scale up operations or offer quality support. In these circumstances, the resources that universities were able to bring proved very significant. The Higher School of Economics was one of the first universities to offer support to schools and, more broadly, systems of elementary and secondary education.

16.3.2   HSE Activity During the COVID-19 Pandemic

The HSE's support for schools and school systems during the pandemic can be broken down into two categories. The first category involves conducting *research and analysis* and transmitting the knowledge gained to both practitioners and politicians, including:

- Monitoring and studying the situation and collecting and promoting university and school case studies on organizing work during a pandemic
- Leading and participating in professional reflections and discussions regarding experiences and training practices in the lockdown context

The second category is that of *practical aid to schools, their personnel, students, and parents*, including:

- Training personnel while consulting administrators and educators on the technological and legal aspects of schools
- Providing online instruction and assistance for students learning software tools and preparing for exams
- Helping parents arrange support for children in the transition to distance learning

The coordinators of the main areas of work were the following HSE units: the Institute of Education, the General Education Department, and the HSE Student Initiative Support Center. Overall, the vice-chancellor for New Recruitment carried out coordination at the university level. The activities of the HSE during the pandemic concerning school and after-school education involved approximately 100 employees (professors, analysts, researchers, and consultants) and 30 volunteers.

16.3.3   Practical Work at the Level of K-12 Education: Support for Schools, Teachers, Students, Parents

The HSE further supported the education system during the pandemic by expanding cooperation with schools in Moscow and other Russian regions in a relationship developed over the last 15 years. Established relations with schools allowed the programs of school support to be put into action quickly and effectively. Most of the HSE's activities with schools and young people were successfully moved online, except for special events that were regularly held in regions outside Moscow. During the pandemic, the "HSE School District" project provided distance support to 18 schools in Russian regions. Volunteer tutors provided individual and group lessons in nine school subjects for more than 100 students using memorization techniques and time management basics. Online career guidance and planning meetings were offered for some schools.

The university traditionally runs large-scale advanced training programs for teachers and school leaders of the "HSE School District." All advanced training courses were quickly transferred to an online remote format during the pandemic. The traditional 2020 Summer School offered 11 training areas, in which 450 teachers were trained free of charge. The HSE offered psychological safety programs and other new courses.

All online courses offered during the pandemic made use of the HSE's digital education and training platform. A total of 76 faculty members from 11 HSE departments were involved in teaching, 35% of whom had not offered courses before. During the pandemic, 579 students of the "HSE Distributed Lyceum School" were provided with online training by the university's teachers. Lyceum's 44 teachers were also supported by distance learning technologies.

Along with the General Education Department and volunteers, the Institute of Education provided its resources in support of schools, their administrators, and teachers. At the start of school closures, professors, students, and alumni of the Education Management program in partnership with the International Education Club arranged an online conference called "A Day in the Life of a Mobile School" on March 24, 2020. The administrative track of conferences, which had 7700 viewers, included workshop sessions with leading experts, school principals, and leaders of digital transformation. The track for teachers (11,500 viewers) offered workshop sessions and practical exercises.

The Institute of Education created the website "Distance Teaching," where Institute of Education experts gathered virtually to comment on schools' ongoing transition to distance learning, examine case studies, and discuss issues of concern. The "Online Law" channel was also launched on YouTube to explain the numerous legal conflicts that arose in the process of educational institutions' work during the suspension of classes, including specific requests from the audience the channel covered 12 issues and had a total audience of 20,818 people.

In addition, traditional forms of instruction at the "Higher Students Academy" were replaced by online classes in a Minecraft model of the campus. In a game popular among school children, HSE students designed a virtual model of the campus online in Minecraft to remind students of the HSE campus in the Moscow region where the traditional Academy and associated projects are usually held. The virtual campus completely resembles the real campus both inside and out. Professors, volunteers, and students conducted online classes in various subjects. For two months of work, over 1000 students joined the classes from more than 15 cities, and towns of the Russian Federation, participating in more than 200 lessons. Schoolteachers were provided with the opportunity to connect and observe the methods of working with students. The Academy's presence on the VK social network, a newly launched Instagram channel, and the YouTube channel "Holidays in the Higher Students' Academy," provided interaction with participants.

The pandemic requires a significant increase in parental involvement in school students' education, entailing a significant burden. Trying to make resources available to this group, the Institute of Education posted YouTube video tutorials for parents (five issues with a total audience of 4577 people). The General Education

Department implemented the "Higher School for Parents" project, comprising 11 online parent-teacher meetings with 54,400 views.

16.3.4   Analytical and Research Work

The pandemic revealed the importance of developing new areas of analysis and research. The following types of monitoring and research were deployed as quickly as possible:

- A survey as part of the international study "School Barometer" (277 education management bodies, 1111 representatives of school administration, 11,788 teachers, 22,080 students, and 34,963 parents)
- A questionnaire survey of teachers (4500 teachers from 85 regions of Russia)
- Interviews with teenagers and parents at HSE partner schools (2500 people in 15 regions of Russia)
- Expert interviews with the representatives of regional and municipal education authorities (15 interviews from 11 regions)
- An internet survey of 18,270 parents and 15,520 children, 620 administrators, and 5331 teachers from all federal districts about the transition of extracurricular education to distance learning during the pandemic.

In addition, the HSE analyzed the management practices of regions, schools, after-school programs, and teachers. The Institute monitored publications in the media and social networks and gathered data from providers of digital educational services and platforms. The HSE quickly analyzed the collected data to answer the following key questions:

- What was the level of readiness of regions, education systems of different levels, teachers, parents, and students for the transition to distance teaching and learning?
- What barriers and difficulties did they face? What were the strategies, models, and practices used under the new circumstances? What was their comparative efficiency?
- What is the projected scale of learning loss due to the pandemic? How does the institution minimize negative impacts and compensate for those losses?
- What changes in the way parents work and live have occurred in relation to their absence from and participation in their children's education? What are the children's opportunities for additional education and self-development during a lockdown?
- How has communication between schools and parents changed with distance learning?
- How satisfied are the main participants in the education system with the new educational format? What are the positive and negative lessons?

The promptness of the analysis and the ensuing publications are noteworthy. Indeed, this level of intensity of a publication has had no analogs in "normal" times.

Since May, the HSE publishes a bulletin on the impact of the pandemic on social and economic sectors and included articles on the "Pandemic and Education." For immediate placement on the HSE website, the institution created a "Remote Supervisor" section with opt-in emails and an optional question-and-answer section. It aggregates developments in instructional and methodological materials on transitioning to distance learning formats as well as news and experiences in the practical application of online schooling formats (20 issues). The "Education under Pandemic Conditions" page was created on the website of the Institute of Education as a place for briefs and extra editions of "The Facts," "Modern Analytics of Education" and other publications.[1] Their total number exceeded 30 issues between April and June.

The publications covered topics such as Russian platforms and services for distance education; knowledge assessment and exit exams under pandemic conditions; the readiness of regional school systems to face the challenge of the pandemic; the transition of regional school systems to distance education; the transformation of after-school education practices for children; legal regulation of wages and paid services in schools under labor restraints; additional topics related to viruses and epidemics and education standards; distance education in school; extracurricular organizations for children; and changes in teenagers' lives and study habits.

16.3.5   University as a Communication Hub

In the situation of the pandemic in Russia, methodological support for schools and teachers from the federal government was very limited. This was partly due to the division of powers between the federal center and the regions. Nonhierarchical models of aid, strategies of interaction, and mutual assistance proved effective for combatting the issue. The scale and novelty of the challenges created a new demand in the professional community for an exchange of views and discussion on various aspects of the education process. The HSE arranged and actively participated in such events.

A regular open workshop from the Institute of Education naturally transformed into a webinar and became an important communication platform. Webinars discussing the impact and lessons of the pandemic for education were held with the participation of leading HSE researchers and experts alongside colleagues from other educational and public institutions as well as experts from the World Bank. Institute of Education scholars moderated and spoke at panel discussions on the organization of schooling during the quarantine at Russia's leading educational forum "Moscow International Education Fair" and at some discussion forums in Russian regions. A total of more than a thousand people participated in these events.

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[1] https://ioe.hse.ru/distance_learning

16.3.6 Working with Stakeholders

HSE leaders regularly sent materials to the government and the president's administration, yet the Russian Ministry of Education, which recently underwent a change in leadership, did not commit to any of the research or analysis from the HSE during the pandemic. However, there is evidence that leadership and relevant departments paid attention to the HSE's results from its various studies and monitoring efforts—the government asked the HSE to prepare a pandemic report on the education system.

HSE scholars maintained communication with administrators and government representatives from dozens of Russian regions. Leaders of regional education systems responded to calls for participation in surveys on school systems' reactions to the pandemic and best practices. They noted the importance of engaging in such studies and the value of the results for administrators. Interest from the media was high throughout the period, and Institute of Education scholars were asked for comments on their efforts by leading publications and radio stations. The research and analysis produced by the Institute, as well as the dialogue with representatives of the school community, became very important factors for understanding the processes underway, predicting consequences, and building education policy.

16.4 Supporting Elementary and Secondary Education During the Pandemic: Outcomes and Lessons for the Future

Using cutting-edge digital tools, the HSE extended its knowledge, human resources, and methodological know-how to all those involved in schooling: teachers, students, parents, and principals. The HSE staff produced high-quality solutions to meet the administrative, educational, and technical challenges.

New formats for working with schools emerged through the university recruiting its students to conduct lessons and assist with homework and providing schools from around the country access to and support in using online blended education courses from the HSE Lyceum. The HSE also had direct engagement with participants in the Higher Students Academy through social networks and without the school as an intermediary. The effectiveness of the distance learning format lies in its ability to expand access, which grew steadily throughout the pandemic and widened its geographic reach. For example, the number of teachers taking professional development courses nearly doubled. Surveys of teachers enrolled in HSE courses during the pandemic revealed that 60% wanted to take part in courses via the online format. Positive responses came from school students and parents as well.

Within the framework of the Lyceum Distributed Schools project, the pandemic led to the first cooperation agreements outside of Moscow. HSE activities were not, however, limited to direct support. Other important aspects included research, consulting, and organizing communications. Indeed, the HSE's mission was not to

figure out how many schools could be supported directly but rather to engage with the nation's entire elementary and secondary education system and strengthen its ability to respond to the pandemic's challenges.

In addition, the pandemic tested HSE's readiness to successfully implement the strategic directions stated in the Development Program and Mission of the university, such as contributing to the development of regional education systems, including support of schools and students in the regions as well as expert and analytical support of educational policy in the country. At the same time, previous undertakings in these areas, as well as in the areas of "leadership in the digital transformation of education" and "participating in global processes" become crucial for the task of promptly providing comprehensive support for the entire education system and for specific target groups to ensure effective work in the context of the pandemic. These undertakings included:

- Extensive research and development helped interpret the unfolding processes and provide consultations to officials and practitioners
- Databases of statistics, international studies of education quality, and human and organizational resources to monitor research and surveys for quickly estimating and forecasting events
- Collaboration with leading universities and international organizations—that ensured prompt exchange of data, firsthand experience, assessment of pandemic impacts, and cooperation in establishing monitoring, research tools, and recommendations
- Partnership relations with regional education management bodies and educational institutions (including modern models of consortiums and school networks); alumnus communities, which enabled the quick collection of data and best practices; and the involvement of practitioners in consulting, methodological work, and professional development programs
- Participation in drafting the national educational policy agenda and extracurricular education based on evidence-based research

Furthermore, the HSE's educational research strategy proved effective in the domain of education inequality. The pandemic allowed many politicians, and society as a whole, to see differences between learning environments at home, which, in times outside of the pandemic, were ignored. The crisis clearly showed the role (actual and potential) of the school in equalizing opportunities and compensating for the deficit of family resources. As stated by HSE researchers have written about in their reports publications, this compensation is not only in terms of education but also in terms of basic needs, including nutrition, safety, and psychological support. These differences are related to the geographical location of residences (access to the Internet), the material well-being of the family (computer, workplace), and cultural and parental involvement in education. These factors determine the nature of education, its quality, and its outcomes.

No information or data on children and families existed to use for rapidly identifying risk groups and including them in support measures, thus HSE has established precedents for analytical work in this area (see Box 16.1).

Box 16.1: Project: Social Impact Bonds. Improving Education Outcomes in the Republic of Sakha (Yakutia) (https://вэб.рф/en/agent/sib/)

Since 2019, the Institute of Education has been conducting Russia's first-ever social impact bond project in the Khangalassky District of the Republic of Sakha (Yakutia), incorporating 27 schools. Social impact bonds (SIBs) are a financial instrument that involves multi-stakeholder agreements between a public authority, investors, and providers of social service.[2] The bond is paid out to investors only if a given result is achieved within the agreed-upon timeframe. The project aims to improve academic achievement among students and overcome existing inequalities. It includes training teachers in contemporary teaching methods, summer schools for underachieving students, seminars for increasing parent participation and understanding, and other initiatives. During the project, a large dataset was collected on the socioeconomic status of students' families, the conditions of their education, and academic outcomes.

At the start of the pandemic, data were collected about whether students and teachers in the district had devices that could access digital platforms and services, along with the speed of internet connection. The data reflected the level of the district's preparedness for the transition to online learning. With the help of these data, the institution assessed the scale and character of the digital gap between groups of students and groups of schools with varying socioeconomic backgrounds (Zvyagintsev et al., 2020). It was significant. Based on this analysis, the university made recommendations for optimizing methods of teaching during the critical period leading up to the end of the school year and preparing for the start of the new school year, together with a long-term plan for overcoming education inequality.

The digital transformation in education is another key area of HSE research and development in the context of the pandemic. Although a few years ago, the university declared itself to be a leader in the country in promoting the digital transformation of education and started to deploy intensive research and development in this field, it was still unable to answer the questions raised by politicians, managers, and, especially, practitioners. With the onset of the pandemic, however, the university gained insights and information in real time, accelerating the institution's understanding of digital transformation in education, which was potentially more useful than several years' worth of local experimental research.

The transition of schooling to an online format proved to be an unplanned experiment in the implementation of digital tools in the learning process. Given that there was no available alternative to digital education, the experiment took place under

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[2] Social Impact Bonds. A New Tool for Social Financing. Princeton University (2014): https://spia.princeton.edu/sites/default/files/content/Social%20Impact%20Bonds%202014%20Final%20Report.pdf

nearly ideal conditions. Two factors contributed to the exceptional value of this experiment. First, it included all kinds of teachers, not just those who were the most innovative and digitally literate. Second, it provided a massive testing period for large national software platforms that have yet to be fully developed and implemented. Some of the lessons learned would not have been made evident in pilot programs and would only have been encountered at the level of mass adoption, at which point it would have been nearly impossible to make significant changes to the platforms.

During the pandemic, the university collected unique data on the effectiveness of Russian educational online platforms and services, digital infrastructure of territories, and ICT competencies of teachers and students and researchers were able to confirm several hypotheses. For example, through this research, it became clear which types of services, resources, and organizational strategies (synchronous/asynchronous) were the most in demand under the conditions of the pandemic. Institute of Education researchers ascertained areas of deficit, such as in infrastructure and training, that acted as barriers to implementing digital technologies.

The challenges of the pandemic pushed forward some of the HSE's inquiry into some issues, which were being investigated prior to the pandemic, and shifted its priorities for the future. Indeed, researchers at universities are already formulating several new directions for research on digital education inequality and interface design for digital education platforms. These questions on interface design range from broad inquiry into factors that contribute to successful platform use, such as level of complexity and user-friendliness, to more specific questions about the effectiveness of various digital tools, services, and technologies for completing different assignments in individual subject areas.

Another lesson from the pandemic is the recognition of a need for the HSE to transition from a broad vision involving the recruitment of allies and promoting the bright future of digital education to a more specific focus on solving concrete problems faced by teachers through based on data assessment and targeted recommendations (see Box 16.2).

Box 16.2: The "Innovation Ambassadors" Project
The HSE's Institute of Education planned the launch of the "Education Innovation Ambassadors" project, a research collaboration with school communities, with the first study was planned for March 2020. The University did not defer or cancel the project but instead worked quickly to develop an additional survey related to schools' transitions. The questionnaire was supplemented with the methodologies of the "Technology Readiness Index 2.0" and "The Innovation Environment in Schools" (Innova), which measure organizations' potential for digital innovation. The individual profiles created for teachers and schools were a key achievement of the institution's analysis of the school system's transformation.

Box 16.2 (continued)

A major benefit of the Education Innovation Ambassadors project is that the university does not simply keep the data for HSE's research but gives it back to the schools—one hundred schools received individualized reports and recommendations. The feedback the HSE received from school principals indicated that the reports were very timely, allowing school leaders to reflect on the experience of the pandemic and make sense of both the successes and opportunities for growth in their school. During the pandemic, much of the effort was directed toward providing material and technical support. Now, it is important for schools to create an environment in which the digital tools they procured can be used effectively. In other words, teaching staff must take a creative approach to unlock the potential of these tools (Khavenson et al., 2020)

16.5 Conclusion

There is every reason to believe that the challenges created by the pandemic will have an impact on the research agenda of the Institute of Education, bringing attention to research on the digital divide, psychological well-being, learning autonomy, and agency.

Reflecting on the experience of supporting schools during the pandemic, we can reaffirm the importance of creating specific mechanisms for organizing work around primary vectors. In addition to lessons learned in specific areas of research, the experience of supporting schools during this period stimulated the consideration of creating a set of primary research vectors at the Institute of Education; primary research vectors bring a concentration of research efforts to solve major challenges and gaps in the institution's understanding of these issues. Such challenges require an interdisciplinary approach. Primary research vectors are influenced by the strategy the university has in place for meeting the needs of key stakeholders, including the professional community and parents. By concentrating efforts around primary topics, the HSE attempts to accelerate the process of bringing solutions to the public and making a tangible contribution to improving the education system.

Additionally, we can reaffirm the initial vector choices: inequality and digitization. HSE expertise and methodological resources were in great demand during the most acute period of the pandemic, and it seems that this demand will continue. The work during the pandemic also strengthened HSE's reputation within the EdTech business community. The university noticed a growing interest among providers of digital education resources in working with the university. They see the HSE as a bridge to the education system and as a collaborator in overcoming the gap between tech companies and the education community.

Of course, the scale of the pandemic challenge and its novelty reveals the limitations of any such undertaking. The response required serious organizational and management efforts on the part of the HSE's administration, as well as the institution's mobilization, creativity, and staff involvement. The timeliness of the university's management response to the pandemic was important as was the objective assessment of the nature of the challenge and its relationship to the university's strategic objectives and areas of competency.

It was necessary to introduce new positions of coordinators in different areas of work and develop plans and regulations for monitoring each area. The complexity of the problem of organizing the teaching process during the pandemic tested the strength of existing channels of communication between different parts of the university. A collaboration between the General Education Department, the Center for Supporting Student Initiatives, the office of career development, and the office for serving gifted students organized the volunteers that made the HSE's work with school students possible. The Faculty of Communications, Media, and Design provided recommendations, installation, and support for the technologies that allowed the General Education Department to scale up the "Vyshka for Parents" project. The General Education Department also assisted the Institute of Education in carrying out surveys through the network of partner schools.

However, the pandemic also revealed a need for improving the model of cooperation among various divisions of the university that are involved in working with schools. Foremost here is the relationship between the Institute of Education and the General Education Department. This reform should begin immediately, as the start of the new school year will mean even greater demand, coming from both regions and individual schools, for the university's consulting and curricular support.

In addition, the current situation has provided justification for the transformation of the HSE's model of communication and media activity, conducted over the past two years, including changes to the site and the creation and promotion of a social network presence. This allowed us to promptly inform the public, receive a greater volume of feedback, cover a broader audience, and consider the broad needs of the country. Noted above, the HSE's system of communication at the time of the pandemic's onset, coming after the upgrade, had considerable potential; new decisions were made to create dedicated sections and pages of the site and introduce new publication formats, with particular attention on visualization and the use of infographics. Individual units and employees took the initiative by creating their own channels on YouTube and actively engaged their social networks with specialized posts.

The scope and intensity of the university's communications with the professional community in the Russian regions have increased significantly during the pandemic. New communication formats and technologies are being used, including events such as the aforementioned online marathon, video consultations with the staff of the Institute of Education, and hotlines with teachers and parents. These technologies have demonstrated their potential for expanding audience coverage, segmentation, and a targeted orientation of communications. At the same time, the situation of the pandemic has clearly demonstrated both the possibility and the need to build

a new digital interface for regular interaction with target groups, considering the idiosyncrasies of Russian geography.

Today, as the HSE develops road maps for implementing the Development Program for 2030, the lessons learned from the HSE's support for the school system during the pandemic include the following:

- Maintaining the online format for some of the HSE's teacher training courses, transforming the digital learning environment to support partner schools, and aiding in preparing target groups of students
- Expanding the network of partnerships with schools, not only with high-performing schools but also schools facing challenges
- Strengthening research on the digitalization of education, as it relates to educational inequality under new learning conditions, digital lessons, digital tools for standardized testing, and student agency; on the integration of the experiences and reflections of practitioners; and on the promotion of active research
- Collaborating with leading universities and international organizations, ensuring swift exchange of data and firsthand experience of the pandemic's impacts, which is critical for rapid and effective response
- Continuing the transformation of the institution's model of communications and media activity; disseminating knowledge to ensure audience coverage; and accelerating the feedback loop

The experience of the pandemic provides a great number of lessons to be applied in the future development of the HSE. However, the key lesson not only applies to the university's internal affairs but also resonates with a broader discussion of how the model of the university should evolve in the twenty-first century (Douglass, 2016). Global challenges and crises highlight the significance of the university's third mission: responsibility for the well-being of the community. The success of this mission hinges on the university's ability to create new scientific knowledge and bring it to practical application. The ways in which a given social system (in the HSE's case, elementary and secondary education) reacts to a situation of crisis are a source of knowledge and direction for the future of that system. The task of the university, then, is to create mechanisms to gather that knowledge quickly and efficiently under those conditions, use it to refine education policy, and improve educational practices.

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Kosaretsky Sergey is Director of the Pinsky Centre for General and Extracurricular Education, Institute of Education, National Research University Higher School of Economics, Moscow and holds a PhD in educational psychology. He is an expert in the field of inequity in general and extracurricular education, school effectiveness, and educational reforms. He participated in projects of OECD, UNICEF, World Bank. He is a member of the Expert Council on Education Issues by the State Duma of the Federal Assembly of the Russian Federation

E-mail: skosaretski@hse.ru

Likhatskikh Elena is Head of Office for Primary and Secondary Education National Research University Higher School of Economics (HSE). She coordinates the interaction between the Higher School of Economics and elementary and secondary educational organizations. She is responsible for communicating the Higher School of Economics with regional and local educational authorities organizes.

E-mail: elihackih@hse.ru

Chapter 17
Community Building in Times of Pandemic: University Camilo José Cela, Spain

Miguel Ángel Pérez Nieto, Nieves Segovia Bonet, Ignacio Sell Trujillo, and Carlota Tovar Pérez

Abstract University Camilo José Cela (UCJC) is a private university located in Madrid (Spain) that belongs to the SEK Education Group, an institution with 125 years of tradition and a strong innovation identity. This case study presents the response that UCJC has given to facilitate the adaptation of the educational community (students, families, and teachers) to the situation arising from the pandemic caused by COVID-19. It will explain the coordination actions between students from the School of Education at UCJC and the impact derived from their interventions. Specifically, it will detail students' participation as teacher assistants in online teaching within the IB pedagogical model to respond to the demands of primary and secondary teachers. This collaboration is the most outstanding due to the number of students and schools involved and the efficacy and efficiency of its implementation.

On the other hand, there were other interventions of a smaller scale but a high social impact committed to disadvantaged sectors of the population. For example, our students' support gave refugee students from Syria reinforcing their training or the psycho-emotional, educational, and legal assistance that volunteers from the bachelor's degree of law provided to children and families in social exclusion. It is also significant to highlight the UCJC international actions: the teacher training program, EachTeach, provided educational methodologies, resources, and media to refugee teachers at the Kakuma refugee camp (Kenya), helping them to raise awareness about COVID-19, and the Cambodian program dedicated to training volunteers on how to combat the pandemic on these vulnerable contexts, where children live on the streets.

Finally, to define broader collaborations and scale these initiatives in the future, this case study will reflect on the reasons for the success achieved, especially in training and pedagogical innovation and in the use of educational technology. The

M. Á. P. Nieto (✉) · N. S. Bonet · I. S. Trujillo · C. T. Pérez
University Camilo Jose Cela, Madrid, Spain
e-mail: Mperez@ucjc.edu

UCJC and SEK Schools collaboration allowed the use of a common technological language, sharing values. The development of training, support, and advice, between the university community (professors and faculty students) and the schools' community (teachers, students, and families), enabled a wide range of relevant issues to be addressed in dealing with COVID-19 by schools and the broader education community.

17.1   Introduction

The University Camilo José Cela (UCJC) is a private academic institution founded in 2000 and located in Madrid, Spain. It belongs to the SEK Education Group (1892), which includes the Felipe Segovia Foundation, the University Camilo José Cela Foundation, six international schools in Spain, and three more in France, Ireland, and Qatar. Its educational model is executed through three lines of action: innovation and entrepreneurship, digital transformation, and social commitment. At the center of this model, The Hive (La Colmena) program supports students, from a holistic perspective, developing additional transversal competencies beyond each specialty or degree chosen, based on these three axes.

SEK Educational Group is a learning enterprise with an entrepreneurial spirit whose objective is to become an intelligent institution, an institution that continuously learns. Through its learnings, it constantly adapts to its social environment that is always changing. Organizations are complex living systems that coexist with all members of society. They are systems composed of tangible and intangible people and resources, integrated into a process towards specific objectives that constitute the organization's raison d'etre. All the members of a learning organization are needed and valuable to function as an integrated whole (Senge, 1990).

For twenty-first-century educational institutions, the subject of education has shifted. It is no longer the student who traditionally goes to class. Now, WE ALL (the Institution itself) are required to learn, unlearn, and relearn new abilities and knowledge. We are witnesses to a change of era, whose main trait is learning. Within this context, all of the members of our learning community progress in their educational process, weaving a social web that constructs knowledge collectively and shares it over its entire life cycle. Today, we all form part of a global community and network of learners with unlimited access to information.

SEK group's community of learners comprises students, teachers, alumni, emeritus professors, families, and the society in which it operates and serves. All the agents of our learning ecosystem share the will of perfection through learning. Upon this central axis, SEK Schools, University Camilo José Cela, the Felipe Segovia Foundation, and the University Camilo José Cela Foundation implement their educational activities. The interaction between different community members contributes to enriching each learning experience and fosters learning inside the group.

University Camilo José Cela holds its firm commitment to serve society. Its organization, methods, and model offer new, valid, and effective responses to the challenges emerging from a changing, globalized knowledge society. UCJC views the challenges of the present day as opportunities and proposes a distinctive educational model, breaking the traditional molds and leveraging the synergies afforded by the latest advances in the different fields of knowledge. In particular, UCJC found in the challenges faced by schools due to the COVID-19 pandemic an opportunity to strengthen the SEK learning community. The confinement forced by the pandemic has become a significant global educational laboratory in which SEK Institution has carried out considerable "institutional learning."

17.2   UCJC Strategies and Initiatives to Strengthen the SEK Educational Community

According to our theory of action, it is from individual action where new hypotheses will best be generated and where they will free themselves from biases and strengthen existing learning (Parsons & Shils, 1951). Thus, the action becomes a necessary element for any change project, especially for social change. At the same time, this theory of change has proven the impact that an action approach has on students' successful development of competencies in educational contexts (e.g., Yoon et al., 2007). Specifically, various authors have focused on the characteristics of this action: being intense in its implementation without losing coherence with the previously defined goals and at the same time expanding and developing the syllabus (Cohen et al., 2003; Garet et al., 2001; Guskey, 2003; Hiebert & Grouws, 2007). The context derived from the pandemic included these characteristics. In educational contexts, a theory of action is presented as a connected set of propositions and a logical chain of reasoning that also explains how action leads to change and how change leads to the development of best practices (Moss & Brookhart, 2019).

On the other hand, the action in the education context emerges as a necessary element for social change. It is a path that can allow the construction of a community (Heble, 2017). The objective of all the actions carried out was to build a stronger community in times of isolation and extreme vulnerability. Acts shared among members of the SEK community allowed institutional learning to take place.

Hence, at the core of SEK Education Group is the continuous search to transform students into becoming global citizens, providing them with learning experiences that allow reflection and inquiry after an action. This value is apparent in all of the SEK Education Group, from its schools to its university, UCJC. The collective efforts can catalyze change, thus helping them to develop intellectually and emotionally while acquiring a passion for learning.

From the theory of action framework, all the members of the SEK educational community have interacted, developing and coordinating collaborative actions in

response to the COVID-19 pandemic. In all these actions, active learning has been sought from the students in the universities and schools and, especially, from teachers and future teachers (education students).

Some of the actions were also coordinated with partners and social agents from different contexts, such as national and international organizations and nongovernmental organizations. The technological base of the UCJC allowed the various collaborations to have an efficient development, generating a shared learning community on fundamental technical support. This specialized support allowed for easy access and the registration of a significant number of evidence (messages, number of interactions, sources of exchange, consensus reached, etc.) that showed the degree of shared learning achieved and the new interaction networks between the different members of the community.

All these actions had a common technological language. Many authors identify common language with a sense of belonging to a common culture. The technological language used at UCJC revealed the shared culture that existed not only between students and teachers but also between the university and the educational community. The regular use of technology as a tool to generate community and improve the education given at the university was a fundamental element for the adaptation and collaboration processes. This demonstrated to be an example of good practices. In reality, it is an example of the importance of anticipating changes and the conviction of the usefulness of technology as a methodology and a tool beyond merely a pandemic response.

We believe that there are essential learning opportunities to strengthen collective responses to COVID-19 that will allow new developments to be brought about through cooperation between institutions (e.g., Crawford et al., 2020). UCJC responded quickly and effectively by adapting its pedagogical system to the needs derived from the COVID-19 pandemic. Also, the institution quickly mobilized its human and technological resources to broaden the focus of its actions to support other national and international educational institutions. We could classify these extraordinary actions into two groups: (1) academic and well-being and (2) social support to foster education in vulnerable contexts.

17.3   Academic and Well-being Strategy

If anything sets SEK Education Group apart, it is the common identity shared by its schools, university, and foundations and its aim to perfect learning experiences for each of its students. This is why a critical strategy of the institution is the development of enrichment programs that foster skills and knowledge considered essential and in line with the outcomes of the Future Work Skills 2020 and 21st Century Learning reports, employing an interdisciplinary approach. These programs enable us to break with the constrictions imposed by the traditional curriculum, including workshops, courses, projects, activities, practical sessions, conferences, or meetings that cross-section each other on each students' study program.

UCJC saw, in the challenges caused by the pandemic, an opportunity to reinforce this strategy. With the support of the presidency of the SEK Education Group and the President's Office, the institution adapted some of these programs and co-created with the SEK schools new ones to face their needs.

17.3.1   Initiatives

17.3.1.1   UCJC Students and Teacher Assistants at SEK International Schools

In April, at the core of the confinement, and as a collaboration between SEK schools and the School of Education of UCJC initiated, forty students from different bachelor and postgraduate degrees became teacher assistants to support the SEK schools.

Because UCJC education degrees are accredited by the International Baccalaureate (IB), whose programs are followed by SEK schools, the adaptation to IB was relativity easy. The support provided covered a wide range of subjects, with mathematics, science, Spanish, and English the most emphasized. As mentioned before, the evaluation carried out showed excellent results, not only in terms of the satisfaction of students and their families but also in terms of the overall academic performance, which even increased in some courses. Another relevant aspect was the high satisfaction of teachers with the design of the implemented support program. We understand that, in such demanding situations, the collaboration of the university students may have been of significant help for teachers and students, contributing to the success of each school in its response to the confinement.

The benefit, however, also extends to the School of Education itself. It provided the students a service-learning experience. Transforming a physical attendance model under the IB to a virtual teaching model was a milestone. The quick and effective move of SEK Education Group to online education allowed them to participate in the front line of such good practice.

The experience for everyone, including teachers, schools, university students, and families, has been highly satisfactory. The direct collaboration and joint work between universities and schools are, at least in Spain, something unusual when sought outside the compulsory practical training of future teachers. Hence, university-college collaboration in a context of crisis is, in itself, an example of good practice.

17.3.1.2   Personalized Teacher Training Programs

UCJC developed various training programs for SEK school teachers through webinars, microlearning pills, tutorials, and newsletters. These programs also highlighted training tools to deal with the new online education form, such as using new

evaluation systems (Respondus) and plagiarism protection systems (Turnitin). A total of 788 teachers participated in these programs, in which they interacted with the university synchronously.

The above initiatives will allow us to review the contents and design of the university's degree in education. The education department is adapting to a new and changing reality with feedback from UCJC students, teachers, and SEK Schools. Thus, the teacher assistants will help create a new curriculum that completes the traditional one. At the beginning of the next academic year, a working group composed of university professors and teacher assistants will be formed. They will co-create a teacher training program, considering the results of the qualitative evaluation of its actions.

It is not just about understanding what UCJC can teach; it is about learning from these interventions. This closes the learning circle in which different members of our community interact. Thus, a shared repertoire of resources could be developed, such as experiences, stories, tools, and ways of addressing common problems, creating what would be a "community of practice" (Wenger-Trayner & Wenger-Trayner, 2015).

17.3.1.3 "Well-being Classroom," Online Psychological Support, and Counseling Services

In this context of collaboration between the university and schools, other areas of the university that were not directly linked to education degrees joined this collaboration by developing courses open to the entire community to cope more adaptively with the anxiety derived from confinement and the pandemic. The Psychology Department also stood out, offering online psychological support and counseling services to the entire SEK community. They developed a webinar channel focusing on critical aspects to developing an adequate social and emotional adjustment to the situation. Eleven psychology faculty members participated in this service, with eight of them having clinical experience, attending twenty-seven requests for psychological help and support. This psychological counseling included at least two online sessions lasting approximately one hour each.

Again, this collaboration experience was highly enriching for the teachers and faculty involved. For this reason, the webinar channel has been kept open, adding subjects like wellness, nutrition, health, or mindfulness and readjusting the psychological support service of the university to favor online counseling for its students.

17.3.1.4 "Family Classroom" and "UCJC Webinars" (Cross-faculty Effort)

In turn, the three schools of the university developed two channels of webinars aimed at parents and students to inform, from a multidisciplinary approach, on how to address the challenges posed by COVID-19 from different sectors of our society:

health, transport and logistics, communication (fake news), urban preventions for future pandemics, volunteering, etc. More than twenty webinars were offered synchronously and asynchronously.

17.4   Social Strategy to Foster Education in Vulnerable Contexts

We need a society that educates, promoting humanistic values and the personal development required by the epochal changes we are experiencing. We need a society in which all its agents, individuals, families, institutions, businesses, opinion leaders, communications media, and political parties bear the responsibility of showing exemplary conduct for human development at a time when all role models are being questioned.

However, to become a stable educational society, we must first learn to alter our conduct to find a solid "learning society" hinging on education and, therefore, will lead to the perfection of each individual and the entire community. On the other hand, although external agents are essential to tackle the transformation of the educational system, increasingly, the large organizations that are spearheading social and productive change are becoming educator agents on a global scale. This change posits new scenarios for configuring our future society and poses new challenges and opportunities for expert learning organizations.

In this group of actions, agents that interact and thereby favor building a stronger community are collaborating with social organizations of the SEK Institution. At SEK Education Group and, in particular, at the University Camilo José Cela Foundation (UCJC Foundation), we are working closely with social organizations, public and private bodies, businesses, and cultural entities that make up our learning community and contribute to the attainment of our educational objectives. In this way, the SEK academic community expands its borders, including, together with the rest of its members, students, alumni, professionals, professionals emeritus, corporate world, and families. All these organizations are exceptional members to face the consequences of the pandemic.

The UCJC Foundation is the instrument of the university to promote and manage the social impact of its current educational model. To this aim, the foundation promotes the discussion about service-learning and research applied to the needs of our society. In this way, the foundation is the reference space of the university for the development of experiences of social innovation. Due to the pandemic, the UCJC, through its foundation, designed two strategies aimed to foster schools in vulnerable sectors:

- In the national context, UCJC Foundation and the Felipe Segovia Foundation launched the SEK Volunteering Network. This initiative clusters the efforts of our entire learning community (schools, university, and foundations) against the pandemic. This joint initiative aims to be a social project that reflects SEK's core values.

- In the international context, UCJC Foundation expanded two of its educational projects: volunteer training and the teacher training platform, EachTeach, to support the school needs derived from the COVID crisis.

In both cases, when schools were declared closed, the lessons learned through the initiatives developed by the UCJC Foundation were crucial. These initiatives aimed at alleviating the injustices caused in countries in conflict, and thanks to them, new people coming from these countries joined the SEK community. People whose lives had been cut short overnight were forced to leave their countries of origin to handle uncertainty and manage the false hope that life would soon return to normal. Through these new members, the SEK community learned the importance of social and emotional learning compared to academics and the importance of promoting the feeling of belonging in isolation situations.

Thanks to this learning, the SEK community managed the complexity of remote education in the emergency unleashed by COVID-19 and the need to promote understanding the causes of this pandemic, in the same way that it had learned the knowledge of the reason for each conflict. Without all these people who strengthened our community, without the courage given by their stories, and without all the learning they gave us, our way of facing the pandemic would never have been the same.

17.4.1 Initiatives in the Spanish National Context

17.4.1.1 Supporting Syrian Refugee Students

One of the outstanding commitments that our university acquired in 2015 consisted of improving the academic training of young refugees in the country by creating a university integration program that would allow them to pursue a career and thus improve their adaptation to the society that welcomed them (the Integra Project). The SEK Volunteering Network wanted to honor this commitment, now addressing refugee students housed in "foreigners internment centers" in the community of Madrid.

This group of young people severely suffered due to confinement and the closure of public education centers. Likewise, access to online training offered by those centers caused specific difficulties for them since the vast majority of them lacked the technological devices to access them. On the other hand, their parents' poor preparation and training prevented them from having adequate educational support in their family environment, endangering their education continuity and generating a high risk of marginalization and academic delay for subsequent courses.

Thanks to the help and involvement of UCJC refugee students, who were already mentioned as part of the Integra Project, the SEK Volunteering Network contacted the NGO "Friends of the Syrian People." This NGO is the leading association representing the majority of refugees arriving from Syria who have been punished by war and terrorism.

Through the NGO, senior students and teachers (active and emeritus) from our institutions organized themselves to support the internment center students. They acted as academic tutors online or by phone, reinforcing educational aspects such as Spanish language, mathematics, physics, and science, as they have proven complicated to these young students.

The follow-up and subsequent evaluation that our organization was able to conduct confirmed the great success of this initiative. The majority of the supported refugees overcame their academic difficulties. Almost all of them managed to keep up with their academic requirements during the entire period of confinement (nationally enforced since March). Without a doubt, once again, our great institutional motivation has been strengthened by an educational initiative supporting young refugees that come to our country. It is essential to mention that on this occasion, the economic and personal efforts made by our entire academic community have been equally rewarded by the civic commitment that the refugee students of the Integra Project acquired before the Spanish society.

17.4.1.2   Integra Project and SEK Schools: Creating 3D Visors

Under the coordination of the SEK Volunteering Network, students from the Integra Project, although confined at the University Residence Hall, generated a production chain of protective visors using the 3D printers available at the university and the SEK schools. More than two hundred visors were handed over to the Civil Protection organism of Madrid to be distributed among health workers of the city's hospitals who were wholly unprotected in the face of the pandemic. This initiative of our students has been of great pride for our entire Institution. It reaffirms our belief that the path undertaken to support young refugees has not been in vain.

17.4.1.3   Supporting Vulnerable Students

This exciting experience of helping refugee schoolchildren led the SEK Volunteering Network to articulate a new initiative to prevent schoolchildren from the risk of social exclusion. Undoubtedly, these were young people who suffered a similar problem derived from the closure of schools. The lack of means to carry out an adequate academic follow-up at home, their family environment, the consequent issues derived from the lack of employment of their parents, or the emotional traumas caused by social isolation or the loss of loved ones made these young people an especially vulnerable group. For this reason, the SEK Volunteering Network contacted another important and representative NGO, Fundación Balia, whose work focuses on improving the living conditions of young people at risk of marginalization. In this way, our students and teachers of our bachelor's degrees in education, psychology, and law provided support to these young people and their families, reinforcing school content, providing psycho-emotional assistance, and giving legal

advice to those parents and/or guardians who had lost their jobs, specifically on how to access state aid or process unemployment records.

At the same time, to achieve a more far-reaching impact, we designed a free social volunteer course that we call "Youth for Social Transformation." Together with Fundación Balia, we trained young students on educational methodologies, protocols, and tools to minimize the effects of COVID on minors for three weeks. For example, students learned the use of emotional intelligence or mindfulness tools, the management of post-traumatic stress, and the proper use of preventive techniques. Besides one theoretical module, the training offered was essentially practical, taking place in youth leisure centers where minors at risk of social exclusion attended.

The presidency of SEK Education Group has provided all the financial resources needed for implementing these initiatives undertaken by our SEK Volunteering Network. The management and implementation of them have benefited from the commitment of the entire community, school, and university that integrated it.

Although we would have liked to have expanded our radius of influence, the national regulation has not greatly facilitated this intention since the laws for the protection of minors, data protection laws limiting the use of reserved data, or the regulation of schools themselves did not allow for speeding up this type of action undertaken by private institutions. Undoubtedly, all this was motivated by the immediacy of the national emergency, which happened without time for an adequate political and social organization. Possibly, in the face of an uncertain future, legal procedures will be improved to avoid keeping the weaker social sectors unprotected.

17.4.2 Initiatives in an International Context

17.4.2.1 Volunteer Training

The UCJC Foundation's commitment to education in vulnerable contexts led it to expand its scope to Cambodia, supporting the NGO Pour un Sourire D'Enfant (PSE) mission and expanding to Kenya, fostering teacher training in refugee camps. Both contexts have been profoundly affected by the coronavirus and have allowed for new lines of collaboration.

For over twenty years, PSE has been operating in Cambodia to help children escape poverty and get a decent job. Each summer, the UCJC Foundation collaborates with PSE to develop the School Continuity Program in Cambodia. The program aims to prevent children from returning to the dumping sites during their holiday period and at the same time avoid dropouts of school. The collaboration consists of developing a volunteer training course created by UCJC professors from nursing, psychology, and physical activity sciences and sport. Its ultimate goal is to develop the skills necessary to face the reality that volunteers and coordinators will experience while working in Cambodia.

This year, the summer School Continuity Program was canceled due to COVID-19. The SEK Volunteering Network offered PSE volunteers the opportunity to participate in the Youth for Social Transformation project mentioned above during the summer school holidays. The PSE volunteers will have the chance to promote the integration of children with limited resources and seriously affected by COVID-19. The program also offers leisure activities, trips in natural environments, and extracurricular courses with this goal. It takes place in the Urban Camps of Balia Foundation, from Monday to Friday during the school holidays.

On this occasion, PSE volunteers will put their skills at the service of society in Madrid, gaining new service-learning experiences. In turn, a training course will be offered to foster the skills necessary to become active global citizens. They will develop competencies such as self-management (analyze and solve problems, initiative, and autonomy, learning capacity, optimism, and flexibility), leadership (ability to lead initiatives, organization, planning, technical and personal reliability), and communication (interpersonal communication, teamwork, negotiating capacity). The program will run for at least one week, although students will choose to extend their collaboration with the entity for longer if they consider it.

SEK Education Group contributed to this initiative with in-kind funding. The dean and professors from the School of Education and Health contributed to the development of the course. The Department of Communication and the Student Department helped in the dissemination of the program. UCJC Foundation was in charge of the coordination. Fifteen volunteers have currently requested participation.

17.4.2.2 EachTeach

Conditions in refugee camps are especially challenging for teachers due to COVID-19. Teachers are the backbone of the education systems and the key to reaching learning goals, regardless of context and situation. Within the COVID-19 crisis, they are on the front line, ensuring that learning continues. These extreme circumstances demand new competencies to facilitate quality distance learning for students in confinement.

Digital platforms for customized teachers' professional development are scarce and not tailored to COVID-19 needs (in the short, medium, and long term). EachTeach is an initiative by the Felipe Segovia Foundation and University Camilo José Cela Foundation that faces this problem. It is a digital marketplace that combines online and in-person training for teachers in vulnerable contexts that narrow the gap between qualified teachers. Its first pilot began in 2019 in the Kakuma refugee camp.

COVID-19 forced EachTeach to cancel the Kakuma visits scheduled. In turn, it opened the door to new ways of collaboration with local organizations and teachers who had been participating in the project. Two of these local organizations are through the initiatives that the UCJC Foundation has supported in this crisis: the COVID-19 Awareness Campaign led by Professor Martha Korok, Kakuma

ambassador of the EachTeach project, and the Peer Mentoring Program for Female Teachers, led by the Lutheran World Federation with the support of UNICEF. Both initiatives are aligned with the Kenya Basic Education COVID-19 Emergency Response Plan (May 2020) developed by the Kenyan Ministry of Education.

17.4.2.2.1 EachTeach: COVID-19 Awareness Campaign

Kakuma refugee camp (Kenya) is a place where confinement is impossible as everyday people need to go to the food and water collection points. Based on the vulnerability of refugees related to this pandemic, there was a need to create a thorough awareness to educate the community on precautionary measures to prevent a more complex situation in the camp. On the other hand, the condition of teachers in this pandemic is very critical since many of them have lost their salaries. In particular, this is the situation of our EachTeach ambassador, Martha Korok.

Taking all this into account, the UCJC Foundation decided to design a small entrepreneurship project that would give teachers an extra source of income and alleviate the lack of knowledge about COVID. Thus, Martha Korok brought together a group of young people to create an awareness campaign. They decided to use poems, songs, and drama to educate and raise people's awareness of the dangers of coronavirus and the measures needed to protect themselves.

The SEK Education Group funded these interventions, and the UCJC Foundation launched a crowdfunding campaign to raise funds for the purchase of masks and soap. It was also responsible for spreading the initiative. Over the three months of the campaign, around 40,000 students have benefited.

We have learned from this experience that COVID-19 needs a joint effort. Refugees are capable of battling this pandemic, but they need the economic support of external organizations. More refugees are still exposed to COVID-19, which means enormous help is still required, especially the provision of facemasks and liquid soaps.

17.4.2.2.2 EachTeach: Peer Mentoring Program for Female Teachers in Kakuma

The Peer Mentoring Program for Female Teachers in Kakuma is an initiative of the Lutheran World Federation supported by UNICEF. It aims to encourage girls to study despite the difficulties of COVID-19. With this aim, the program will mentor fifty female teachers, who will mentor four more teachers. In this way, two hundred teachers will be responsible for boosting girls' education in Kakuma. Twenty-one primary schools of the Lutheran World Federation have been involved in the program.

UCJC Foundation and a team of ten UCJC researchers from the School of Education and Health are collaborating in designing the content of this program,

ranging from basic definitions of mentoring to more specific aspects related to COVID, such as the psychological and health support needed for children.

17.5   Lessons Learned

The pandemic offered University Camilo José Cela a unique opportunity to share with the whole educational community best practices, new content, reflections, and knowledge to face the challenges in schools due to the coronavirus. SEK Learning Community came together as a team in the face of unprecedented challenges. More than ever, there was a clear need to learn from each other, support each other, and share the learning struggles we were all striving to overcome. Learning was found in unexpected places and through initiatives that combined the strengths of different community members, which might have, otherwise, remained unseen and would probably never have connected.

The lessons learned are related to the UCJC's three strategic axes of action[1]. Concerning the first axis, **Innovation and Entrepreneurship**, we would like to highlight several issues**:** the creativity of teachers that developed new materials, content and innovative teaching, and research proposals; the adaptability, flexibility, and willingness of the students, teachers, and families to learn together; the relevance of closer relationships with civil society organizations for the co-creation of new lines of action; the importance of assessment and research for each further action; and the need to create fluid learning models beyond the COVID crisis. About the second axis, **Digital Transformation**, we have to mention several points: digital skills and teamwork have been essential as well as the agility and creative search for solutions; combining face-to-face with digital education is crucial to maximizing the advantages of both; and digital social tools are a way to connect and build communities. Finally, concerning the third strategic axis, **Social Commitment**, the most relevant lessons learned were as follows: students and teachers demonstrated a profound sense of community and solidarity and became aware of the strength of the SEK Community, they empathized and put themselves in each other's shoes to understand how they had lived this situation, our experience in emergency contexts has been precious, family involvement in the educational process has improved dramatically, and teachers point out that relationships between all members of the Learning Community have improved.

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[1] These results come from several focus groups developed at SEK schools to reflect on the community experience during the Covid-19 pandemic.

17.5.1   Next Steps

These lessons learned around our three strategic axes guided us to define the next steps. Concerning **Innovation and Entrepreneurship**, there are several actions to be accomplished: education degrees to redesign three-year plan; creation of a well-being and SEL platform to serve the whole community; customized itineraries for teacher and student training; advancement in the measurement of academic and social impact; research about the new learnings and its evaluation; and quantitative and qualitative data collection and analysis during COVID and its relationship with recent developments. Concerning **Digital Transformation**, we want to foster several areas: UCJC's new learning model, future and Learning Think Tank to inform future results of UCJC, and hybrid technologies to sustain new learning methodologies. To conclude, concerning **Social Commitment**, our next steps will deal with three lines of action: training teachers for crisis contexts, enhancing the volunteer network platform, reinforcing partnerships, and expanding network capacity.

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Miguel Ángel Pérez Nieto graduated in psychology from the University of Salamanca. He holds a master's degree in intervention in anxiety and stress from the UCM and a doctor of psychology, also from UCM, earning his doctoral thesis the extraordinary prize. He has been an associate professor in the Department of Basic Psychology (Cognitive Processes) of the UCM. He is currently a professor of the Department of Psychology of the Camilo José Cela University, having directed more than a dozen doctoral theses and participates as a speaker in postgraduate studies from different universities. A result of his research activity is the 80 publications in scientific journals relevant to his field. He has been director of the Department of Psychology of UCJC and dean of the Faculty of CC of Health of the UCJC (2008–2013) and from 2015 to the present dean of the Faculty of Education and Health of UCJC.

Nieves Segovia Bonet is the president of SEK Education Group, composed of Camilo José Cela University and SEK International Schools, an educator and expert in educational innovation, and a member of the Advisory Board of the Spanish Ministry of Education. She is vice president of the Global Sports Innovation Center, the Club Excelencia en Gestión, and Edutech Cluster Spain. She is a member of the Ashoka Support Network and a board member of Fundación Transforma España and Fundación Europea Sociedad y Educación. Nieves Segovia founded and promoted the Global Education Forum, a community of education innovators, and SEK Lab, an Edtech accelerator. In 2017, she launched the UCJC Integra Program, a university education plan for refugees, which has now been joined by Sphera, an intercultural social entrepreneurship center, and EachTeach, a global initiative for training refugee teachers. Among other awards, she has received the UNICEF Prize for Education Values and the European Citizen Award from the European Parliament in Brussels. She is a 2019 Advanced Leadership Initiative Harvard Fellow.

Ignacio Sell Trujillo graduated with a degree in geological sciences from the Complutense University of Madrid, DEA from the Université Joseph Fourier de Grenoble (France), and Doctorate European from the Université Bourdeaux III, Bourdeaux (France). He is an associate professor at the Complutense University of Madrid (Spain), the University of Tucumán (Argentina), and the University of Sao Paulo (Brazil) and the director of the University of La Laguna University Summer Courses. At Camilo José Cela University, he assumes the following functions over the last ten years: director of the Center of Emotional care for victims of terrorism "Peace Campus" member of the VVT RAN (network of radicalization, European Commission working group awareness victims); director of the INTEGRA project, inclusion in higher education of young refugees and expatriates of areas of conflict; and director of the SFERA Experience—Social Educational Innovation Project. He is currently CEO of the Camilo José Cela University Foundation.

Carlota Tovar Pérez holds a PhD in industrial engineering with more than twenty years of experience in research, development, and innovation. Her primary expertise lies in strategizing and leading cross-functional teams to bring social change in technological environments—as a leader, researcher, and expert consultant. Her first fifteen years were dedicated to the development of virtual reality training systems. She turned her professional career to focus on using technology to foster organizations' social responsibility. For the last two years, she has been promoting social transformation at UCJC as vice-rector for Innovation and Research. She is currently Head of Social Innovation at the UCJC Foundation. Nowadays, she is responsible for designing the new model of The Hive (La Colmena), the program for developing the cross-cutting competencies of UCJC students. She continues promoting technology in favor of the most vulnerable.

Chapter 18
University-K-12 Collaboration During the Pandemic: The Case of Turkey

Derin Atay

Abstract As of March 2020, educational institutions across Turkey were closed, and distance learning was introduced as an early precaution to halt the spread of the coronavirus. The shift was especially hard for K-12 school students, parents, and teachers, and it required collaboration between universities and schools more than ever. This chapter presents the systematic academic and psychological support provided by the Faculty of Educational Science of Bahçeşehir University, Turkey. Based on a needs analysis, faculty instructors offered online training and seminars to K-12 teachers mainly on digital literacy and integration of technology to courses, and to students and parents on topics such as anxiety, stress, and resilience. The support of faculty members to both public and private schools throughout Turkey has been proved to be of great importance in navigating through the pandemic, and especially in areas with low bandwidth and connectivity. One of the most important issues realized during the pandemic was the need for robust and continuous university-K-12 relationships to ensure continuity of teaching and learning in hard times.

18.1 Introduction

After the first case of the COVID-19 was confirmed on March 11, educational institutions across Turkey were closed and distance learning was introduced as an early precaution to halt the spread of the virus. Shortly after schools were shut down, around 19 million K-12 students and one million teachers shifted to online education. Students at public schools received school lessons online and on TV through the Turkish Education Information Network (EBA) and public broadcaster TRT EBA, while those at private schools followed courses on the online platforms offered by their schools.

D. Atay (✉)
Bahçeşehir University, Istanbul, Turkey
e-mail: derin.atay@es.bau.edu.tr

As of March 16, 2020, education at all universities was suspended as well, and universities determined their opportunities and capacity for distance education. A road map for distance education at universities was created by a delegation of concerned university experts. This road map focused on five primary topics: curriculum, infrastructure, human resources, content, and implementation. Bahçeşehir University (BAU) was one of the universities where decisions made about these topics were put into practice very rapidly and effectively due to the existing infrastructure and highly competent instructors. The instructors were used to giving online courses and were provided with ongoing training and support for such education.

BAU is a foundation (nonprofit and private) university that was established in 1998 with six campuses spread around Istanbul. The educational opportunities range from certificate programs offered on topics addressing the needs of people in various sectors to undergraduate and postgraduate degree programs in nine faculties with over 1350 lecturers and around 25,480 registered students, 4133 of whom are international students. BAU also offers cooperative education programs with 2330 CO-OP Brand Collaborations and 175 CO-OP Branded Courses, which are strongly supported by the business world.

The University is part of the BAU Global Education Network, as well as two chains of K-12 schools with around 180,000 students and 21,000 teachers in approximately 280 campuses all around Turkey. These schools, especially those in Istanbul, are in close contact with the Faculty of Educational Sciences. Within the "University within School" program, courses are linked to practice mainly through these K-12 schools under the supervision of the university supervisors and schoolteachers. In addition, collaboration with the Faculty of Education addresses the academic and psychosocial needs of the schools, covering a variety of subjects ranging from teacher training to curriculum development.

While distance education started rapidly in all departments of the university, the board of the university also discussed methods for supporting elementary and secondary schools during this unusual and challenging time. On the one hand, the government was trying to safeguard people from infection through a combination of confinement and mitigation strategies. There were ongoing lockdowns, particularly for people aged above 65 and below 20, and these disrupted the psychological life of not only people in these age groups but also that of the public. The serious threat the global pandemic posed to the psychological well-being of individuals along with its obvious health-related impact was felt increasingly in every layer of society. On the other hand, the shift to online education was a serious challenge; courses at the K-12 level that were designed for face-to-face education had to be transferred to online education. Neither students nor teachers and parents were ready for such a rapid shift.

As coronavirus hit the campuses, BAU, like other universities in Turkey and all over the world, set some priorities to respond to the quickly evolving situation: (1) maintaining health and safety of students, staff, and the community, (2) maximizing student learning and thriving, and (3) supporting staff. Educational reports came first from China and then from parts of Europe, along with formal and informal meetings of Turkish university members with the stakeholders of educational

institutions. All reflected the fear, anxiety, and restlessness of the tri-pillars of the education system: students, teachers, and parents who were trying strategies to cope with the situation they were in. Thus, the university made the right decision by emphasizing that the health, safety, and well-being of every individual came first and that instructors had to operate with an understanding of the complexities in students' home lives as well as mental, emotional, and physical strains their communities were facing. This message was explicitly shared by the board on a regular basis.

The Department of Psychological Counseling and Guidance (PCGD) in the Faculty of Educational Sciences took the lead in addressing the urgent needs regarding anxiety, fear, and loss of resilience by providing psychosocial support services, and frequently sharing information via television programs and online seminars first with the stakeholders of the university and then with the whole public. These programs, individual, and group, sessions helped students overcome the trauma the isolation might have caused them and their families. They were also much appreciated by the international students in particular, as well as those who had to return to their hometowns because of the closures. Feedback collected from the participants was very positive. Many said, "I learned what it means dealing with the unknown," "Talking with a professional about the pandemic and the situation we are in made me feel relieved," and "I was having so many bad scenarios in my mind especially when I was alone. Though they are not gone totally, I feel much better." The experiences with the university members and students enabled the Faculty members to be better prepared to give support to K-12.

18.2   Initial Steps: Needs Analysis

At the beginning of April 2020, a comprehensive study was conducted by the Faculty of Educational Sciences to investigate the opinions of all stakeholders regarding distance education in general and the education provided in their institutions. The aim was to navigate the process of distance education and determine whether any support was needed to maintain the continuity and quality of the education provided. The Faculty hoped to address not only education at the time of the current school closure but also the possibility of future stoppages over the coming months due to potential recurring outbreaks. Research findings would help teachers and school leaders make informed decisions. The study was conducted at the beginning of April. Likert-type statements and open-ended questions were sent to schools in all regions through Google Docs. In only 5 days, 4435 primary school students, 9536 secondary school and high school students, 5661 teachers of 18 different subjects, and 25,436 parents responded to the surveys. Analyses of the data revealed that the schools did their best to maximize student learning and thriving. Delivering quality instruction, though it was clearly a challenge in current circumstances, was achieved to a great extent in the eyes of all stakeholders. With the help of technologically advanced systems and teachers with high digital literacy and competence in technology integration, the schools were able to offer synchronous and

asynchronous online learning to students. Psychosocial support was offered to students and parents through school counseling departments, and the analyses of the data (open-ended questions completed by parents and teachers as well as talks with the heads of participating schools and many state schools) revealed the need for seminars and trainings on several issues for psychosocial and academic support. Thus, the data analyses showed that more collaboration and support on specific areas was needed, and that support was provided to schools in BAU Global Education Network as well as public schools all over Turkey.

18.2.1   *Psychosocial Support*

One of the main areas of need identified was resilience, defined as the ability to adapt when faced with stressors such as trauma, tragedy, threats, family and relationship problems, or serious health problems. The uncertainty the pandemic brought was challenging and worrying for everyone, yet it affected everyone differently. Psychological resilience was very important during the pandemic period. Heads of the K-12 schools asked BAU faculty members to inform teachers, students, and parents about the importance of psychological resilience during the pandemic period and guidance on how to improve their own psychological resilience. Similar requests came from Istanbul Provincial Health Directorate & Coronavirus Online Support Program (KORDEP) Working Group Volunteer Orientation and Training Programs. Many seminars on this issue were offered through social media live-broadcast, such as "Psychological resilience in children and adolescents in pandemic days," "Psychoeducation and psychological first aid in pandemics," "Protective role of resilience," and "Training to explore our psychological resilience," some of which reached around 3000 people. Because of the magnitude of the task, the instructors at the department collaborated with MA and PhD students, supervising the counseling the students provided in individual and group sessions, which was offered on a volunteer basis. Through Instagram accounts, sessions were offered on "Family resilience in pandemic days," "The well-being of parents during the days of the pandemic," and "Facilitating communication with children during pandemic days." This ongoing project has reached around 4500 people so far.

Parent seminars focused on how parents should talk with students—especially young ones—about the pandemic, how to answer their questions, and how to balance personal and work life during the pandemic. In other seminars, topics such as the characteristics of stress, effects of misinformation on stress, and the importance of social relations/friendship were addressed.

Another issue that was of great importance to all stakeholders was anxiety: individuals felt helpless because they could not plan, predict, and control the events and situations in their lives (Barlow, 2000). The psychological effects of the COVID-19 outbreak on children and college students were investigated (Hong et al., 2020; Radesky, 2020; Zhang et al., 2020). Both studies indicated that the COVID-19 death count showed a direct negative impact on general sleep quality, leading to stress and anxiety. Studies with adults who were living in different countries also showed high

levels of anxiety and stress (Chakraborty & Chatterjee, 2020; Li et al., 2020; Madani et al., 2020; Mazza et al., 2020; Uvais et al., 2020; Wang et al., 2020). In addition, the scores for positive emotions and life satisfaction decreased (Li et al., 2020; Satici et al., 2020). A number of interactive online seminars were prepared jointly by the faculty members and K-12 Psychological Counseling and Guidance office, covering topics such as "Anxiety management between parent and child in coronavirus period." Approximately 4500 people were reached with this seminar.

Another issue that led to anxiety among students and parents was the postponement of exams. In Turkey, many exams were postponed due to coronavirus. The university entrance exam, which has the highest expected attendance of 2,500,000 students, is just one example. There were some changes in the duration of the exam and the scoring, coupled with safety precautions expected from every single student and teacher. The exam anxiety experienced by the students increased dramatically not only because of the changes and additional procedures but also because of the lockdowns they had to obey. Thus, several seminars were carried out on this subject and all parties (students, teachers, and parents) were informed about strategies for decreasing anxiety and the importance of motivation. Many individual and group sessions were held for these purposes.

One strategy for dealing with the uncertainty and anxiety brought by the pandemic is to stay in the moment. The effectiveness of mindfulness practices on stress has been demonstrated in secondary school students, adolescents, and adult groups (Anand & Sharma, 2014; Baer et al., 2012; Carmody & Baer, 2008; Chandrasekara, 2018; Nyklícek & Kuijpers, 2008; Snippe et al., 2017). During the pandemic, many training and interviews were requested from our faculty to relieve the stress and anxiety of the stakeholders. Training included, "Mindfulness practices for children," "Mindful parents and mindful children," and "How can we use mindfulness skills when trying to normalize in the midst of this crisis?" Mindfulness seminars, which are regularly provided by the faculty within the "University within School" model, were given online to relieve the stress of the participants.

18.2.2 *Academic Support*

In addition to seminars on affective issues, the Faculty regularly informed parents about the importance of balanced screen time for children and how to spend the time they were all at home most effectively. Parents were facing a dilemma: on the one hand, they thought their children were spending too much time in front of screens, on the other hand, they wanted them to follow the online courses and not miss anything. Parents were given some tips to find out whether their children are actually conducting academic work or just "consuming."

Furthermore, although teachers were provided with technology support by their own schools, faculty assistance was requested on strategies for redesigning education for online learning and ways of enriching synchronous and asynchronous lessons. The English Language Teaching Department held an online training, "Computer Technologies and Web 2.0 Tools during the Period of Distance

Education," for teachers working at state schools with the collaboration of the Ministry of Education (MoNE), and approximately 500 participants attended the training. The training addressed issues such as how to implement and use computer technologies effectively during the period of distance education and the preparation of course materials using Web 2.0 tools.

A very important finding of the study was that it underlined the importance of self-regulation in distance education. Self-regulated learning is a self-controlled process in which the learner manages their cognitive activities, emotions, motivation, and behavior to support the learning process (Zimmerman & Schunk, 2001). It was highly predictable that children who do not possess self-regulated learning skills, which includes setting goals, creating and implementing plans, and evaluating this process, were having difficulties in online learning environments. Online learning environments are different from those school settings in which learning activities are organized by teachers. Online learning provides the learners with the freedom to plan their own time, place, and learning activities. However, the effective use of this flexibility is directly related to the self-regulation skills of the learner (Barnard-Brak et al., 2010; Broadbent & Poon, 2015). Trainings were organized for both teachers and parents about self-regulation skills for achievement in online learning. The purpose of the teacher trainings was to explain the importance of self-regulated learning skills and to inform teachers on how to use online tools to develop learners' self-regulation skills. In-class activities and home assignments intended to boost students' self-regulation skills in online education were also shared with the teachers. The purpose of the parent training was to inform parents about what self-regulation skills are, why they are important, and what parents can do to support the development of these skills in their children. Parents were told that education might persist in the system in the form of several online classes, so they needed to understand the importance of students' ability to regulate their own learning for their success.

As can be seen, all departments of the Faculty of Educational Sciences were involved in the initiatives to support K-12 schools, but the PCGD had the largest workload. All the seminars and trainings were done on a volunteer basis, as the mission of BAU includes supporting the community, fulfilling their needs while maintaining close contact with all sectors in the community, and preparing graduates according to community needs and demands. As for the Faculty of Educational Sciences, the collaboration between departments and K-12 schools has been of utmost importance both in terms of preparing teacher candidates and offering support to K-12 education and well-being.

Creating partnerships between universities and K-12 schools has always been essential for BAU. Researchers, instructors, and administrators have sought ways to boost student achievement by sharing expertise. However, it is more than an instructional relationship based on a one-way flow of information from the university to the schools. As exemplified before, the model "University within School" is based on the idea that partnerships develop in response to the needs identified by practicing teachers for their specific classrooms, curricula, and educational contexts. Accordingly, all the seminars by the instructors and all the practices by the university have been conducted to address the concerns and needs of collaborating schools.

Theory and practice play an important role in determining the nature of educational research and teaching practice in teacher education programs. Thanks to practices in collaboration with K-12 schools, BAU could acknowledge the importance of theory in educational research and practice in teacher education and also ascertain the influence that theory has on practice in teacher education. We believe that strong and long-term partnerships between university faculty and K-12 schools are required and must be supported by grounding teacher education more strongly within practical contexts.

All initiatives are supported by the Innovative Education Development Research Center of BAU, which is an education, development, and quality center established for the purpose of determining, implementing, and improving the quality standards of schools. This center ensures that education standards that can be measured and supervised are established in schools. This center has organized most of the seminars, especially those provided to public schools.

18.3   Conclusion

The large-scale outbreak of the COVID-19 Pandemic has forced schools to suspend campus learning and switch to online learning practices. The shift imposed new challenges for institutions in implementing effective, engaging, and inclusive education. Our goal was to contribute to the development and improvement of the learners, teachers, and parents who are at the heart of the sudden change. Focusing on the changing roles of online teachers, we purposefully designed our practices according to the unique characteristics and needs of our target groups. To promote the development of effective online teaching practices and online learning processes, we supported them in a variety of ways, such as virtual seminars, online training programs, online discussions, and one-to-one support. Reflection and question and answer sessions were done after many of the seminars, which provided invaluable information about how to design future seminars and training to meet the needs and wants of stakeholders.

Looking back, we can identify several positive aspects of the initiatives taken. University and school collaboration, though not a new endeavor, became much stronger. In the research we conducted, K-12 teachers indicated that during this period they developed professionally. Through our collaborative endeavors, we could guide them in their design and teaching of online courses during that delicate time. We propose that the dynamics of online teaching are contextual and dependent upon various factors including the institutional resources, students' goals, etc. To be able to promote the development of effective online courses, engaging learning environments, and a range of skills in teaching online, we designed our trainings and collaborations to be consistent with unique learning environments. Since the focus of professional development for online pedagogy suddenly shifted from integrating technology, in traditional teaching practices, to teaching through synchronous and asynchronous online tools, we attempted to extend the teaching and learning processes in online contexts by combining theory and practice at just the right time.

On the other hand, moving into online education posed difficulties not only for teachers but also for us. These challenges included workload issues, isolation problems, and differences in the educational contexts of teachers. The instructors at the Faculty had their own teaching workloads and were affected by the pandemic as well. Moreover, K-12 teachers were not competent at the same level with technological devices and synchronous/asynchronous learning environments. Building trust and sustainable inquiry during seminars, activities, etc. at the time of outbreak inevitably brought difficulties that had to be handled.

One of the most important issues COVID-19 has taught us is that it would be hard to sustain life—education, home life, family relations—without the collaboration and mutual support of institutions. The university and K-12 collaboration is an excellent example of this. BAU has done much to reach out to students, parents, and teachers in both private and public schools, and the initiatives will go on as they did before the times of the pandemic.

Measures of social distancing and quarantine did curtail the spread of the pathogen to a great extent, and we hope to mitigate the likely detrimental psychological effects through our collaborative endeavors.

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Derin Atay is the Dean of the Faculty of Educational Sciences of Bahçesehir University, Turkey. She received her MA and PhD degrees in English Language Education from Boğaziçi University, Turkey. Her career in education spans 30 years, teaching and doing research in the areas of pre-and in-service teacher education, English language education, and the role of culture in language education. She published articles in the indexed journals, co-authored book chapters, and participated in projects on various aspects of language education, as well as offered professional development seminars to teachers all over Turkey.

Chapter 19
Arizona State University: A Learning Enterprise Supporting P-12 Education in the COVID-19 Pandemic

Carole G. Basile

Abstract Although no one was fully prepared for a pandemic in 2020, Arizona State University was ready and able to respond. As the COVID-19 virus began to spread across the world, ASU began moving university students to remote learning environments. As K-12 schools began to close across the nation, ASU disseminated elementary- and secondary-level educational resources and created hybrid learning opportunities for students of all ages.

Three distinct categories of action defined the university's response to COVID-19:

- Direct provision of education to P-12 learners
- Provision of human and intellectual capital (people and ideas) to P-12 schools
- Curation and provision of free educational resources to learners, families, and schools

Many of the existing long-term commitments being pursued by various ASU units had helped the university develop capabilities that could immediately be applied to help elementary and secondary learners and the education professionals serving them during the pandemic. Some of the immediate responses accelerated the university's efforts to pursue long-term actions that could help both schools and P-12 students and families integrate remote learning and instruction into effective education models.

ASU responded rapidly to the educational challenges COVID-19 presented because the university had a high degree of institutional readiness in at least three key areas of operational excellence and organizational culture:

- A core set of preexisting commitments and functional capabilities in the area of technology-enhanced instruction
- Strong existing partnerships with P-12 schools
- An institutional vision to universal learning that demands a university be ready and able to deliver instruction to all learners across many modalities

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C. G. Basile (✉)
Dean Mary Lou Fulton Teachers College, Arizona State University, Phoenix, AZ, USA
e-mail: Carole.Basile@asu.edu

This chapter only represents a moment in time, the beginning of the pandemic, and the actions taken to support and ameliorate consequences. Since this time, much has happened.

19.1 About ASU

Arizona State University (ASU) has developed a model for the New American University by creating an institution that is committed to excellence, access, and impact. Through the New American University model, ASU educates more than 120,000 students each year and supports a larger student body than any other university in the United States that operates under a single institutional administration.

The university is demonstrating that access and high academic quality can happen together.

- While increasing enrollment by 49.8% since 2002, ASU achieved the #17 research expenditure ranking among 768 US universities without medical schools.
- US News and World Report named ASU the #1 university for innovation in 2016, 2017, 2018, and again in 2019.

ASU is proud of their students and their ability to complete their university education against often difficult odds.

- Eight-five percent of ASU undergraduate students receive some level of financial assistance; among the highest percentage of any top-tier university in the United States.
- Thirty-six percent of ASU undergraduate students receive Pell Grants, the most diverse class ever
- Forty-six percent of ASU's incoming first-year students in fall 2019 came from minority backgrounds, which reflects ASU's commitment to higher education access
- Twenty-seven percent of ASU's student body is first-generation college students
- ASU ranks no. 1 among the state's public universities for its 87.8% first-year students retention rate (https://www.asu.edu/about/facts-and-figures).

The charter ASU adopted in 2014 serves as a succinct expression of the university's purpose:

> ASU is a comprehensive public research university, measured not by whom it excludes, but by whom it includes and how they succeed; advancing research and discovery of public value; and assuming fundamental responsibility for the economic, social, cultural, and overall health of the communities it serves.

ASU is strategically implementing the academic enterprise, which is the core of the institution providing programs and degrees across a wide swath of disciplines; the knowledge enterprise, which advances research, innovation, strategic

partnerships, entrepreneurship, and international development; and the learning enterprise, which fosters universal access to social and economic opportunity by creating new pathways to learning that are accessible at every stage of a learner's life. As part of its commitment to innovation, ASU empowers its units to make strategic and operational decisions in line with its charter.

19.2 Immediate Response

The following units played key roles in ASU's university-wide response to the educational challenges presented by the COVID-19 pandemic:

ASU Preparatory Academy (ASU Prep) is a tuition-free college preparatory school that serves students in grades K–12. ASU Prep is chartered by ASU and is a Cambridge Curriculum school focused on critical thinking skills and deep learning experiences. P-12 schools have a mission to personalize education and improve outcomes for all students.

ASU Prep Digital (ASUPD) is an accredited online school where learners can take a single online course or enroll in a full-time, diploma-granting program. ASU Prep Digital offers an accelerated path toward college admission and the chance to earn concurrent high school and university credit. ASUPD provides high-quality P-12 learning experiences designed to improve student outcomes at scale. Since its inaugural year in 2017, ASUPD has grown from 1500 enrollments to 22,000 in 2019–2020.

The Gary K. Herberger Young Scholars Academy (HYSA) is a learning environment designed for highly gifted students in grades 7–12 located on the Arizona State University West campus. Funded in part by an endowment from the Herberger Family and supported by ASU, the Gary K. Herberger Young Scholars Academy was founded to address the needs of academically and intellectually gifted students in the Phoenix area.

ASU's Mary Lou Fulton Teachers College (MLFTC) is one of the few colleges of education in the United States that excels at both teacher preparation and world-class scholarly research. MLFTC is ranked #13 in US News & World Report's annual rankings of America's graduate schools of education. In line with the ASU charter, MLFTC is committed to building and supporting the Next Education Workforce. To that end, the college works with schools and other partners to (1) provide all students with deeper and personalized learning by building teams of educators with distributed expertise and (2) empower educators by developing new opportunities for role-based specialization and advancement.

Many other units participated as well, by expanding offerings or creating new avenues to engage with state-of-the-art technologies in artificial intelligence, adaptive learning, and interactive platforms. All these units recognized the need to step up during a difficult year and took action to support P-12 education.

19.2.1   Direct Provision of Education to P-12 Learners

Following the onset of the pandemic, ASU directly served thousands of K-12 students across the state of Arizona in collaboration with ASU Prep, ASUPD, and HYSA. The physical brick-and-mortar schools of ASU Prep and HYSA transitioned more than 3,000 elementary and secondary learners from 12 physical sites to remote learning within one week. ASU Prep Digital (ASUPD), which regularly facilitates transitions to blended learning with local schools, provided leadership and support while still supporting more than 10,000 learners who were already taking advantage of online learning opportunities through ASUPD.

The ASU Prep academies surveyed families and ensured that hardware and internet access were covered. They also surveyed staff needs, set up training, and managed the physical transition. The ASUPD team provided the digital and technical infrastructure, training, ongoing coaching, and intensive internal and external support. Both teams also offered all-day help sessions in an "open house" format in Zoom rooms where parents and students could pop in anytime with questions. As a result of these efforts, attendance for site-based students at ASU Prep during the remaining nine weeks of school remained at 89%.

ASUPD was able to scale and or adapt three existing initiatives to support schools locally and nationally during the disruptions caused by the pandemic:

Initiative 1: *Digital Suite of Remote Learning Resources*

> At the onset of school closures, ASU responded immediately by launching a robust suite of free online educational resources to support the transition to remote learning for learners and educators nationally. This platform, called ASU for You, includes online student tutoring sessions, access to ASUPD core course materials, a library of training videos to help teachers and parents transition, and full technology and remote teaching support for schools. The platform provides consistency across schools and empowers teachers with tools that augment their current distance learning plans, providing metrics and assessments to inform decision-making.

Initiative 2: *ASU Prep Digital Online Teacher Corps Training*

> ASUPD quickly responded to teacher training needs through ASUPD's Online Teacher Corps five-day intensive training. Equipping teachers to operate within the agile and nimble nature of online learning environments, this training ensured students had a seamless transition between on-site and online classrooms. Thinking in the long term, educators could also use their new skills to implement blended learning as an ongoing strategy to personalize learning. Additionally, with a workforce trained in e-learning practices, schools could drastically abbreviate or eliminate short- or long-term education interruptions when future closures were required. The training enabled educators to reimagine instructional design and delivery, consider new teaching roles and methods, explore new school and learning models, and understand how to manage blended or remote environments effectively.

Agenda topics included:

- Online curriculum
- Learning management system
- Best practices in online instruction
- Setting up a virtual instruction plan
- Web 2.0 tools (web conferencing, plagiarism detection, etc.)
- Live lessons
- Pace charts
- Setting up a home page
- Supporting students with special needs
- Creating supplemental resources and customizations
- Academic integrity and discussion-based assessments
- Preparing for "go live" with students
- Best practices for effective communication
- Monitoring student progress
- Building social presence
- Social and emotional learning in an online environment
- Teaching time and stress management

Very quickly, 583 teachers were trained, impacting approximately 49,505 P-12 students. Of these teachers:

- 75% were from rural districts, and 84 teachers represented tribal communities, including the Hopi, Navajo, and San Carlos Apache reservations.
- There were 31 school districts and 80 unique schools represented. ASUPD provided training for 43 elementary schools with 246 elementary teachers, five middle schools with 47 middle school teachers, and 32 high schools with 290 high school teachers.
- Two more training sessions are scheduled, with approximately 1000 teachers participating before July 2020.
- Additionally, ASUPD trained 800 teachers from Hawaii, Kamehameha Schools, which serves 5600 students. Training also took place in Utah, reaching 2500 students.

Initiative 3: *Free Digital Summer School Opportunities for All Arizona Learners*

To promote continued learning in the summer, the State of Arizona funded several ASUPD summer school programs, which enabled Arizona students to enroll at no cost. These included ASUPD online high school summer school courses that offered supplemental math programs to improve foundational knowledge and fill in gaps for P-12 students and a choice of one tuition-free university course that can count toward high school and college credit. Early in the pandemic, ASUPD saw an 800% increase in demand for summer school enrollment. For comparison, in 2019, ASUPD had 283 students enrolled in summer school, and in 2020, that number grew to 2,602 students. Fundraising efforts for initiatives continued as ASUPD sought support from both foundations and individual donors. ASUPD operates at cost-neutral in most instances.

19.2.2 Provision of Human and Intellectual Capital in P-12 schools

When the spring 2020 semester started, ASU's Mary Lou Fulton Teachers College had 646 teacher candidates working full-time in schools as residents. By mid-March, MLFTC had five days to develop an actionable plan to (1) keep its students safe, (2) provide those students with meaningful clinical experiences that would allow them to graduate on time and earn the college's institutional recommendation for teacher certification, and (3) create something that would be valuable to school and district partners and to the P-12 learners they serve.

ASU's Mary Lou Fulton Teachers College (MLFTC) developed Sun Devil Learning Labs, which served as an online platform that allowed the college's teacher candidates to complete their clinical experience requirements while providing online instruction to elementary school students. In six days, the college built, tested, and launched a new platform. Through this platform, ASU teacher candidates delivered live streaming lessons, with supervision and coaching from ASU faculty, four days a week, to P-8 students. ASU students developed these lessons and then conducted them on the Zoom teleconferencing platform while end-users viewed those lessons live on YouTube channels organized by grade level.

The Sun Devil Learning Labs platform successfully fulfilled its primary purpose: providing MLFTC students experience in designing and delivering remote instruction. It also saw some success in realizing its secondary purpose: engaging P-8 learners while their schools were closed. MLFTC briefly stopped creating new content for Sun Devil Learning Labs after the school year concluded, but it relaunched in June, partnering with one school district to provide summer learning for that district's students to combat summer learning loss. The platform had over 15,000 lesson views in a month.

For three years, MLFTC has been working with partner districts to design and field Next Education Workforce models that seek to provide all students with deeper and personalized learning by building teams of educators with distributed expertise and empower educators by developing new opportunities for role-based specialization and advancement. The college's work on the Next Education Workforce has recast a problem commonly called a "teacher shortage" as a workforce design challenge. Unlike roles in nearly every other profession, the job of a teacher is undifferentiated. A teacher's first day on the job looks remarkably similar to the 3000th day. Society asks teachers to be experts in too many topics, which makes the job untenable and drives many talented individuals from the profession. As a result, our education system does not reliably deliver quality learning outcomes or experiences. The Next Education Workforce initiative starts from the conviction that if we are not getting the workforce or the learning outcomes we want, we need to redesign the profession, the workplace, and how we prepare people for both. The Next Education Workforce will include community educators—people who can complement professional educators and support students by working as technicians, content experts, and applied learning specialists.

COVID-19 is likely to accelerate teacher retirements and cause long-term absences. It is also likely to accelerate the pace at which schools must integrate technology and remote learning. Accordingly, MLFTC accelerated its efforts to develop resources to train community educators. MLFTC developed concise, targeted micro courses, and each micro course provides on-demand training that is easy to navigate, understand, and requires less than 20 min to complete. Training includes universal skills for the classroom (e.g., how to give feedback to students) and cover specific subjects (e.g., strategies for reading aloud to young children).

In the future, pandemic or not, some or all learners will likely be remote at different periods of time. Sometimes, the instructors or content experts will be remote, and at other times, perhaps, everybody will be somewhere other than school. Regardless of the setting, learning must happen. The innovations in remote learning and instruction that we developed early in the pandemic will have long-term benefits for how we bring expertise into rural schools and other communities that are not fully staffed with the pedagogical and content expertise their learners need.

19.2.3   Provision of Educational Resources to Learners, Families, and Schools

ASU rapidly curated a wealth of resources developed across the university and made them available online, for free, to the public on a web-based platform called ASU for You.

ASU had long planned to launch ASU for You, but the COVID-19 pandemic shaped how ASU launched the platform which has an increased focus on health and education content. The education content included the following:

- *Education resources curated by MLFTC.* Faculty and staff curated resources for educators, families, and education leaders to adapt to remote learning. These tools support a multitude of audiences as they respond to the educational socio-emotional challenges caused by the COVID-19 pandemic. The MLFTC community resources page on ASU for You had over 18,000 views.
- ASUPD offered its services through the ASU for You platform and adapted them specifically to the pandemic.
- *Fulton Virtual Summer Academy.* ASU's Fulton Schools of Engineering operates online STEM camps. Designed for students in grades 1–12, the camps feature age-appropriate engineering design challenges and activities that allow students to explore coding, circuits, computer-aided design, entrepreneurship, engineering design, and more.
- *Miacademy Learning Channel.* Miacademy offers hundreds of original lesson videos across every K–8 content area, including language arts, math, science, and history, extending into art, music, and foreign language learning.
- *Arizona PBS LearningMedia and PBS Kids.* They offered videos, interactive lessons, games, and other content for P-12 learners that align with school curricu-

lum standards. With a focus on early childhood education, these guides from Arizona PBS and other sources include dedicated help sections for parents, caregivers, and teachers.

- *Virtual Field Trips.* Used in high school and college classrooms, these interactive and educational "Virtual Field Trips" feature topic-based, interactive experiences that capture real expeditions and scientists doing research. Many of these experiences also respond to your real-time feedback.
- *Ask a Biologist.* Whether it is for school, at home, or just for personal interest, Ask a Biologist introduces viewers to fascinating topics about what makes the living world work the way it does, from microbes to mammals. Ask a Biologist offers articles, experiments, and VR tours and tap the expertise of professional biologists to answer questions.
- *Cultural Innovation Tools.* These are tools used by artists, designers, and other creatives to adapt their process to these challenging times. Online resources—including exhibitions, performances, educational tools, stories from artists, and more—allow users to continue to create, collaborate, and educate in the arts.
- *Sustainability Teachers Resources*. These engaging activities introduce students to central themes in sustainability science. While designed for grades 6–9, activities can be easily modified for most students and align with Next Generation Science Standards and Common Core science, language arts, mathematics, and history/social studies where appropriate.
- *Infiniscope.* Infiniscope uses simulations and virtual field trips to help educators engage learners in a whole new way. If you work to deliver education, you can make connections here that help you build adaptive, exciting learning experiences for your students.
- *SciStarter.* Through citizen science projects, you can help scientists answer questions they cannot answer alone. Share observations, analyze data, and play online games to advance important research from astronomy to zoology. Just join a project, track your contributions, and earn a certificate for completing the online tutorial.

19.3   Elements of Institutional Readiness

19.3.1   A Core Set of Preexisting Commitments and Functional Capabilities in the Area of Technology-Enhanced Instruction

ASU's commitment to educational access is built on the understanding that digital and remote instruction should be part of any comprehensive educational ecosystem. ASU Prep Digital had existing expertise and scalability in delivering digital

instruction for P-12 learners that could be adapted, in short order, to address specific and immediate needs raised by the physical closure of schools to prevent the spread of COVID-19. ASUPD's resources in course content, training, and summer school content were leveraged and adapted for immediate needs related to school interruptions. The rapid growth of ASUPD's Online Teacher Corps Training and free digital summer school is a testament to ASU's firm commitment to broaden access to quality education, to the passion and expertise of the ASUPD team, which digital learning space veterans lead, and to market demand increases. Over the last three years, ASUPD has carefully created a robust suite of resources, tools, training, and content to support families and schools in accessing quality digital learning.

MLFTC had existing expertise in remote instruction at the college level due to the recent growth of its online undergraduate and graduate degree programs. While MLFTC's online degree programs do not currently lead to teacher certification, the college's faculty and staff had significant technological and pedagogical skills that could be applied, on short notice, to the challenges raised by the pandemic. In addition, because of its extensive online degree-program portfolio, MLFTC houses an Office of Digital Learning (OoDL), which provided extensive technical and pedagogical support to college faculty and the team that designed and executed Sun Devil Learning Labs.

19.3.2 Strong Existing Partnerships with P-12 Schools

ASU has longstanding, deep partnerships with P-12 schools. ASU is the largest producer of certified teachers in the state of Arizona, and one of the largest in the US MLFTC has more than 1000 enrolled students conducting professional internships and residencies in schools at any given point in a school year. Because of the breadth and depth of those relationships, schools were ready to refer families to Sun Devil Learning Labs. Additionally, as fall 2020 approached, those partnerships serve as a strong foundation as MLFTC works with schools and districts to design professional and clinical experiences that meet the needs of both ASU teacher candidates and P-12 students in an uncertain learning environment.

The range of services ASUPD provides to schools made it a natural partner for schools to turn to in a time of crisis when they needed to acquire and implement forms of digital and remote instruction quickly. Additionally, ASU Prep Digital has been offering college-prep courses to high school students and was a trusted, known provider of quality digital learning experiences. The relationship network developed before COVID-19 relies on partner feedback and outcomes for designing and improving educational services. The sudden onset of the pandemic required swift solutions for our P-12 partners. Leveraging the experience of many university teams and soliciting input from local education and civic leaders, ASU was able to generate new resources and increase access to existing ones.

19.3.3 An Institutional Vision of Universal Learning That Demands That a University Be Ready and Able to Deliver Instruction in Many Modalities to All Learners

ASU does not operate as a traditional university. ASU considers itself a learning enterprise that embraces the Universal Learner® concept, which rests on a recognition that, in a rapidly changing, technology-driven world, people will need to access education and learning platforms throughout their lives. ASU does not limit its educational services to people enrolled in degree programs, people on its campuses, or people of traditional college- and graduate school-attending ages. This is a different institutional model and self-conception than other American universities, including large public universities. Under President Michael Crow's leadership, ASU has intentionally designed and implemented a learning enterprise model. In addition to degree programs, ASU is committed to developing high-quality learning services and experiences that take less time and cost little or no money to complete. These services and products are relevant and useful and address several pressing social and economic needs. As a result, when schools closed due to COVID-19, ASU had the capability and the culture to quickly make quality, effective learning experiences available to elementary students, secondary students, college students, P-12 students, parents, and professional educators. Years of developing its capabilities as a learning enterprise enabled ASU to apply entrepreneurial means—agility, inventiveness, and adaptation —toward fulfilling its charter mandate to assume fundamental responsibility for the economic, social, cultural, and overall health of the communities it serves.

19.4 Conclusion: What's Next

When P-12 students, their families, and schools needed the university and its resources, ASU moved quickly to provide as much support as possible. There was no single initiative to respond to the P-12 educational challenges presented by the pandemic. In fact, there was no time for institutional planning, yet there was a need for an institutional response. Because of its distinctive design, capabilities and culture, ASU was able to mount a robust, many-faceted response.

While it is too early to assess the impact of that response, ASU is monitoring several of its efforts. Though ASUPD has received positive feedback and increasing demand for its Online Teacher Corps Training, it is observing a few challenges and trends. The pandemic accelerated the transition into digital environments whether schools and teachers were ready for that change. The immediate shift highlighted the lack of training, experience, and resources to implement quality and rigorous learning experiences in many districts. Feedback from teachers participating in ASUPD's Online Teaching Corps illustrates that there are significant gaps in skill

sets and knowledge in digital teaching methods and that the gaps varied significantly by type of school (rural vs. urban areas). Further, those with greater gaps of knowledge found the online training environment to be more challenging.

MLFTC is continuing to place interns in virtual placement settings. MLFTC is also prototyping courses and modules for community educators and working with schools and communities to determine what roles and skills schools will need to ensure that the disparities and inequities of school closures are minimized.

ASU's efforts continued to grow and change throughout the summer. The university will always prioritize, further responding and supporting P-12 schools and learners beyond the pandemic. ASU for YOU continues to make resources available for P-12 programming. ASU works with potential funders about how to evolve these ideas and conduct both internal conversations and informal conversations with various constituents as events change and needs are recognized. One acute area that requires further attention is leadership. ASU clearly sees a need and demand for leadership training to equip school, district, and state leaders to address the promise and challenges of digital and blended learning.

The extreme stress caused by the pandemic revealed cracks in our normal ways and helped us see that they have been there all along. As ASU has responded to the disruptions caused by COVID-19, we have peered through the cracks in the normal and have seen the brittleness of some of the assumptions and current practices in education. But we have also seen paths to possible and promising learning futures. During the pandemic, we learned more about this under duress. But it will help us learn more by design in the future. The crack in the normal offers us all a glimpse into the possible.

Carole G. Basile is the Dean of the Mary Lou Fulton Teachers College at Arizona State University (ASU). As Dean at ASU, her work has centered on redesigning the education workforce and changing practices in teacher and leadership preparation. She is currently working with education organizations nationally and internationally to design systems and enable organizational change in these areas.

Chapter 20
MIT Full STEAM Ahead: Bringing Project-Based, Collaborative Learning to Remote Learning Environments

Claudia Urrea, Kirky Delong, Joe Diaz, Eric Klopfer, Meredith Thompson, Aditi Wagh, Jenny Gardony, Emma Anderson, and Rohan Kundargi

Abstract With schools and educational centers around the country moving from in-person to emergency remote learning due to the COVID-19 pandemic, education faces an unprecedented crisis (Hodges et al., Educause Review 27, 2020). This case study presents the efforts and impact of Full STEAM Ahead (FSA) launched by the Massachusetts Institute of Technology (MIT) in response to the pandemic to support remote collaborative learning for K-12 learners, parents, and educators. We present two FSA initiatives: (1) weekly themed packages with developmentally appropriate activities for K-12 remote learning and (2) Full STEAM Ahead Into Summer (FSAIS), an online summer program for middle school Massachusetts students, specifically targeting students who are at risk for "COVID Slide." (Institute-wide Task Force on the Future of MIT Education-Final Report: http://web.mit.edu/future-report/TaskForceFinal_July28.pdf?) Our operative theory of change is that we can improve K-12 remote collaborative learning experiences through developing and sharing a curriculum that exemplifies the minds-on and hands-on approach advocated by MIT, strategically leveraging existing structures and projects within MIT, and establishing partnerships with the local and international community. We gauge the effect of these efforts on contributing members of the MIT community and targeted learners by analyzing data gathered through participant surveys and artifacts such as the website, packages, modules, and student projects created during the summer programs. Our findings indicate that existing structures and resources – with community building – facilitated the achievement of our goal to develop and distribute problem-based learning activities and that interaction and community building were central in meeting those goals. This work contributes to the knowledge base regarding emergency online learning and the development of effective university outreach efforts.

C. Urrea (✉) · K. Delong · J. Diaz · E. Klopfer · M. Thompson · A. Wagh
J. Gardony · E. Anderson · R. Kundargi
Massachusetts Institute of Technology, Cambridge, MA, USA
e-mail: calla@mit.edu

20.1 Introduction

Within the short span of a few months in early 2020, the COVID-19 pandemic rapidly impacted and transformed the world. In mid-March, as schools and educational centers around the United States transitioned to emergency remote learning, education faced an unprecedented crisis (Hodges et al., 2020). For several decades prior, the MIT community has invested in improving pK-12 education. In response to an institute-wide recommendation to define a K-12 strategy, a special interest group known as the pK-12 Action Group was established in 2016.[1] This group joins members of different departments, laboratories, centers, and educational outreach student groups[2] to develop programs, activities, and resources to engage pK-12 teachers and students in meaningful educational experiences. As the pandemic disrupted education, the pK-12 community paused to consider, "How can our collective resources and ideas be made of service to the education community?"

This case study focuses on Full STEAM Ahead (FSA) – MIT's response to this educational crisis. Specifically, we present the design and development of two related Full STEAM Ahead initiatives. The first initiative was FSA *learning packages* – a curated collection of theme-based science, technology, engineering, arts, and mathematics (STEAM) learning activities for K-12 educators, students, and parents. From March to May, we released ten weekly learning packages on a newly designed website to share high-quality curricular materials for remote use. Members of the MIT community volunteered their time and efforts towards this initiative. The second initiative, Full STEAM Ahead into Summer (FSAIS), was conceptualized as the pandemic threatened to significantly disrupt summer learning opportunities for all students. Many summer programs for K-12 students, including our on campus programs, were canceled. Additionally, MIT students' summer job opportunities were limited due to the weakened US economy and uncertainty of safety in the workplace. To provide learning opportunities for local students and summer employment for MIT students, we created an online summer program where MIT students served as tutors and mentors to middle school students. FSAIS utilized resources curated from the spring FSA learning packages and other STEAM camp modules. Funding for the summer program came from a few sources. The MIT Chancellor Cynthia Barnhart's Office funded MIT student salaries; an internal donor funded the books included in materials kits. Money for the materials kits was raised from an external donor, the MIT Office of Government and Community Relations, and families who donated funds to cover the cost of those materials.

Full STEAM Ahead's mission is to create and share high-quality resources to facilitate digital and non-digital learning for K-12 and lifelong learners. By providing STEAM-based instructional materials and an open forum for users to share insights, we aimed to inspire a diverse global community of educators, students, and

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[1] Institute-wide Task Force on the Future of MIT Education-Final Report: http://web.mit.edu/future-report/TaskForceFinal_July28.pdf?

[2] To learn more about these pK-12 programs and activities visit: https://outreach.mit.edu/

parents to find innovative and humanistic solutions to the challenges of learning at a distance. With this mission in mind, our theory of change is that we can improve K-12 remote collaborative learning experiences through strategically leveraging existing structures and projects within MIT and establishing partnerships with the local and international community. We are guided by two research questions:

1. How do groups at MIT collaborate internally and with schools and families to develop and support education efforts that reflect the mission of MIT?
2. What impact do these collaborations have on MIT students, K-12 students, and parents, and for improving future iterations of our work?

We first describe each initiative and then examine its impact on contributing MIT members and targeted learners. Finally, we explore the effects of those initiatives by analyzing survey data from participants and artifacts such as the website, modules, and student projects. In our discussion, we reflect on the advantages and challenges of each of these approaches and consider what aspects of our experiences could be transferable to other institutions.

20.2 About MIT

Since its founding in 1861, the Massachusetts Institute of Technology has remained committed to advancing knowledge and educating students in science, technology, and other areas of scholarship to best serve the nation and the world in the twenty-first century. MIT currently has a student population of approximately 11,500 undergraduate and graduate students, awarding need-based scholarships to 59% of enrollees. The institute is well known for rigorous education and a faculty including Nobel Laureates and MacArthur Fellows. Furthermore, MIT is intentional about developing and supporting the next generation of learners in STEM education.

In 2014, an institute-wide task force initiated a deep self-assessment on the future of MIT Education focusing on the potential of MIT's resources and research to produce innovations in education based on "the educational model that has served the institute so well for so long." From this, a list of recommendations included a call to extend MIT's "*mens et manus*" style of pedagogy to the world, exploring means of certification to empower learners outside of the institute, collaboration with the global community to bring scaled change, and definition of an institute-wide K-12 strategy. For years, many departments, labs, centers, and student groups had been actively supporting young learners who fell outside of the scope of higher education. However, in establishing a concentrated devotion from the auspices of the institute's administration and highlighting MIT's focus on K-12 education, our community has grown to collaborate, support, and innovate new practices. We have more fully realized the potential impact of higher education on establishing pathways for youth into STEM careers and fostering imaginative ways of thinking to bring both students and the world future success.

20.3 Bringing "Mind and Hand" to Remote Learning Environments

The pedagogical spirit underlying these initiatives is embodied in MIT's motto, *"mens et manus*," which translates to "mind and hand." "Mind and hand" describes the combination of study and practice that characterizes the MIT approach towards meaningful learning. Fulfilling "*mens et manus*" involves rich learning opportunities to engage with content by collaboratively tackling problems, experimenting with multiple solutions to real situations, and learning by designing and building projects in alignment with one's interests.

MIT canceled all in-person spring and summer programs in response to the COVID-19 pandemic. Several MIT pK-12 groups responded to the disruption by pivoting to offer a diverse set of online programs. MIT Media Lab's Public Library Innovation Exchange (PLIX) and the Science and Engineering Program for Teachers (SEPT) are two adult learning programs delivered remotely. For high school students, programs included the Beaver Works Summer Institute (BWSI); the Saturday Engineering Enrichment and Discovery (SEED) Academy; BioBuilder; the Edgerton Center's Engineering Design Workshop (EDW); MIT Online Science, Technology, and Engineering Community (MOSTEC); and Lemelson-MIT Biotech in Action: Virtual Summer Lab. In addition to programs developed by MIT groups and centers, several programs created and managed by MIT students switched to remote delivery. These included the ESP Summer Program, involving two thousand students and approximately two hundred MIT student teachers, and the MIT CodeIt program, a six-week middle school program which teaches Scratch (a block-based programming language). Additionally, the MIT App Inventor's Coronavirus App Challenge received around one hundred project submissions from 20 countries, with participants between the ages of 8 and 72.

This case study focuses on Full STEAM Ahead (FSA), a program that includes two parts: the spring Weekly Learning packages, and the online collaborative project-based summer program.

20.3.1 Weekly Learning Packages

When schools shut down, our team members connected with teachers to learn more about their challenges from transitioning to remote learning. State education agencies (SEA), who usually guide schools, administrators, and educators, had vastly different responses to the pandemic. Some SEAs provided detailed guidelines, while others had little information for educators (Reich et al. 2020a, b0). One of the greatest difficulties that teachers reported was the limited availability of high-quality learning materials. Teachers did not have the time to develop new materials from scratch and often did not know where to find pedagogically sound curricular materials online. Teachers were also overwhelmed in trying to communicate with students

online and reaching the students with the most needs—themes paralleled in multiple research studies (Reich et al. 2020a, b). In response to the pandemic, many organizations offered curricular materials to teachers for free. Inundated with new curricular options, many educators could not simultaneously vet resources and adapt their classrooms and lives to remote instruction. Conversations with teachers inspired the conceptualization of MIT's Full STEAM Ahead learning packages.

The Full STEAM Ahead learning packages curated student-facing lessons with distribution over a span of several weeks. Learning packages were originally envisioned to be a weekly set of themed activities relieving some of the teachers' challenges. The release of learning activities over several weeks was intended to create a space where teachers, parents, or students could return each week to find new, well-designed materials on a variety of topics(Table 20.1).

Each package was intentionally designed to be open-ended, project-based, and theme-based with their activities for K-12 learners. The ten learning packages covered many topics in a variety of styles. For instance, the packages included activities that engaged learners in constructing a simulation of disease contagion (Package 1), designing musical instruments and compositions (Packages 4 and 8), and using recycled materials to build new inventions (Packages 2 and 6). Some packages also experimented with innovative ways of learner interaction, which includes allowing learners to ask researchers questions about life in space and the future of exploration virtually (Package 3) and asking learners to gather observations of their immediate surroundings and consider why things in and around their homes are the way they

Table 20.1 List of Full STEAM Ahead Weekly packages and their creators

Weekly package	Contributor
Week 1: Modeling the spread of disease	The Education Arcade
Week 2: Stepping into invention education	Lemelson-MIT program (School of Engineering)
Week 3: Exploring and living in outer space!	Space Exploration Initiative (MIT Media Lab)
Week 4: Making music and sounds	Edgerton Center
Week 5: The world around us	Collaboration between MIT Open Learning, Education Arcade, MIT Museum, Edgerton Center, MIT Sloan, Public Library Innovation Exchange, MIT Environmental Solution Initiative, & J-WEL
Week 6: Inventing matters!	Lemelson-MIT program (School of Engineering)
Week 7: Reveal! Discovering science through compelling images	MIT Museum
Week 8: Making Music & Sounds – II	Edgerton Center
Week 9: Artificial intelligence!	Collaboration between personal robots group & MIT app inventor
Week 10: Get creative with math!	Lifelong Kindergarten Group (MIT Media Lab)

are (Package 5). Across all packages, there were common elements, such as interviews with experts and opportunities to share creations and collaborate through an online forum.

The analytic data described the demand for the packages and the general level of interest. Project examples we received through forums and emails demonstrated the students' level of engagement and the potential use of the materials, but this data was anecdotal, and our learner engagement was very limited. We reflected on this initial effort, the positive response from members of the MIT community, and our ability to collaborate as part of the response. From this, we saw an opportunity to engage more closely with learners, to scaffold learners' interests, and to advance our understanding of how middle school students learn STEAM concepts and develop skills through online learning experiences. Full STEAM Ahead into Summer was launched!

20.3.2   Summer Program: Engaging Directly with Learners

Full STEAM Ahead into Summer is a virtual summer program and academic enrichment opportunity that combines hands-on exploration, project design, and skill building (such as collaboration, problem-solving, and academic skills) in STEAM subjects. Designed for rising 7th, 8th, and 9th grade students in the state of Massachusetts, this three-week program involves approximately 4 h of activities and mentoring each day, incorporating materials from the Full STEAM Ahead website and open-source modules adapted for remote use from prior MIT STEAM camps (Bagiati et al., 2018).

To simultaneously serve MIT students and families and children in the Commonwealth of Massachusetts, we decided to develop a program where MIT students could mentor and teach middle school students through a collaborative, hands-on, remote learning program. We hoped to leverage our existing resources in the form of FSA learning packages and student expertise while developing a STEAM enrichment program for children most affected by the pandemic.

We recruited 33 MIT undergraduate students, graduate students, and recent graduates to be mentors for this pilot program. Two of these mentors were promoted to program coordinators, responsible for serving as the primary points of contact between the MIT staff, MIT student mentors, and the program participants as well as their parents and guardians.

Seven training sessions made the mentors familiar with the activities and modules they would facilitate over each of the three-week sessions and hosted faculty, K-12 educators, MIT digital learning fellows, and our staff to share advice. These sessions included an introduction to problem-based learning inspired by "The Three Acts of a Mathematical Story," an introduction to the specific STEAM modules, online teaching tips, culturally responsive teaching, a training to involve all students in remote learning, an introduction to Design Thinking, and how to lead a book club around "The Lost Tribes" by Taylor-Butler (2018) (Gewin, 2020; Hammond, 2014; Meyer, 2011; Razzouk & Shute, 2012).

Elements of the Program

The switch to online learning has been especially challenging for students with a lower socioeconomic status, who are at a greater risk of falling behind academically (Goldstein, 2020). We wanted to make sure the program served learners from different backgrounds and interests, but above all, those who could benefit from the different elements of the program (math tutoring, project modules, etc.). The initial phase of the recruitment focused on partner schools that serve traditionally underrepresented students in STEM fields – including Black and Hispanic students – students who qualify for free or reduced lunch, English language learners, and students who will be the first in their families to attend college (see Table 20.2).

We spoke with teachers, administrators, and parents at the Community Charter School of Cambridge (CCSC) and incorporated their input into the design of the program. For example, parents advised us that they would prefer a three-week program (as opposed to a six-week program) and that it would be important to make

Table 20.2 FSA Summer Program Schedule

Time	Element	Brief description
10:30–10:40	Program-wide meeting	Schedule reminders, shout-outs, community building
10:40–11:10	Choice time	Modeled after MIT Educational Studies Program's SPLASH and SPARK offerings, described as a "teaching and learning extravaganza" where MIT student volunteers teach a topic of their choosing on a specified weekend in November
		Our mentors' offerings included Coding in Scratch and Python, Greek Mythology, Creative Writing, Micro:Bit Basics, TikTok Dancing, LGBTQ Diversity, Making Origami Animals, etc.
11:20–12	Academic time (math tutoring, book club on Fridays)	5–7 students per group
		Informed by the Massachusetts prerequisite content standards and interviews from teachers and parents
		Math problems are based on "three ACT math", an inquiry-based strategy where students analyze a visual image or video using a three-part, story-telling structure (i.e., invitation, discussion, and resolution)
		Friday Book Club: Students read and discuss *The Lost Tribes*, a book for middle school students by Christine Taylor-Butler, an MIT alumna
12–1	Lunch break	
1–3 (2 on Fridays)	Project-based learning time (guest speaker on Fridays)	10–12 students per group, engaging in a variety of hands-on modules
		Topics included Exploring Outer Space with CubeSats, Music Instruments & Data—Sonifying Your Data, The World Around Us—Observational exploration, Building Wind Turbines, and Two-Stage Water Rockets
		Culminated in a week-long design thinking workshop in which students develop their own projects
		Generative, allowing space for creativity and innovation (not just replication)

activities engaging, as many of their students were tired of remote learning. Our recruitment team also utilized existing partnerships between MIT and local Cambridge Public Schools, Prospect Hill Academy in Cambridge/Somerville, and Greater Lawrence Technical High School. Our outreach included multiple meetings with school leaders and teachers to describe our program in depth and confirm support from the school. We requested that schools allow students to keep borrowed technology over the summer so that students, regardless of income level, could access our program.

We discovered a high demand for access to summer opportunities. Over the course of two weeks, we received 800+ applications for the pilot program. Admissions prioritized students from our "partner schools;" over half of our participants came from schools that serve underrepresented students. Every student who applied from a partner school was granted a seat. We filled the remaining 130 seats through a random lottery of completed applications. We accepted 341 students (6th–9th grades) from 57 cities across the state of Massachusetts (see Fig. 20.1). The first session began on July 6th and included 166 students from 47 towns. The second session, which started on August 3rd, included 125 students from 40 towns.

Because of the hands-on nature of the project modules, each participant and MIT Mentor received their own materials kit. Early on, we decided that the kits were necessary for the program's success and equity for all participants, so they were provided free of charge. To make the most of limited resources, we decided to order materials and self-assemble 350 kits in a socially distanced setting, a collegue's backyard. We offered three pickup locations for kit distribution, and the remaining boxes were mailed to participants.
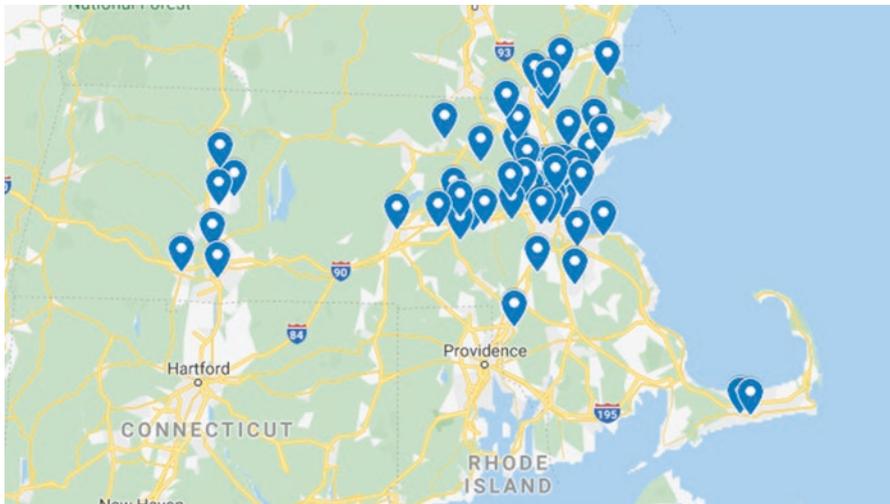

Fig. 20.1 Map of student participant locations in Massachusetts

So far, we have described two remote learning initiatives – FSA learning packages and FSAIS –developed in response to the pandemic. In the remainder of this paper, we draw on data from the initiatives to investigate two research questions:

1. How do groups at MIT collaborate internally and with schools and families to support education efforts?
2. What impact do these collaborations have on MIT students, K-12 students, parents, and in helping us improve our work?

20.4   Method

The research study includes a mixed-method, convergent research design, with qualitative and quantitative data gathered simultaneously during the project (Fetters et al., 2013). Our methods are similar for both Full STEAM Ahead Weekly Learning Packages and Full STEAM Ahead into Summer initiatives. We invited participants from FSA and MIT community members to complete a survey about the package creation and distribution process; we also invited parents and middle school students to complete a postexperience survey about the FSAIS program. Our research has been designed with minimal impact on the day-to-day experience of the program and to maintain confidentiality and anonymity among respondents. It is also covered under COUHES E-2470 for the FSA project and COUHES Protocol #: 2007000196 for the FSAIS project. We calculated frequencies and descriptive statistics for quantitative data from survey data and qualitative review of the artifacts designed by students during the program, open-ended survey responses, and informal parent/student feedback.

While our summer program had an academic component, we did not expect to see significant changes in student performance in math and reading over just 3 weeks. Research on similar outreach programs indicates that programs of about a 30-h duration can impact students' knowledge of the program topics, as well as attitudes, interests, and beliefs in STEM (Cappelli et al., 2019; Newton et al., 2018). Thus, we hypothesized that this program would increase students' interest in and motivation to explore STEAM topics, their self-efficacy in mathematical problem-solving, and their knowledge of and self-efficacy for open-ended, project-based work (Chen, 2012; Chen & Usher, 2013). Our sample at the time of writing this article included 50 parents and 50 students, about one-third of those who had enrolled in Session 1. The demographics and age for the students in this sample appear in Table 20.3.

Table 20.3 Demographics of student and parent respondents

Race	N/%	Ethnicity	N/%	Grade in Sept 2020	N/%
White	22 (44%)	Not Hispanic	37 (74%)	7th	22 (44%)
Asian	8 (16%)	Hispanic	11 (22%)	8th	10 (20%)
African American	13 (26%)	Prefer not to say	2 (4%)	9th	18 (36%)
More than one	4 (8%)				
Prefer not to say	3 (6%)				

20.5   Results

This case study includes responses from the MIT community about their experiences and contributions to FSA learning packages and results from the first session of the summer program; at the time of this chapter's writing, the second session had just begun. We plan to maintain our research into the summer program and share these findings in future publications.

20.5.1   MIT Community Collaboration in Learning Packages

FSA learning packages provided an opportunity for the MIT community to mobilize their capacities and efforts towards common goals. In what follows, we describe:

1. How the community self-organized within a very short span of time to mount this initiative.
2. Results from data analytics about the global reach of learning packages.
3. How this collaboration supported the MIT community members' individual goals.

20.5.2   Rapid Mobilization of Capacity and Efforts to Launch the Learning Packages

Each package represented the combined efforts of several groups or labs and individuals across MIT. The groundwork for the development of the packages was largely established through the development of Package 1, "Modeling the Spread of Disease," which was assembled and released within 5 days of project initiation. In the development of this package, members of the MIT pK-12 community self-organized into four sub-teams. The sub-teams were fluid and changed based on the specific week, but a small core team of individuals volunteered their time toward package development across the ten-week span. The four sub-teams worked on specific tasks involved in package completion:

1. Ensuring that each week had a package lead, coordinating with package leads, and ensuring that packages-in-progress aligned with our broader pedagogical goals.
2. Designing and developing activity materials for the package and interviewing experts. In some weeks, this team consisted of individuals from a single group that was already involved in STEM education outreach (e.g., Package 10), and in others, a package was formed out of a collaboration between two or more groups (e.g., Package 5).
3. Preparing and transferring the activity materials and videos onto the Full STEAM Ahead website.
4. Disseminating packages through writing and sharing media releases.

20.5.3 Data Analytics About Global Reach of the Packages

Our analytics revealed a total of 130,000+ pageviews and 45,000+ unique viewers for the learning packages over the course of the 10-week package release. The packages were accessed by learners in 150 countries around the world, with most visitors from the United States, Canada, India, the United Kingdom, Brazil, Japan, Australia, Mexico, Turkey, and Hong Kong. Around 35% of site visits were from returning viewers. Data from the first week of August shows that the most popular packages have been "Stepping into Invention Education" (Package 2) and "Modeling the Spread of Disease" (Package 1). Other popular packages include "Making Music and Sounds Part I" (Package 4), "Exploring and Living in Outer Space!" (Package 3), and "Getting Creative with Math" (Package 10) (Fig. 20.2).

We received some examples of artifacts produced by students from Full STEAM Ahead forums and emails. One of the projects came from a young boy who shared
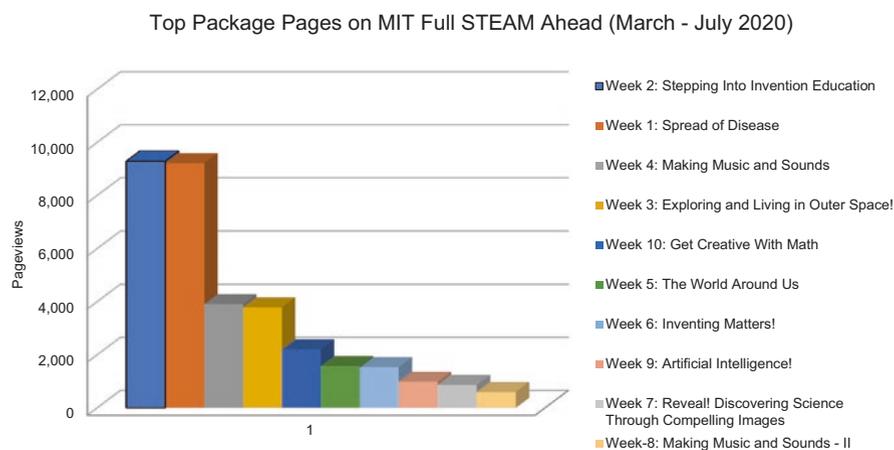

**Fig. 20.2** Top page hits from the MIT Full STEAM Ahead website
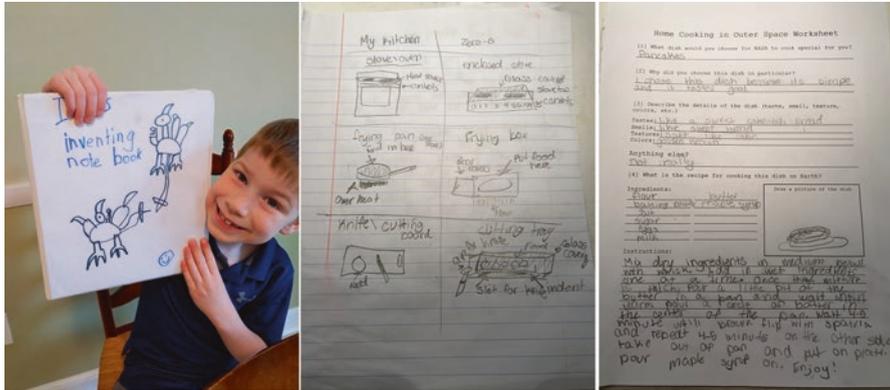
Fig. 20.3 Artifact examples from Full STEAM Ahead package activities

his picture of the invention journal, developed during "Stepping into Invention Education" (Package 2). A second example came from a middle school girl who was engaged with the "Future of Space Food" activities that were part of "Exploring and Living in Outer Space!" (Package 3) (Fig. 20.3).

We also heard from teachers, who adapted some of the resources and activities for use during the spring semester and added them to their remote teaching.

> I love the activities in the Full STEAM ahead modules! There are a lot of resources being thrown at us [teachers] right now but I do find the Full STEAM ahead ones stand out in terms of being actually useful. — Educator from Columbia, SC

20.5.4   How This Collaboration Supported the MIT Community Members' Individual Goals

We received 20 responses from members of the MIT community who contributed to the weekly packages. We have at least two responses from eight out of the ten packages. Packages 7 and 10 had only one response (Fig. 20.4).

The top factors that motivated members of the community to participate in the FSA consisted of helping others (teachers, parents, and students) and collaborating with other members of the MIT community. Approximately 95% of respondents reported that they felt that they met those goals (N = 20 responses). The only respondent who expressed that their goals were not met explained that "the goals of content creation were met, but we really don't know anything about who we reached or how satisfied they were."

About 44% of responses mentioned the need to have more visibility of the impact (N = 9 responses). Some respondents also reported that the FSA team did not connect them with teachers.

%

■ 1 To help educators during a time of crisis   ■ 2 To help parents during a time of crisis
■ 3 To share existing resources with a wider audience ■ 4 To create new resources for students
■ 5 To adapt what we have created to an online format ■ 6 To collaborate with other teams at MIT on a project
■ 7 To feel like I‚Äôm giving back in a time when everything feels so bleak ■ 8 Other (please explain):
■ 8 Total

Fig. 20.4 Reasons for participating in developing FSA learning packages

Content creation, dissemination, and collaboration among members of the MIT community were some of the most important outcomes from the weekly packages. When reporting about participation, 90% of the respondents said that they were able to reach a broader audience, and 85% said it helped them both develop age-appropriate materials and collaborate with other MIT community members (N = 20 respondents). Specifically, the respondents reported that the FSA team helped them disseminate their materials (90%), provide feedback (85%), or help by adding new resources (45%). Looking deeper at collaboration among members of the MIT community, we know some collaboration happened during package creation and continued even after the package launches (50%). About half of the respondents (55%) reviewed other packages, so that all packages were reviewed by between 2–6 community members. Further opportunities and aspirations for collaboration were proposed by the respondents, who mentioned ideas such as "combine technical, research and subject matter expertise/offerings with others to have greater impact," "collaborating on research projects," and "blending content/cross-referencing content," among other comments.

20.5.5   Summer Program

Students and parents were asked to rate different aspects of the summer program: the materials kit, hands-on projects, choice time, math tutoring, and the selected book. The responses are summarized in Fig. 20.5, grouped by aspects with student feedback on the left column and parent feedback on the right.
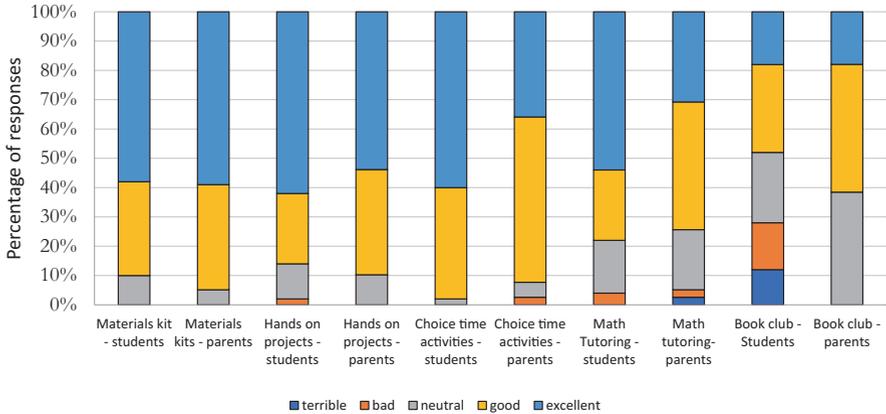
Fig. 20.5 Students' and Parents' Feedback on the Summer Program

Parents and students gave the material kits and the hands-on projects the highest ratings. Some students and parents recognized that being online made project building more difficult and were especially appreciative of having hands-on projects. One parent appreciated that "[…]my child was able to do hands-on activities while doing distance learning – the ability to not be stuck in a chair during distance learning."

One student wrote that what they liked best was "the way they made Zoom meetings fun, starting to learn Python in choice time, and building and designing hands-on projects despite the fact that we were all remote on Zoom."

Another important part of the program was how mentors encouraged collaboration among students. Students responded that they felt like they were part of a community of peers and MIT mentors. Students were able to share ideas and work together through the online format, indicating that community interaction was an important part of their remote learning experience (Fig. 20.6).

Students' open-ended comments reinforced the importance of interaction with others. One student wrote, "I enjoyed how I got to interact with other people during quarantine and had fun during this program." Another commented, "Something that I liked from the program is the way we interact which is cool to see online because this didn't happen in regular school." Parents also commented on the level of engagement their children had in the program. One parent wrote, "My son used a scientific approach to build and design independently. It was amazing to see such engagement in an online learning platform." Another commented, "My child was willing to get out of bed every day and participate; he did not do this with remote school. He absolutely loved his math tutor and has not stopped talking about it! Well done!" The MIT mentors were essential to the success of the program and were described as "friendly," "fun to talk to," "inspiring," "patient," and "phenomenal." We are learning a lot from the MIT mentors' reflections and will present those data in future research.
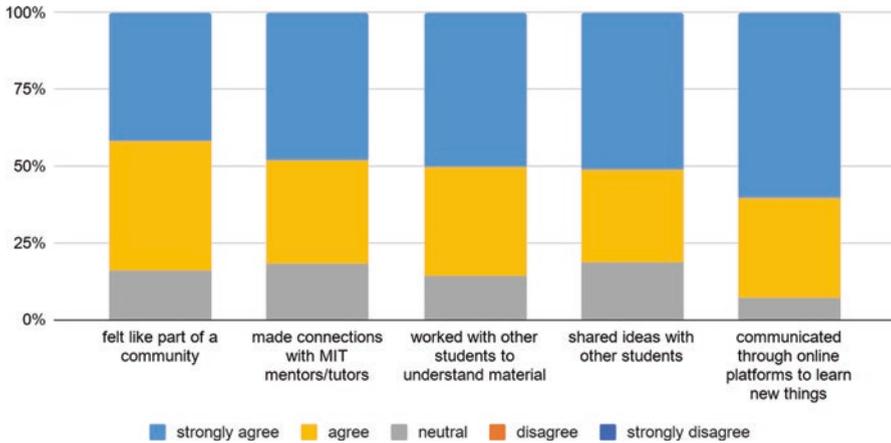
Fig. 20.6 Students' response to online engagement and collaboration during FSAIS (N = 50)

While there is still a lot of uncertainty about education in the coming months, it is certain that online and remote learning will continue to be an essential delivery system for learners. We will continue to investigate these ideas during Session 2 and will continue our research on how to develop and support active, hands-on, and collaborative learning in remote settings.

20.6   Discussion

This case study demonstrates two approaches toward the same goal of improving pK-12 remote collaborative learning experiences between the university and community in response to the global pandemic. In this discussion, we consider the benefits and drawbacks for each and consider how these findings may inform other institutions who are interested in engaging with the pK-12 community. We believe our results support our hypothesized theory of change, which was that a minds-on and hands-on approach can be applied to remote learning experiences by strategically leveraging existing structures and projects within MIT and through external partnerships.

Our initial response was to gather a range of existing resources for the Full STEAM Ahead website. The FSA website presented the range of resources from existing MIT pK-12 groups. The initiative also prompted the creation of weekly packages, which created opportunities for MIT staff and faculty to collaborate across groups to create and distribute weekly updates to the community via social media. Website analytics display that the content was accessed by people around the globe. We had some, but little, activity in the online forums. Beyond the analytics and some user emails, we are uncertain of the website's impact on educators and

learners. However, we know that this initiative helped bring together people at MIT and resulted in a product that is easy to maintain and sustain.

Our summer response was more focused, labor-intensive, and resource-intensive but still drew from existing projects. We were able to reach out to teachers and recruit students from our existing partnerships with local schools. These relationships allowed us to connect with teachers and parents for a "needs assessment" to determine what types of activities would be helpful to their students. In some cases, we were able to arrange for students to keep the technology they had borrowed from their school to support access and equity.

The existing curriculum was adapted from prior work and from the website weekly packages for the remote project-based learning experience. We also modified existing processes to fit with the online format. For example, we created shared Google Docs; two coordinators reviewed the reflections each day for themes, great ideas, questions for the group, and "shout-outs" for the group meeting. Results from this program suggest middle school students and parents valued the learning experience and connections with MIT mentors.

In reflecting on our Full STEAM Ahead efforts, we believe that there are some key ideas that are applicable beyond MIT. The first idea is to leverage existing resources whenever possible. We were able to pull together a website and a summer program quickly in part because we already had established the network of people doing pK-12 activities and because we identified a plan of action and invited the MIT community to contribute. The second idea is to embrace and find resources to support cross-institutional partnerships. We were able to leverage school partnerships and relationships that we had cultivated both from the STEP teacher certification program and the Office of Government and Community Relations. This initiative enabled us to work alongside members of other MIT programs who we may not have connected with outside of Full STEAM Ahead. We believe that funding from the Chancellor is one indication of support for cross-institutional partnerships and hope that the value in these partnerships will continue to be recognized and encouraged by the university. Third, we encourage individuals to cultivate pK-12 communities within their institution. MIT has several pK-12 initiatives, and we share ideas and awareness of each other's work through monthly informal "pK-12 lunches." During these lunches, we eat together, invite a speaker from inside or outside the MIT community to share their work in pK-12, and engage in a discussion. This community was the cornerstone of the Full STEAM Ahead initiative and the source of the core team, and it consolidated the resources used for the website and summer program. Building community through hosting these types of lunches is an easy entry point into building a community of pK-12 interested groups and individuals that can be ready to activate for the next global crisis, with the hope that we will not need to do that anytime soon.

20.7 Conclusion and Next Steps

We have met the challenge of remote learning with innovative strategies that we hope will advance MIT's mission across a distance. While designing the learning experiences, we have purposefully maintained the hands-on nature of the activities and allowed students the freedom to develop and test new ideas, fail, and iterate. In the spring, we purposefully designed our weekly packages to be accessible to many audiences by creating projects that mostly needed commonly available items such as paper, cardboard, markers, string, and aluminum foil. In the summer, we continued this strategy by assembling and distributing materials kits to all students who participated in the Full STEAM Ahead into Summer program.

As we continue to adapt to the pandemic's challenges, we will still document and share our successes and challenges, cultivating further reflection and the development of promising ideas. With this in mind, we think about three critical pathways forward: teaching and mentoring opportunities for MIT students, STEAM projects and materials for students, and teacher/parent support and development.

For fall 2020 and spring 2021, MIT has committed to fund every undergraduate student in an experiential learning project. Faculty and staff from MIT departments have developed a range of opportunities for MIT students that are collectively grouped under a few themes: Public Service and Social Impact, Innovation and Entrepreneurship, Global Opportunities, Teaching and Learning, and the long-standing Undergraduate Research Opportunity Program (UROP). With the expansion of experiential learning this fall, we are seeking ways for the program to provide a model for others and how we can leverage this experience to provide an umbrella that helps to support other teaching and learning experiences in a rigorous way. With administrative support, we have established the Undergraduate Teaching Opportunities Program (UTOP) as an umbrella organization to provide trainings, pedagogical development, seminars, and structure to programs across the campus, drawing upon lessons from past efforts and recent efforts during the age of remote learning.

As we craft new methods for valuable learning environments, we have continued to honor our motto: creating and sharing high-quality learning experiences and engaging the minds and hands of pK-12 students.

Fig. 20.7 A compilation of MIT contributor logos

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Dr. Claudia Urrea is the Senior Associate Director for pK-12 at the MIT Abdul Latif Jameel World Education Lab (J-WEL), and she also has a visiting scholar position with the Lifelong Kindergarten group at the MIT Media Lab. During the last 7 years, she has worked on different initiatives such as the Institute-wide Task Force on the Future of MIT Education, the MIT Online Education Policy Initiative, and the MIT pK-12 Action Group. Additionally, Dr. Urrea founded the MIT STEAM camp, which brings MIT's learning approach to middle school students and teachers in international locations, and co-founded Full STEAM Ahead, a virtual program that combines hands-on exploration, project design, and skill building in STEAM subjects. Before joining MIT Open Learning, Urrea worked at the Interamerican Development Bank as a consultant in the education sector and at the One Laptop Per Child organization as Director of Learning. For the past 25 years, Dr. Urrea has helped multiple governments and nongovernment agencies – The New York Academy of Sciences, Schlumberger Excellence in Education Development, and International Development Research Centre, among others – to empower and support schools and communities of learners to evolve from traditional pedagogy to progressive learning environments.

Kirky DeLong has over 20 years of experience in the development of learning technologies, online laboratories, and open-source projects. During her time at MIT, she has worked on many projects involving a broad range of technologies, including the MIT iLab Project, which developed online laboratories enabling students to access real instruments online that can be shared around the world; the MIT-Haiti Project, which promotes teacher professional development through active learning and Kreyòl language in STEM disciplines; and the Connected Learning Initiative (CLIx) project, which aims to improve the professional and academic prospects of high schools students from underserved communities in India.

Joe Diaz is an MIT graduate and advocate of hands-on STEAM activities for K-12 students. As an alumnus of MIT's Scheller Teacher Education Program, he has spent time both inside and outside the classroom, developing programs for kids who have little access to quality education. For the past 4 years, he has worked with MIT Open Learning to bring MIT's learning approach to elementary, middle, and high school students and teachers via the STEAM Camp project to a variety of locations including Hong Kong, China, and Greece.

Dr. Eric Klopfer is Professor and Director of the Scheller Teacher Education Program and the Education Arcade at MIT. He is also the Head of the Department of Comparative Media Studies and Writing, and faculty advisor for MIT's J-WEL World Education Lab. His research has focused on technology and pedagogy for growing the understanding of science, technology, engineering, and mathematics (STEM) and systems. His work uses a design-based research methodology to span the educational technology and learning ecosystem, from the design and development of new technologies to professional development and implementation. Much of Klopfer's research has

focused on computer games and simulations for building an understanding of STEM as well as connecting programming to topics of student and teacher interest. He is the co-author of the books, "Adventures in Modeling," "The More We Know," and "Resonant Games," as well as the author of "Augmented Learning." His lab has produced software (from casual mobile games to the MMO: The Radix Endeavor) and platforms (including StarLogo Nova and Taleblazer) used by millions of people, as well as online courses that have reached hundreds of thousands. Klopfer is also the co-founder and past president of the nonprofit Learning Games Network.

Meredith Thompson draws upon her background in science education and outreach as a research scientist and lecturer for the Scheller Teacher Education Program. Dr. Thompson's research interests are collaborative learning, STEM educational games, and virtual and simulated environments for learning STEM topics. She has a bachelor's degree in chemistry from Cornell University, a master's degree in science and engineering education from Tufts University, and a doctorate in science education from Boston University. She has two current projects: The Collaborative Learning Environments for Virtual Reality (CLEVR) is creating a cross-platform collaborative game about cellular biology and INSPIRE is a group of education professors who are using games and simulations in teacher preparation. Thompson uses those games and simulations when she teaches the STEP course: "Understanding and Evaluating Education."

Aditi Wagh is a Research Scientist in the Scheller Teacher Education program at MIT. She received her doctoral education in Learning Sciences from Northwestern University after which she spent 3 years as a postdoctoral scholar at Tufts University. As part of her research, she designs computational tools that enable students to author ideas and express their thinking for STEM learning in classrooms and informal learning environments. She investigates how these tools can support students' learning of complex systems and engagement in STEM practices. Her research has been funded by organizations such as the National Science Foundation, Tufts University, and the Davis Foundation. Her research projects have ranged from designing and studying maker education in schools and after-school programs, developing computational modeling toolkits and curricula for K-12 education, redesigning undergraduate biology labs to integrate computational modeling, and developing interactive museum exhibits for the Field Museum.

Jenny Gardony is the Program Manager of the Scheller Teacher Education Program at MIT. In her role, she co-teaches the Introduction to Education Classes ("Looking Forward and Looking Back on Education" and "Understanding and Evaluating Education"), and she mentors, supports, and evaluates upperclassmen earning their teacher certification in secondary STEM fields. Jenny's other work in the STEP Lab includes teacher professional development, particularly around student-centered inquiry-based education, and community outreach to broaden access and participation in STEM fields. Prior to coming to MIT, Jenny taught middle and high school math for 10 years. While teaching, she served as a mentor for new teachers, a grade level leader, and founded/led a student drama club. She received her BA from Tufts University and her MEd from Cambridge College.

Emma Anderson is a research scientist in the Scheller Teacher Education Program at MIT. She received her PhD from the University of Pennsylvania's Graduate School of Education. She holds an MA from the University of Buffalo in geology and a BA from Smith College in sociology-anthropology. Her research centers around science, art, making, and play. Her research has explored learning biology through a complex systems lens, bridging science and math learning with coding, shifting teachers' pedagogical practices, and more. Prior to her doctoral studies, she worked at Baltimore Woods Nature Center as an environmental educator bringing science lessons into urban kindergarten through sixth-grade classrooms and leading summer campers around the woods.

Rohan Kundargi As the K-12 Community Outreach Administrator within MIT's Office of Government and Community Relations, Dr. Rohan Kundargi works assiduously to connect MIT's K-12 opportunities with young learners in the Cambridge-Boston metro area. A first-generation Indian American, Rohan was raised in Northern California before embarking on careers in research and higher ed. Before his career in community engagement, Dr. Kundargi was an academic geoscientist, obtaining earth science degrees from UCLA and Boston University, where he enjoyed investigating Earth's mysteries using a myriad of techniques: from shooting lasers through diamonds to creating complex 3-D models to simulate how volcanoes erupt. After graduate school, he moved to Eastern Washington to run Science in Action! Gonzaga University's largest STEM outreach program to the second-largest school district in the state, before joining MIT OGCR in 2018.

Chapter 21
Initiatives to Promote School-Based Mental Health Support by Department of Educational Sciences, University of Education Under Vietnam National University

Hoang Phuong Hanh, Tran Thanh Nam, and Le Anh Vinh

Abstract This chapter describes a case study of the university's attempts to support general education institutions through the COVID-19 pandemic crisis. Applying the School-Based Mental Health Collaboration, faculties from the University of Education, Vietnam National University Hanoi took a whole-school approach to promote mental health services for students all over the country via various channels. With multiple training webinars on studying and coping skills during social distancing periods for students, classroom consultation skills for teachers, initiatives from the university attracted remarkable responses from the community. Suggestions to improve the effectiveness and sustainability of the efforts, including digitalization consideration, targeting and effective mobilization of resources, dissemination of learning materials, and long-term planning, are discussed in the last half of the chapter, after reviewing and evaluating their impact and potential.

21.1 Introduction

The COVID-19 pandemic has induced a wide range of significant socioeconomic concerns all over the globe, including in the education sector. In Vietnam, containment efforts led by the Government, including a three-month period of school closures, have led to multiple immediate responses intended to sustain educational

H. P. Hanh · L. A. Vinh (✉)
Vietnam Institute of Educational Sciences, Hanoi, Vietnam
e-mail: hanhhp@vnies.edu.vn; Vinhla@vnies.edu.vn

T. T. Nam
University of Education, Vietnam National University Hanoi, Hanoi, Vietnam
e-mail: namtran@vnu.edu.vn

continuity (La et al., 2020). While comprehensive actions were initiated by the Ministry of Education and Training (MOET) regarding the switch from conventional methods of education to online and TV learning using technological tools, which involved thousands of schoolteachers and managers across the country, little systematic attention was paid to address the mental and emotional needs of teachers and students (Vu et al., 2020). The disruptions in daily learning routines meant that many students were not able to engage consistently with the new forms of schooling provided by the temporary responses (Tran et al., 2020; Trung et al., 2020). Distance learning requires skills that might be novel to many students, such as independent study, time management, self-discipline, schoolwork, and social life balance. Those from vulnerable groups could face more challenges, leading to a higher risk of family abuse, dropping out of school to engage in child labor, or early marriage, as a result of prolonged school shutdowns and income constraints (Tran et al., 2020). For teachers, both professional and emotional support are much needed to help them overcome increased pressure from adapting to new teaching modes and demands in keeping students engaged remotely while at the same time, coping with the new pressures on their family income.

This gap in the existing action plans of education agencies and institutions highlighted the necessity of extensive efforts on a national scale to address mental health as well as social and emotional needs of students and teachers (Nguyen et al., 2013). This is particularly critical during the pandemic as well as in the long term since education in Vietnam has always been achievement-driven without sufficient focus on the socioemotional development of learners. As psychological counseling is a new concept in Vietnam, MOET has stipulated an official tenured position for this in every school; however, there is a serious lack of specialists based at schools due to a human resource deficit. Consequently, if issues were to arise, the existing arrangements are professionally subpar. Prior to the pandemic, the Department of Educational Sciences of the University of Education at Vietnam National University (VNU) has led attempts to assist K-12 schools, such as consulting for school leaders and teachers on mental support for students, organizing courses, seminars, workshops, TV shows, and digital dissemination of information to raise social awareness and enhance teachers' skills in counseling. However, the focus of these attempts was mainly limited to school bullying. There has been an increase in the number of reported incidents in educational settings recently, including child molestation, teen depression, and behavioral problems. In response, the measures undertaken by schools are often slow and not well-targeted. These problems have become more critical during school shutdowns and social distancing periods, increasing the need for timely interventions.

21.2   Theory of Action

The efforts generated here are based theoretically on The School-Based Mental Health Collaboration (SBMHC) model by Eppler-Wolff et al. (2019), which is grounded in attachment and mentalization theory and practice. The model

highlights the significant role of teachers and teacher-child attachment, as compared to parent-child attachment, in shaping students' behaviors (Ainsworth, 1978; Holmes, 1993; Eppler-Wolff et al., 2019). Safe and trusting teacher-child relationships can help soothe the trauma originating from insecure parent-child attachments, particularly those impeding positive learning habits (Rass, 2017). SBMHC also takes the approach of the mentalization theory, which posits that if a caregiver or a therapist (or a teacher in this context) can take a mentalizing stance, he or she can understand his/her own mental states as well as those of others (Steele et al., 2015). From this, it is possible for them to modulate disruptive feelings of student patients.

This model was chosen because it describes a whole-school approach to mental health services, which involves all stakeholders, including students, teachers, parents, and school managers, each with their own perspective and role in mind. As the model focuses on classroom consultation, the clinical supervision of classroom consultants—who, in the case of Vietnam, are also the teachers—is particularly important. This is expected to be delivered by university clinicians. The clinical supervisors are supposed to be responsible for using mentalization practice to monitor and support the teacher consultants with their experiences with student patients (Eppler-Wolff et al., 2019).

21.3   Profile of the University in Charge

As the first modern university established, and one of the two national universities in Vietnam, VNU has undergone various stages of development since 1906. VNU is the largest comprehensive higher education and research center in Vietnam. Accommodating over 2300 academic staff from 34 member universities, schools, institutes, centers, and service units, and offering nearly 500-degree programs for about 45,000 undergraduate and graduate students, VNU is entrusted with the mission of producing highly qualified human resources and a talent pool for the industrialization and modernization of the country. VNU holds a special position in Vietnam's higher education system, operating according to a special regulation promulgated by the Prime Minister. VNU reports directly to the Prime Minister and has high autonomy in personnel organization, academic programs, scientific research and technological development, planning and finance, international relations, and other fields. VNU is authorized to work directly with ministries, ministerial-level organizations, governmental bodies, and people's committees of central cities and provinces on affairs related to VNU. VNU's universities, schools, and institutes maintain their juridical entity status as higher education and scientific research institutions regulated by the Law on Education and the Law on Science-Technology.

The initiative examined in this case study originated from the Department of Educational Sciences at the University of Education (UEd), a member school of VNU since 1999. UEd is responsible for training teachers, educational specialists, and managers for all academic levels in Vietnam and is also a research hub on

pedagogical sciences, educational management, and psychological studies. UEd also serves as one of the consultancy units for MOET and local education agencies about strategic plans, policies, and program implementation for educational development, together with scientific research and technological services. The university offers undergraduate and graduate degree programs in Subject Specialized Pedagogy, Educational Management, Testing and Assessment, Developmental Clinal Psychology, and various other short-term training courses. Established in 2009, the Department of Educational Sciences is responsible for implementing training programs on educational sciences and leading scientific research in Economic Education, Social Education, Educational Statistics, School Psychological Counselling, Developmental Clinical Psychology, School Social Works, Therapeutic Education, and Lifelong Learning. In parallel with improving research quality standards in the field of Educational Sciences, the department also envisions supporting technology transfer and offering high quality services of psychological counseling for K-12 teachers and students. The department has been running various training courses in education and life skills, school counseling, and professional development for teachers and school leaders.

As a university specialized in teacher training and educational sciences, the University of Education (UEd) has realized that although lifelong learning is crucial for teachers, most of them only receive prescriptive on-the-job training on teaching pedagogies. Voluntary training, based on individual teacher needs, has been relatively rare and needs to be better promoted among teacher networks. Over the past few years, UEd has launched several new degree programs and many need-based teacher professional development courses and modules in order to familiarize schoolteachers with the idea of actively seeking learning opportunities in order to remain up-to-date on new skills and capabilities. This is aligned with the vision and mission of the university, which is to create educators for tomorrow who are globally competent, lifelong learners, and inspirers. The teaching approach of UEd is liberal and learner-centered, valuing the autonomy of teacher trainees. Therefore, much emphasis is placed on creating changes in the perceptions and attitudes of teachers about continuous learning and professional development.

A considerable proportion of research at VNU UEd Department of Educational Sciences is concerned with K-12 education. Hence, many of the activities and initiatives by the university are tied with general schools. UEd even founded an annex school called High School of Educational Sciences, which serves as a practical and educational research site for the university. This initiative to provide support for the mental health and socioemotional development of students and teachers was undertaken as part of the university's stated mission and operational approach to strengthen the role of university training and research on the enhancement of general education. These efforts, which were implemented through the voluntary and uncompensated work of university staff and faculty, also reflect the sense of social responsibility felt by the university to ease the consequences and aid those in need during the time of crisis resulting from the pandemic. The Board of Presidents at VNU also saw the opportunity to promote social awareness and understanding about the role of mental and socioemotional well-being in education, together with the popularity of the university in terms of its vision, mission, and function.

21.4 Implemented Efforts in Response to the Pandemic Crisis

Given the emergency situation during the pandemic, UEd Department of Educational Sciences has collaborated with the Department of Student Affairs under MOET and partnered with UNICEF to initiate a series of rapid digitally-based responses, which aim to provide mental and socioemotional support for K-12 teachers and students. All academic faculty were involved on a voluntary basis, and there were little or no additional technical costs incurred. Overall, these efforts were implemented through three main forms: webinars, social network channels, TV shows, and printed/digital learning materials.

The first attempt implemented was a three-hour webinar on mental health for students at High School of Educational Sciences in March 2020. Students were given notice about the event with a register/login link on a first-come, first-serve basis. The topics discussed revolved around stress management, anxiety, teen depression, sleep deprivation, and attention deficiency when learning online at home. Explanations, advice, and guidance were provided by the guest speakers, who were also academic faculty of the Department, to help students develop emotional management and problem-solving skills for a healthy mental life. The event was limited to only 100 Zoom accounts at one time, but the real number of students in attendance was larger since many students gathered into groups to follow the session from one PC/laptop. However, there were still many more interested students who were unable to participate in the event, including those from other upper secondary high schools. As a result, the recording video of the session was shared on UEd's official website sot that all students interested could view it.

As the link to this first webinar was reposted many times on different social media platforms, it was noticed that this issue attracts not only students but also teachers, who have been struggling to find ways to support and engage their students in sustaining school work while leading a healthy social life. As mentioned above, schools in Vietnam do not have specialized psychological counselors for students, so it is important that teachers are equipped with sufficient knowledge and skills to support their learners. This has led to the second, larger-scale series of webinars targeting teachers and managers in Hai Phong and Thai Binh provinces in early April. The Department of Student Affairs under MOET contacted provincial Departments of Educational and Training to reach out to every elementary and secondary school in the region to nominate teaching staff to attend. Additionally, interested teachers and parents in need of guidance on how to support their children mentally could also self-register for the event. The webinar attracted over 18,000 participants from 130 Zoom accounts to discuss career orientation and school counseling tips and experiences, as well as the skills required of homeroom teachers to adhere to the new national curriculum framework with the competency development approach.

Participants at the webinars were guided through a step-by-step process of effective school counseling, focusing on skills such as identifying common emotional behaviors of students, understanding the underlying causes of their misbehaviors,

and knowing how to assist those with socioemotional behavioral problems with active listening, reflective emotions, and empathy skills. The webinar series enabled teachers to further understand the psychological issues of students and become familiar with the five-step procedure to deliver mental support for students. Assessment tools for initial diagnosis of socioemotional and behavioral problems as well as different sources of high quality learning materials were also shared in the sessions.

After the series of webinars, there were many follow-up questions and an observed need for consistent sharing and discussion of these topics. As such, academic staff joined the Vietnam Students Forum (HSF) in an online counseling program called "Accompanying students through COVID-19" held on a Facebook fan page to deliver counseling support and help students improve their academic and life skills when learning at home. Every week, the group of specialists from UEd created counseling content in the form of video clips or infographics, which were then sent to the forum. The topics covered included improving motivation, digital safety and resilience, coping strategies for tiredness and anxiety, improving attention span for online learning, and maintaining positive social relationships. Each of these posts has received approximately five to ten thousand views and comments. A separate Facebook page was created and dedicated to improving digital safety and resilience, with the aim of enabling school students to become proficient digital citizens who can be active, thrive, and learn in the digital world while at the same time are able to protect themselves and others from potential risks.

In addition to online social media pages, academic faculty from UEd were invited to be guest speakers on a TV chat show program to discuss various social and educational issues. Each of the show's episodes was devoted to providing information using the speaker's expertise or counseling service about a controversial topic in education, such as helping children and adolescents control time spent on digital devices, handling cyberbullying, or choosing majors at the undergraduate level. Some, but not all, of the episodes targeted a parent audience and offered guidance for supporting children at home in independent learning skills and reentering school life after social distancing.

The TV show sessions and weekly infographic posts on the HSF fan Facebook page were so popular that the experts from UEd received even more questions and inquiries for additional detailed information. The Board of Presidents at VNU and Board of Rector at UEd decided to launch a specialist team, which included academic staff from the Department of Educational Sciences and the Department of Technological Education, to compile, consolidate, reorganize, and develop the ready-made infographics into comprehensive guidebooks. Within six weeks of early April, the team had successfully created three downloadable books on mental health care and career orientation for students and on the digital transformation in education for teachers. Information in these documents is presented in a user-friendly format with links or QR codes linking to online video clips and interactive questions and quizzes to engage readers. In addition to the download links on the UEd

website, the printed versions of these guidebooks were distributed to 27 Provincial Departments of Education and Training in North Vietnam for introduction to regional school leaders and teachers.

21.5   Monitoring and Reflections

The effectiveness of these efforts to date can be assessed by the level of engagement from the community. The number of participants in every webinar session always exceeded expectations. In addition to the large number of views and comments on social media pages and follow-up questions sent to the experts, news articles and reports about the webinars and publications were also widespread on electronic news sites and TV. These efforts have been considered a successful stepping-stone to raising social awareness about mental health and essential life skills for students in order to help sustain education continuity during the pandemic. Mental health care is a relatively new concept to many Vietnamese people even though many students have struggled with difficulties and socioemotional and behavioral problems regularly prior to, but especially during, the pandemic. However, there is a serious lack of a support system for this vulnerable group. Given the available resources and how critical the situation is, dissemination of information and efforts to engage and offer guidance to improve awareness and attitudes are the key solutions to improve the situation.

These efforts have demonstrated that demand for school psychological counseling and support in the acquisition of life skills in general, and particularly during times of crisis, is huge, but has not been properly undertaken. Children and adolescents are exposed to various types of risks from their daily habits and the digital world but do not know how to seek help, while furthermore, the availability of specialists in the field falls immensely short. In addition, awareness and perception of schools and parents regarding this topic have not been sufficiently improved in order to address this need. It is, therefore, crucial to equip teachers and parents with scientific knowledge, skills, and tools for basic psychological support and intervention at school and at home. This is what went beyond expectations since, at the beginning, efforts were only to target K-12 teachers and students. Initially, there were no deliberate efforts to engage parents in the activities. However, feedback from teachers and students as well as the naturally growing interest from groups of parents have informed the team about the significant role of parents in collaborating with schools to help stimulate students. This was even more critical during social distancing as students spent the entire time at home with parents. Efforts by teachers could be ineffective without understanding and support from the parental side.

In terms of teachers, it has been noted that the demand for psychological counseling and mental support of this group is as high as students. Teachers would be unable to assist learners if they themselves also suffer from mental issues and are in need of help. As a result, in addition to training on innovative teaching methods and counseling skills, more self-help coping strategies and external support are needed

for teachers. This also means that school leaders and local educational managers should have been involved more intensively and directly to develop school counseling skills to share the burden and better support teachers.

What remains especially difficult is developing a monitoring system to measure the sustainability of the effects of the interventions. Despite considerably high levels of interest and interaction with the webinars and guidebooks, there has been no examination of how things have actually transitioned into real life. Students and teachers have been encouraged to provide reflections and feedback through online minigames on social network pages, but the responses have not been widespread. Moreover, the growing interest and demand for learning and counseling from the community were larger than the available technical infrastructure and human resources could support. Since there was no funding for technical facilities, the available digital platforms for the webinars were unable to accommodate the full number of interested participants. The usability of the free tools for creating content and designing the guidebooks also impeded productivity under such a tight time frame. Additionally, even though the expert team worked beyond their expected responsibilities to serve the community, time constraints made them unable to offer help and support to every individual case reported through different channels.

As mentioned earlier in the SBMHC model, the role of clinical supervisors is key to the success of classroom consultancy. However, this was not possible at this beginning stage due to time, financial, technical, and personnel constraints. The involvement of school leaders and parents has also not been sufficient. The attempted efforts mainly revolved around teacher professional development and teacher-student relationship at a surface level.

21.6   Ways Forward

Although these efforts were initiated in response to the emergency situation caused by the pandemic, reality has proven that this is not a one-off occasion as there is always chance for similar relapses. Preparation for sustainable solutions is a must; therefore, plans are being drafted from the experiences and lessons learned from the initial attempts.

First, digital pathways are ideal channels to approach children and adolescents in this day and age. When encountering problems, students might not confide with or accept support from parents or teachers but are much more willing to seek out information and advice from the Internet, particularly when youth nowadays have access to digital devices and develop good IT skills from a very early age. Since schools were reopened in the country in May 2020, three months after COVID-19 was announced to be a global pandemic, the Facebook page for digital safety and resilience continues to post constant updates with more detailed guidance on digital learning skills and self-management strategies. This is important even beyond the pandemic context because blended learning is becoming predominant in modern education. Together with more webinars, discussion threads, and forums on social network pages, online counseling services are also expected to be a promising and

cost-effective support method given the current lack of facilities and human capital in charge.

Second, the development and production of learning materials need to be further reinforced. Printed and online publications are still one of the best ways to disseminate knowledge and improve community awareness, particularly considering the serious scarcity of official knowledge available in the Vietnamese language in this field. Product materials need to cover a wider range of topics and address the needs of students, teachers, and also parents. This is specifically important to teachers and parents who cannot attend and follow intensive training courses. There also needs to be more detailed communication and distribution plans for these products so that more diverse audiences are targeted. The consolidation, revision, and sharing of these products will be undertaken systematically to allow open access, to the exchange of ideas, and constantly update information.

Third, right after the pandemic and social distancing, the focus of support should be customized to better target students of vulnerable groups, such as those with economic constraints, domestic violence, or learning difficulties. These groups are considered in critical need of mental support and guidance. TV broadcasts and printed materials work more effectively with these groups since many of them cannot afford personal digital devices to access online-based sources. Home-based counseling for the whole family and extra support for parents are also necessary to help these children reengage with academic work or return to school. Many of these students have opted to drop out due to the psychological difficulties caused by the alternative online learning mode during school shutdowns in addition to economic issues.

Last, but most importantly, in order to realize all of the aforementioned plans in the coming period, there needs to be a specific road map and investment budget for human resources and network development. Staff from one academic department of VNU and MOET Department of Student Affairs were only the initiators who laid the first stepping-stone. The next step requires synchronized collaboration of all stakeholders from policymakers, educational authorities, school leaders, teachers, and the community. Teachers need long-term support to effectively deliver a socio-emotional learning curriculum as a solid foundation for student control of their mental well-being (Eppler-Wolff et al., 2019). It is, therefore, important to spread this vision and involve more institutions and organizations of expertise in the field with a view to scale the efforts for extensive and sustainable effects.

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Hoang Phuong Hanh is a MA linguistics graduate from the University of London, UK and currently working as a researcher at Vietnam Institute of Educational Sciences. She is also a PhD student in education at the University of Auckland, New Zealand. She has published works concerning STEM education, youth's digital capacity, and educational disparities. Her research interests also include educational leadership and policy as well as education innovations and reforms.

Tran Thanh Nam earned his PhD in clinical psychology from Vanderbilt University, USA and is now the Dean of Faculty of Educational Sciences at the University of Education, Vietnam National University Hanoi. He has over ten years of postgraduate teaching experience, focusing on psychopathology, psychometrics, and therapeutic intervention. His research includes adaptation and calibration of assessment tools for early detection, adaptation, and calibration of intervention programs for children and adolescents with developmental disorders, behavioral problems, anxiety, depression, post-trauma stress disorders.

Le Anh Vinh earned his Master in Education and PhD in Mathematics at Harvard University and is currently Vice Director General of Vietnam Institute of Educational Sciences (VNIES). He has had more than 70 international publications (both in Math and Education) and is leading a research group at VNIES on developing Vietnam Educational Strategy Framework 2021–2030. Professor Le Anh Vinh is currently the leader of many cross-national education projects on innovative teaching, STEM education, skills-based learning.

Chapter 22
Conclusions: What Innovations Resulted from University–School Collaborations During the COVID-19 Pandemic?

Check for updates

Fernando M. Reimers and Francisco Marmolejo

Abstract Based on a cross-case analysis of the studies presented in this book, this study concludes that during the COVID-19 pandemic, universities engaged with school systems and school networks to sustain educational opportunity. They did so through entrepreneurial educational innovation in ways which helped integrate their research, teaching, and outreach functions. This finding speaks to the nature of universities as learning organizations, open to their external environment, not just to respond to changes in it, but to shape it.

This chapter identifies seven innovations that universities advanced in their collaborations with schools:

1. Research and analysis to support decision-makers in formulating strategies of educational continuity (outreach and research).
2. Advancing knowledge based on research in schools in the context of the pandemic (research).
3. Instructional and technological resources and online platforms for students and teachers, including efforts to support connectivity (outreach and teaching).
4. Professional development for teachers, education administrators, and parents (outreach).
5. Highlighting the importance of attention to socio-emotional support for students (outreach).
6. Organizational learning and innovation (synergies among research, teaching, and outreach).
7. Innovations in teaching: Engaging university students in these collaborations with schools (teaching).

F. M. Reimers (✉)
Harvard Graduate School of Education, Cambridge, MA, USA
e-mail: Fernando_Reimers@harvard.edu

F. Marmolejo
Qatar Foundation, Doha, Qatar
e-mail: fmarmolejo@qf.org.qa

These seven innovations include products, solutions, processes, and managerial improvements, and for the most part they are evolutionary innovations and, in some cases, revolutionary.

These collaborations were facilitated by and, in turn, reinforced three institutional processes supportive of outreach:

1. University mission and strategy
2. Collaboration and institutional integration
3. Structures and preexisting collaborations with schools

22.1 What Does University Engagement with Schools During the Pandemic Say About Universities?

What does this study tell us about the role of universities in helping to sustain educational opportunities during the most serious global educational crisis of the century? How did universities step up to fill an evident void in capacity in the larger educational ecosystem, and just as importantly, what did this social engagement do for schools and for universities?

This study shows that, amidst the significant challenges caused by the COVID-19 pandemic, universities around the world found ways to support schools in sustaining educational opportunities. To do so they innovated, and such innovation reinforced the integration of the research and outreach functions of the university. These innovations created value for schools by helping them meet the need to educate students in the new context created by the crisis, especially the challenges stemming from social distancing requirements. Universities created these innovations largely by mobilizing existing staff and resources, rather than by obtaining new resources or diverting resources assigned to address other needs to serve the emergent needs of schools. In other words, the university responses identified in this study were the result of entrepreneurial innovations, rather than the result of sharing existing capacity or resources with schools.

Given that the uncertainties created by the pandemic included also uncertainties about financial resources, judicious use of existing resources was an implicit, and sometimes also explicit, element of the context in which universities had to innovate to support schools. In addition to having to create value while using existing resources prudently, the entrepreneurial responses that produced such innovation had to create value based on existing capacity and resources, in a context of multiple demands on them and amidst great uncertainty about how the pandemic would evolve, including how long it would last. Speaking metaphorically, such process of innovation took place not while navigating a ship in stable waters, but in a storm without a clear view of the horizon and without a clear sense of how long the storm would last. It is arguably more challenging to see the opportunities in a stormy context of that sort and, perhaps for that reason, the case studies in this book offer only some evidence of integration between the functions of outreach and teaching in these collaborations between universities and schools.

Since we relied on a sample of convenience for the survey we administered to 101 universities, as well as for the twenty case studies examined in this book, we cannot ascertain what percentage of the more than 28,000 universities around the world supported schools and school systems during the pandemic. We also do not know how sustainable the collaborations we observed will be in the long term or what their long-term effects will be for institutions or individuals, since the focus of this study was on responses in the immediate months after the outbreak of the pandemic. Furthermore, it is still too early to know how effective these innovations will be in preventing or mitigating learning loss, school dropout, or mental health challenges to school-age students.

However, it is conceivable that just as the experience of living through this pandemic will have a lasting impact in the lives of the survivors, not least in how the experience changed their aspirations and sense of purpose, it is also possible that students, faculty, and staff whose experience of the pandemic was mediated by the university responses to it, including the collaborations we studied in this book, will be changed in lasting ways. Maybe students who engaged with schools during the pandemic will become more interested in inequality and in education in the future. Maybe their solidarity with others will be augmented as a result of these experiences. Maybe they and their professors will become more adept at dealing with "super wicked problems" as a result of the experiences gained during the pandemic. Perhaps the faculty who participated in various outreach efforts will develop different professional priorities for their teaching or their research. Maybe those who participated in broad outreach efforts to the larger public will come to expect such levels of outreach for their future work. And it is possible that university leaders themselves develop a new sense of urgency around deepening the engagement of the university with the larger education ecosystem as a result of what they learned from the engagements described in this book. We cannot answer these questions at this point given the limitations we have acknowledged, especially the limitation of conducting this study while the pandemic was still unfolding.

These limitations notwithstanding, it is, nonetheless, remarkable that in a context challenging all education institutions to themselves figure out how to carry out their core activities in the new context created by the pandemic, the universities studied in this book would give outreach to schools such importance. While it could be argued that they did so out of self-interest in the case of preexisting partnerships with schools, for instance in the schools that provided placements for student teachers from teacher education programs in the universities, or for the schools which were part of the same university systems that collaborated with them, it would have been entirely justifiable that in a context of uncertainty universities hunkered down and focused only on activities defined as essential or core, a criterion that most activities of outreach examined in this book would hardly meet. It is precisely because universities had a choice to *NOT* engage with schools that the fact that they chose to engage is indeed remarkable. Furthermore, a good many of the activities described here reached out to constituencies and schools that were not part of the university system or with whom universities had preexisting relationships.

It speaks to the high importance universities assign to their social responsibility that they rapidly innovated in teaching and learning to sustain educational opportunity in schools when their own ability to deliver in person instruction was severely challenged by the measures to contain the spread of the virus requiring them to adjust and look for novel ways to teach their own students.

The efforts studied in this book illustrate that universities are indeed institutions open to their external environment; in fact, a number of the collaborations examined in this study were possible because of preexisting partnerships between universities and school networks. This study shows that universities have embraced the third mission of reaching out to their communities to meet their needs, arguably taking it as seriously as the research and teaching missions, even amidst, or perhaps especially, during a global crisis, a time when many activities deemed "nonessential" were understandably interrupted. Just as important, they embraced that mission entrepreneurially, not just sharing existing capacity and resources but creating new products or services in a context of financial constraints and depending largely on the creative use of existing resources.

The evidence examined in this study suggests that universities are indeed open systems, in interaction with their environment, able to discover changes that can influence them and to change in response to those changes. While discovering the crisis caused by COVID-19 did not require especially fine-tuned perceptive capacities, understanding that the consequences of the crisis for schools were important enough for universities to consider addressing them a "core" activity did evidence well developed foresight and social sensibilities.

In choosing to collaborate with schools during the crisis, universities demonstrated that they are also able, to the extent that such efforts are successful, to create better futures, as the result of the innovations they can generate. This evidence challenges the view of universities as "ivory towers" isolated from the surrounding environment and detached from local immediate problems.

As a result of collaborating with schools, universities not only generated clear and valuable innovations to sustain educational opportunity and to improve it, but this process also contributed to transforming internal university processes in ways that enhanced their own ability to deliver on the third mission of outreach. In this concluding chapter, we identify seven innovations resulting from these collaborations, analyze them, and discuss the three ways in which those collaborations began to transform the universities we studied.

The collaborations that the case studies describe, and those reported in the survey administered to 101 universities, resulted in the following seven innovations pertaining primarily to outreach, but extending to research and teaching as well, and creating synergies among these three functions of the university:

1. Research and analysis to support decision-makers in formulating strategies of educational continuity (outreach and research)

2. Advancing knowledge based on research in schools in the context of the pandemic (research)
3. Instructional and technological resources and online platforms for students and teachers, including efforts to support connectivity (outreach and teaching).
4. Professional development for teachers, education administrators, and parents (outreach)
5. Highlighting the importance of attention to socio-emotional support for students (outreach)
6. Organizational learning and innovation (synergies among research, teaching, and outreach)
7. Innovations in teaching: Engaging university students in these collaborations with schools (teaching)

These seven innovations include products, solutions, processes, and managerial improvements, and for the most part they are evolutionary innovations and, in some cases, revolutionary.

Products

– Research and analysis to support decision-makers in formulating strategies of educational continuity
– Advancing knowledge based on research in schools in the context of the pandemic
– Highlighting the importance of attention to socio-emotional support for students

Solutions

– Instructional and technological resources and online platforms for students and teachers, including efforts to support connectivity

Processes

– Professional development for teachers, education administrators, and parents
– Innovations in teaching: Engaging university students in these collaborations with schools

Managerial improvement

– Organizational learning and innovation

These collaborations were facilitated by and, in turn, reinforced three institutional processes supportive of outreach:

1. University mission and strategy
2. Collaboration and institutional integration
3. Structures and preexisting collaborations with schools

22.2 Which Innovations Resulted from Collaborations Between Universities and Schools?

1. Translating existing research-based knowledge and carrying out research and analysis to support decision-makers in formulating strategies of educational continuity

A form of collaboration involved translation and dissemination of existing research-based knowledge in service of supporting education leaders, teachers, parents, and students in schools during the pandemic. To provide guidance in a short time frame, this form of collaboration involved a combination of synthesizing existing knowledge in ways relevant to the circumstances created by the social distancing requirements imposed by public health authorities, organizing and facilitating convenings, and accessing and translating research from other contexts, as well as carrying out analysis of empirical evidence collected during the crisis. In some cases, this form of collaboration involved engaging in activities to extract knowledge from the practice of those who were leading in response to the pandemic and facilitating exchange of ongoing practices in various convenings. Often efforts of dissemination evolved from one-way sharing of knowledge from university faculty and staff to schoolteachers and staff into two-way forms of exchange. As these dialogues evolved, this caused university staff involved in these dissemination efforts to learn from the schools and from the challenges they faced, which influenced their own research interests and agendas.

The Getulio Vargas Foundation in Brazil, for instance, organized a series of convenings of education decision-makers in various states and municipalities and carried out research and analysis to support them in formulating strategies for educational continuity. The Higher School of Economics (HSE) in Russia carried out similar tasks, informing policies of education continuity at various levels of government. HSE also created various platforms to disseminate the research it was conducting on the readiness of various systems for strategies of educational continuity.

The Pontifical Catholic University of Chile (PUC) relied on the expertise of the faculty to offer guidance to the Ministry of Education on how to prioritize the curriculum to sustain education in the context of diminished capacity for delivery created by the suspension of face-to-face instruction. They also provided guidance on how to prioritize socio-emotional attention to students in response to the anxiety and stress created by the pandemic.

In Japan, Keio University offered the research expertise of the faculty to the local government and to the Ministry of Education, which led to a significant regulatory change in the kind of internet connections schools were allowed to use. This change led schools to implement distance education in ways which are socially acceptable and economically feasible, reducing the initial investment and operation cost.

The Qatar Foundation (QF), a multi-institution education platform, convened multiple global seminars to take stock of the needs created by the pandemic and to

facilitate the rapid exchange of knowledge that would support educational continuity not only in Qatar but also in other participating countries.

Bahçeşehir University in Turkey disseminated knowledge and resources during the pandemic to support emotional well-being, mitigating stress and anxiety of students and parents in the schools affiliated with the network of which Bahçeşehir is a part.

While these activities are best characterized as outreach, they also reinforced other functions such as research or teaching as a result of bringing faculty into closer connection with schools and school systems, educating them on their emerging needs, and likely opening up opportunities for new research agendas.

2. Advancing knowledge based on research in schools in the context of the pandemic.

In addition to the rapid research and analysis done to support education decision-making as described above, universities developed more elaborate research projects, either as extensions of work that began as they engaged with schools and education authorities to support sustaining educational opportunity during the pandemic or as they modified preexisting research projects so they could be adjusted to the context of distance education caused by the pandemic.

In some cases, engagement of the universities in research as avenues to support collaborations with schools influenced the research agenda of the universities in ways that are likely to continue beyond the pandemic. For instance, the collaborations established by the Higher School of Economics in Russia influenced major research agendas of the institute, especially on educational inequality and digital transformation.

The Institute of Education at the University of Lisbon pivoted two research projects with school networks—which focused on building teacher capacities in the use of digital technologies and in teaching STEM subjects—to an online environment. In this way, an action research project, developed prior to the pandemic, was transformed to offer just-in-time support to teachers in developing competencies relevant in the context of the need to teach remotely arising out of the pandemic.

Also, at Massey University in New Zealand, researchers modified a preexisting research project on learning mathematics to explore how family members engaged in students' learning of mathematics while they were confined at home by the social distancing requirements.

Because the educational effects of the pandemic will likely continue after the health crisis subsides, the engagement of universities in research responsive to these emerging needs created by the pandemic will position them well to continue to do work very relevant to the new educational challenges created by the pandemic.

3. Provision of instructional and technological resources and online platforms for students and teachers, including efforts to improve connectivity

Another form of collaboration involved universities distributing instructional resources or platforms to schools that could support educational continuity through remote instruction. In some cases, these were resources that existed prior to the

pandemic; in other cases, these were developed during the pandemic or modified to fit the context of remote learning created by the school closures.

For example, the Getulio Vargas Foundation in Brazil shared online education resources developed for its virtual school with other schools in the country. Similarly, the University of Chile provided internet connectivity and resources to marginalized Chilean regions.

In China, Tsinghua University provided access to online courses for elementary and secondary students.

In Colombia, EAFIT assisted in the development of the national multimedia platform used to support educational continuity by the Ministry of Education in Colombia, and they also reached out to 96 secretaries of education to assist them in developing a strategy for educational continuity and providing professional development to principals and teachers.

In Mexico, the Autonomous University of Puebla (BUAP) rapidly pivoted a residential entrepreneurship education program into an online program that was offered to students at the high school and college level who were in institutions that were part of the university.

The Higher School of Economics in Russia offered online instruction to students in using online tools and preparing for exams.

In the United States, Arizona State University offered online instruction to students in the schools it operates—face-to-face and online—while offering online college courses to high school students over the summer and online instruction for teachers to help them develop skills to teach online. In addition, they developed resources for students, families, and schools.

Additionally, the Massachusetts Institute of Technology's extensive engagement with precollegiate students pivoted to an online format. The institute also designed new online project-based learning programs.

The Camilo Jose Cela University in Spain offered digital resources to support students and parents during the pandemic. It also supported various marginalized groups, including refugees.

In Morocco, Al Akhawayn University developed online resources to teach middle school math and science; the platform was migrated to Ministry of Education servers for open online access, and it was used to offer online and offline solutions during the pandemic. Nonformal primary education classes in the University's Community Development Center were maintained and supported with university resources.

The Qatar Foundation developed several tools to assist remote instruction during the pandemic that were used by schools in Qatar.

Vietnam Education University developed digital resources to develop teacher capacity to support students' mental health.

These various forms of engagement in which universities shared resources, either technologies or digital assets, with the larger education ecosystem illustrate how the pandemic accelerated opportunities for democratizing access to assets developed in universities to the wider community. It also underscores the potential benefits resulting from the increased scale of engagement created when schools become part of

school networks that include universities and that allow considerable efficiency in creating and deploying technologies or instructional resources.

4. Professional development for teachers, education administrators, and parents

The collaborations designed by the universities to support precollegiate education during the pandemic augmented the capacities of education administrators, teachers, and parents in a variety of ways, relying on open-access webinars to disseminate information as well as on targeted efforts to assist particular schools over a sustained period of time. Just as importantly, such engagements also augmented the capacities of universities and their knowledge of online instruction and of a variety of ways to support lifelong learning.

Most of the universities engaged in some form of dissemination of information with the public, as was done, for instance, by PUC in Chile or Tsinghua University in China.

There were also more intensive efforts to support the development of capacity in targeted schools. In most cases, those efforts built on preexisting partnerships with those schools, often extending them. As it was mentioned earlier, some of these actions took place in the context of preexisting research projects that involved collaborations with schools as those pivoted to adjust to the context of remote learning, as was the case in the University of Chile, in the Institute of Education of Lisbon, and in Massey University in New Zealand. Other efforts did not grow from research projects but from preexisting collaborations focused on institutional strengthening.

For example, in Chile, PUC built partnerships with education authorities serving low-income communities, in which context they provided professional development to teachers.

In Colombia, EAFIT provided professional development to teachers and principals to teach remotely in 96 municipalities.

Symbiosis International University in India provided professional development for teaching online to teachers in the schools that are part of the network, and it also provided infrastructure to a number of rural schools that it 'adopted.'

In Mexico, BUAP provided professional development to faculty in order to convert a residential entrepreneurship education program into an online program and to scale its reach.

Also in Mexico, the University of Guadalajara offered professional development to faculty in the university and in the high schools that are part of the university.

Furthermore, the Instituto Tecnologico de Monterrey developed a Flexible Digital Model for instruction, which was quickly and effectively transferred to the high schools that are part of the institution, supporting know-how to convert courses into an online format.

The Qatar Foundation offered professional development for teachers from all schools in the country, at the request of the Ministry of Education and Higher Education, so they could teach remotely.

In Russia, the HSE offered professional development to teachers and parents.

Bahçeşehir University in Turkey provided professional development on the effective use of technology to school principals in the schools affiliated with the network of which the university is a part.

This engagement between universities and schools around the professional development of teachers and administrators is significant because it brought attention to what is an emerging area of opportunity for universities: supporting lifelong learning and ongoing professional development in multiple fields, not just education. From the point of view of schools and education systems, access to university-based professional development made visible the many ways and domains in which partnerships with universities can augment their capacity. Such engagement also made more visible within the university the value of a wider range of formative vehicles—such as short courses, skill-based training, and programs to prepare teams in organizations rather than individuals—compared with the traditional degrees on which universities have conventionally depended as the main educational mechanisms to deliver education. It is likely that, as universities pursue the opportunities of lifelong learning, they will need a greater variety of mechanisms and that exclusive reliance on degree programs would be very limiting to meet the flexibility learners will need to access programming and the variety of needs they will have throughout their careers. Additionally, because these professional development activities took place in a context of physical distancing requirements, many of them were carried out remotely, in this way augmenting faculty capacity to teach online.

5. Highlight the importance of attention to socio-emotional support for students

As they developed collaborations with schools and education systems, universities did more than provide resources and supports for teaching remotely; they helped educators reprioritize the curriculum and, in particular, give greater attention to educational needs that the pandemic made more salient. One of those needs was emotional support for students, a need not consistently addressed by schools previously, but made more relevant by the stress and anxiety the pandemic caused among students and their families.

This area was prioritized by the Pontifical Catholic University of Chile as it assisted the Ministry of Education in rebalancing the curriculum.

In Tsinghua University, China, emotional support was also the focus of online learning camps delivered by the university.

Similarly, in Spain, the Camilo José Cela University developed and disseminated digital learning assets to support socio-emotional well-being. In Turkey, Bahçeşehir University did the same thing, focusing on supporting resilience and the mitigation of stress and anxiety for students and parents through digital learning resources and webinars.

In Vietnam, the Education University also supported the mental health needs of students through digital resources developed specifically during the pandemic.

The contribution of universities to reprioritizing curriculums and attending to the socio-emotional well-being and development of students is important in three ways: First, it reframes the conversation about the purposes of schools, underscoring the

importance of socio-emotional well-being in educating the whole child. Second, it inserts the university in the conversation of the precollegiate curriculum, a potentially important game-changer for education systems, if it is sustained beyond the pandemic. Third, this interest in the education of the whole child at the precollegiate level may extend into an interest in the education of the whole person at the university level which might in turn translate into efforts to make the education of university students more relevant to the world they will inhabit.

6. Organizational learning and innovation

The engagement of the university in collaborations with schools for the purpose of sustaining educational opportunities represented an opportunity for rapid innovation. In all featured cases, as discussed at the outset of this concluding chapter, the contributions of the university reflected some form of educational innovation. In addition, in some cases, these innovations seem to have generated distinct opportunities for organizational learning within the university, helping it reframe preexisting work or the relationships between work carried out in distinct units in the university. For example, at PUC Chile, the engagements of its school of education with schools strengthened a conversation on the relationship of faculty research with practice. This conversation spotlighted the importance for the school of education to be deeply connected to practice and the importance of developing an intentional focus on low-income students. In his remarks in one of the webinars arranged by the university, the president emphasized the value of understanding the dialogue between universities and schools as a two-way dialogue that could build durable ties, which would contribute to the improvement of education.

At the Universidad de Chile, the use of online modalities to sustain an improvement network to prevent student dropout led to a significant redesign of the theory of action of this activity within the university as a result of using online tools, with greater emphasis on the collaborative nature of the relationship and on the importance of creating participatory processes to design the improvement efforts, relying on technological tools.

At the Tecnologico de Monterrey, a Mexican university with extensive experience in online learning, the pandemic provided the opportunity to rapidly deploy a model of flexible and digital learning, which was adopted at the university and secondary school level. The university is monitoring and evaluating the model and conceptualizing the lessons learned, for the purpose of advancing institutional knowledge about digital instruction. This is one of the clearest examples of institutional learning resulting from collaboration.

In New Zealand, Massey University's modification of a research project on mathematics education with indigenous communities—investigating how to adapt an asset-based and culturally affirming approach to mathematics education as students learned from home—generated valuable conceptual knowledge in addition to that which resulted from an ongoing research project.

At Arizona State University, an innovation to help teacher candidates develop online lessons during the pandemic enhanced interest at the school of education in preparing teacher candidates effectively for online instruction. The pandemic also

accelerated the university's work on the Next Education Workforce Initiative, an effort to redesign the teaching profession to be more collaborative, integrating individuals in various roles. The university has accelerated the development of microcourses which can support various adults who are not certified teachers but can support student learning.

MIT's collaboration with schools and students at the precollegiate level during the pandemic resulted in the development and evaluation of an online project-based set of modules that reflected MIT's educational philosophy of learning from action.

In addition to these documented learnings resulting from these collaborations, other learnings are likely to have resulted, including learning to carry out most of this work and to teach using online platforms and technology, learning new ways to democratize access to knowledge for the larger community, and learning to collaborate across silos in the university for the purpose of addressing social challenges. Most significantly, these engagements provided many in the university community with an opportunity to learn to collaborate in order to tackle "super wicked problems."

These examples demonstrate how engagement in outreach to schools during the pandemic helped the university refine its approaches to research and teaching in ways that will likely have durable effects beyond the pandemic. They underscore how service to schools during the pandemic provided the university the benefit of synergies across activities in the areas of outreach, research, and teaching.

7. Innovations in teaching: Engaging university students in these collaborations with schools

Some of the universities saw in their collaborations with schools an opportunity to educate their own students. As the pandemic will remain a significant memory for students throughout their lives, providing them opportunities to engage in efforts to mitigate the losses it has caused is in itself a valuable lesson in civic engagement and leadership. In stepping up to be of service to schools, university students have likely also gained a range of important competencies that will serve them well as they participate civically and economically in a world in flux.

For example, Tsinghua University in China created a blended learning community, engaging precollegiate and college students in programs of online learning that foster intergenerational learning.

As part of the efforts supported by the Qatar Foundation, Georgetown University's campus in Education City, in Qatar, created several programs, which were implemented by Georgetown students, to support precollegiate students.

In Spain, the Camilo Jose Cela University engaged students in the university as teaching assistants for students in the school network part of SEK.

In Turkey, Bahçeşehir University engaged graduate students in supporting schools that are part of the Bahçeşehir network in providing support for the emotional well-being of students.

Arizona State University engaged teacher candidates in a program where they developed and delivered online instruction in local schools.

MIT engaged undergraduates as facilitators of a new online project-based course for precollegiate students.

These examples illustrate also the synergies that the pandemic enabled between outreach and teaching. In opening their doors to the world and in building bridges to schools, universities provided their own students with opportunities to learn problem-solving, adaptation, service, leadership, resiliency, and above all the capacity and disposition to be upstanders rather than passive spectators in the face of human suffering and social need.

22.3 What Type of Innovation Did These Collaborations Motivate?

Innovation requires new ideas, but it is more than ideation. It involves the creation of value for the purpose of solving problems or meeting unmet needs. It has been defined as "the successful implementation of creative ideas within an organization" (Amabile et al., 1996). Innovations can vary by degree: incremental, evolutionary, and revolutionary (Brown, 2009, 162–164). An incremental innovation involves the gradual improvement of a process or product, for example, as a result of improving efficiency. Evolutionary innovation involves extending offerings for existing customers as well as finding new customers for existing offerings. Revolutionary innovations create new offerings for new customers (Matthews & Brueggeman, 2015, 31–33).

Innovations can also vary by type: products, experience, solutions, systems, process, business model, and managerial (Ibid, 35).

The innovations created by the universities to support schools that were examined in this book consisted of products (knowledge briefs for policy makers or for the public), solutions (technological platforms to deliver content or to teach), processes (programs of professional development for teachers or experiences of service learning for students), and managerial (collaboration between two preexisting programs or administrative units).

In terms of degree, some are incremental innovations (improvement in existing products or processes for existing customers), evolutionary (extending existing products to new customers or creating new products for existing customers), or revolutionary (serving new customers with new products). We will examine the innovation matrix (innovation type by degree) for each of the seven innovations generated by these collaborations and described in the previous section.

22.3.1 Research-Based Knowledge and Conducting Research and Analysis to Support Decision-Makers in Formulating Strategies of Educational Continuity

22.3.1.1 Evolutionary Product Innovation (New Product, Same Customer)

The dissemination of knowledge and resources to support emotional well-being during the pandemic to students in the schools affiliated with the network of Bahçeşehir University in Turkey is an example of creating a new product for an existing customer and as such of evolutionary product innovation.

22.3.1.2 Revolutionary Product Innovation (New Product, New Customer)

Many of the collaborations examined in the book involve the creation of a new product (knowledge briefs) for new customers and as such of revolutionary product innovation. For instance, the convenings to share knowledge with decision-makers organized by the Getulio Vargas Foundation in Brazil—since the foundation also supported them in analysis as well as knowledge-sharing—that activity blends into a solution, illustrating that the collaborations can span several categories in the innovation matrix.

A similar activity was performed by the Higher School of Economics in Russia as they disseminated research to inform policies of education continuity at various levels of government.

The Qatar Foundation's global convenings to take stock of the needs created by the pandemic and to facilitate the rapid exchange of knowledge that would support educational continuity is another example of a new product, new customer; hence, revolutionary product innovation.

22.3.1.3 Revolutionary Solution Innovation (New Solution, New Customer)

The guidance offered to the Ministry of Education to reprioritize the curriculum by the Pontifical Catholic University of Chile (PUC) is an example of a solution innovation; since the solution is new as well as the customer, this is an example of revolutionary solution innovation.

A similar example was Keio University's assistance to the local government and to the Ministry of Education to guide regulations regarding internet connections allowed in schools.

22.3.2   Advancing Knowledge Based on Research in Schools in the Context of the Pandemic

22.3.2.1   Incremental Process (Same Process, Same Customer)

The pivot of the two research projects at the Institute of Education at the University of Lisbon to an online environment and a similar pivot at Massey University in New Zealand illustrate an incremental improvement in a process to serve the same customers.

22.3.2.2   Revolutionary Process Improvement (New Process, New Customer)

The development of new research agendas on educational inequality and digital transformation by the Higher School of Economics in Russia is an example of a new process and new customer resulting from the collaboration.

22.3.3   Provision of Instructional and Technological Resources and Online Platforms for Students and Teachers, Including Efforts to Improve Connectivity

22.3.3.1   Evolutionary Solution (Same Solution, New Customer)

Dissemination of online education resources developed by Getulio Vargas Foundation in Brazil for its virtual school illustrates finding new customers for an existing solution.

A similar type of incremental solution innovation is the provision of internet connectivity and resources by the University of Chile to marginalized Chilean regions.

A similar incremental solution was provided by Tsinghua University in extending access to existing online courses for elementary and secondary students.

22.3.3.2   Revolutionary Solutions (New Solution, New Customer)

EAFIT's assistance to the Ministry of Education in Colombia and to 96 secretaries of education in developing a strategy for educational continuity and providing professional development to principals and teachers illustrates new solutions for new customers.

22.3.3.3 Incremental Process Innovation (Same Process, Same Customer)

Several universities created online versions of existing programs to serve their own students, illustrating incremental process innovation. These incremental process innovations include the Autonomous University of Puebla (BUAP) pivot of their residential entrepreneurship education program to an online modality to serve their own high school and college students. Also, Arizona State University's offered online instruction for students in the schools it operates—face-to-face and online, another example of incremental process innovation. Similarly, the Massachusetts Institute of Technology pivoted to an online format to deliver its programs for pre-collegiate students.

In Spain, Camilo Jose Cela University's reliance on digital resources to support students and parents of the institution during the pandemic, as well as to support various marginalized groups, including refugees, is also an example of incremental process innovation.

22.3.3.4 Revolutionary Process Innovation (New Process, New Customer)

When the new process involves reaching new customers, this defines revolutionary process innovation. Examples include Arizona State University offering online college courses to high school students over the summer and online instruction for teachers to help them develop skills in teaching online, as well as developing new resources for students, families, and schools.

Similarly, the online instructions developed by The Higher School of Economics in Russia for high school students, including to help them prepare for exams, illustrate new processes for new customers.

22.3.3.5 Revolutionary Product Innovation (New Product, New Customer)

A prototypical example is Al Akhawayn University's development of online resources for teaching middle school math and science which were eventually transferred to the Ministry of Education servers, hence reaching impact at scale. Another example of new product and new customer innovation is the tools to assist remote instruction developed by the Qatar Foundation for schools in Qatar.

In the same category are Vietnam Education University's digital resources to develop teacher capacity to support students' mental health.

22.3.4 Professional Development to Teachers, Education Administrators, and Parents

22.3.4.1 Revolutionary Product Innovation (New Product, New Customer)

Most of the universities engaged in some form of dissemination of information to educate the public, such as the case of the Pontifical Universidad Catolica in Chile or Tsinghua University in China.

22.3.4.2 Incremental Process (Same Process, Same Customer)

A number of existing processes of professional development pivoted to an online format, creating incremental improvements to existing processes to serve the same customers of the universities, usually schools with preexisting partnerships with the universities, such as the action-research projects at the University of Chile, in the Institute of Education of Lisbon, or in Massey University in New Zealand.

22.3.4.3 Evolutionary Process Innovation (New Process, Same Customer)

These include the efforts to offer a new process to existing customers. For instance, the novel professional development provided by Symbiosis University in India to the teachers in the network. Or the professional development BUAP in Mexico provided to faculty to migrate a residential entrepreneurship education program to an online environment; since one of the goals was to also scale the reach of the program, this is also an example of revolutionary process innovation in that it seeks to serve new customers.

Similar examples include the University of Guadalajara's provision of professional development to faculty in the university and in the high schools that are part of the university, as well as the Flexible Digital Model for Instruction that was developed by the Instituto Tecnologico de Monterrey and is used to help high schools that are part of the institution pivot online.

Similarly, professional development on the use of technology offered by Bahçeşehir University to school principals in the schools affiliated with the network is an example of evolutionary process innovation.

22.3.4.4 Revolutionary Process Innovation (New process, New Customer)

Beyond the dissemination of knowledge, universities engaged directly in ongoing efforts to develop capacities; for instance, the PUC in Chile supported teachers in low-income communities. In Colombia, EAFIT provided professional development to teachers and principals to teach remotely in 96 municipalities. Other examples

include the Qatar Foundation's professional development for teachers from all schools in the country and the professional development offered to teachers and parents by the HSE in Russia.

22.3.5   Highlight the Importance of Attention to Socio-emotional support for students

22.3.5.1   Revolutionary Solution Innovation (New Solution, New Customer)

All examples of this type of innovation involved creating new solutions to reach new customers. Among them are the assistance the Pontifical Catholic University of Chile provided the Ministry of Education in rebalancing the curriculum, the online learning camps delivered by Tsinghua University, the digital learning assets developed and disseminated by the Camilo José Cela University, and the resources and webinars developed by Bahçeşehir University and by the Education University in Vietnam.

22.3.6   Organizational Learning and Innovation

22.3.6.1   Revolutionary Managerial Improvement (New Managerial Practice, New Customer)

In Chile at PUC, the engagement of the school of education catalyzed a reexamination of the relationship of faculty research with practice. At the Universidad de Chile, the theory of action of an action research project to prevent school dropout was significantly revamped once online modalities were used to engage with the school improvement network.

22.3.6.2   Evolutionary Process (New Process, Same Customer)

The rapid deployment of the model of flexible and digital learning to secondary schools at the Instituto Tecnologico de Monterrey provided opportunities to advance institutional knowledge about digital instruction, creating a new process of instruction.

The pivot to online research on mathematics education among indigenous communities in Massey University generated significant conceptual knowledge on how to teach mathematics drawing on the knowledge funds of those communities, the foundation of new processes to serve those students.

At Arizona State University, an innovation to help teacher candidates develop online lessons during the pandemic enhanced interest in the school of education in

preparing teacher candidates effectively for online instruction, in effect creating a new process of teacher preparation.

MIT's collaboration with schools and students at the precollegiate level during the pandemic allowed them to develop and evaluate an online project-based set of modules, a new format to advance a preexisting pedagogy.

22.3.7   Innovations in Teaching: Engaging University Students in These Collaborations with Schools

22.3.7.1   Evolutionary Process (New Process, Same Customer)

A few universities constructed opportunities to engage their own students in their collaborations with schools during the pandemic, in this way improving the instructional process for their students; for instance, in Georgetown University's campus in Education City in Qatar, Camilo Jose Cela University in Spain, and Bahçeşehir University in Turkey, university students participated in the activities to support schools. Arizona State University did the same with teacher candidates. Tsinghua University in China created a blended learning community engaging precollegiate and college students in programs of online learning, and MIT engaged undergraduates as facilitators of a new online project-based course for precollegiate students.

It is worth noting that universities engineered the design and delivery of these innovations in a context of augmented constraints, not just financial but also the constraints resulting from physical distancing requirements. That meant that new delivery systems had to be used to deliver value to schools and communities. For example, to share knowledge with educators, parents, or decision-makers, universities depended largely on technology platforms rather than on more conventional means of communication that requires gathering in a conference hall or meeting room. Such innovation in the means of delivery has the potential to eventually lead to disruptive innovation; for example, in learning to use online platforms to share knowledge, universities realized the wider reach and inclusivity of such platforms. Such learning has considerable potential to influence future university knowledge dissemination activities, not just those focused on outreach to schools.

22.4   Which Processes Supported These Innovations?

The following three processes supported these collaborations and were in turn reinforced by them:

1. University Mission and Strategy

   In most cases, the collaborations with schools were aligned with the university's mission or strategy, which valued engagement with and impact with the community. This could be a key factor contributing to the most visible engagement shown by the universities sharing their experiences on this book.

For instance, in Brazil, the Getulio Vargas Foundation had established two centers focused on basic education as a result of seeing itself as an engine of innovation in Brazilian society.

In Chile, the participation of the University of Chile and of the Pontifical Catholic University in the social roundtable which the government established to provide policy guidance for the pandemic provided the framework to support the engagement of the schools of education in various collaborations with schools and also the collaboration between both universities.

In addition, the mission of the Pontifical Catholic University includes contributing to the improvement in the quality of life of those in the communities of which it is a part. This mission had led the school of education to develop a strong interest in their own impact on practice.

In Colombia, EAFIT's mission explicitly supports activities that contribute to national development.

In Mexico, the strategy of the Autonomous University of Puebla emphasizes social impact.

The mission of the Institute of Education at the University of Lisbon includes expanding and deepening collaborations with the education system and contributing to the improvement of education and to supporting public policies through research, education, and outreach.

Russia's Higher School of Economics' overall strategy to support evidence-based decision-making supported the university's involvement in research on education during the pandemic.

Bahçeşehir University's mission includes contributing to addressing the needs of the community in Turkey.

Arizona State University's vision includes taking responsibility for the economic, social, cultural, and overall health of the communities it serves and embracing delivery of instruction in many modalities, which provided the strategic support to extend already deep collaborations with schools during the pandemic.

In Vietnam, the Education University has a mission that includes enhancing general education through training and research, which provided the institutional backbone to the national initiative to support the mental health and socio-emotional development of students during the pandemic.

As these examples illustrate, university engagement with schools did not happen in a vacuum—it was enabled and supported by clear institutional priorities that valued such engagement and by leadership that provided the necessary supports for that engagement. In that sense, the pandemic was not a disruptor of the mission of the university, but rather an occasion to enact values and aspirations already reflected in the mission, perhaps making the significance of those values more visible to internal and external stakeholders of the university.

2. Collaboration and Institutional Integration

The engagement of the university with schools and school systems both depended upon and stimulated collaboration across various units within the university and between the university and other entities. This was very clearly the case for the

schools that were part of the same institution as a university, such as the Universidad de Guadalajara, Monterrey Tec in Mexico, Camilo Jose Cela University in Spain, or Bahçeşehir University in Turkey, in which the pandemic created the occasion for further integration of entities that were already part of the same institution.

At the Universidad de Guadalajara, the strategy to develop faculty capacity for online learning jointly for university and high school faculty supported greater integration across these two levels, a preexisting structural challenge which had proven difficult to tackle. Similar effects took place at the Universidad Camilo Jose Cela, in which engagement of university students with the schools that were part of the same educational institution as the university furthered collaboration across teachers in the network and university faculty members.

These collaborations were not just intra-institutional but inter-institutional as well. In Chile, the pandemic created the occasion for the University of Chile and the Pontifical Catholic University to strengthen collaborations both with education authorities and among themselves.

Similar institutional integration in response to the pandemic and as a way to more effectively collaborate with schools was observed in other cases. For example, in the Getulio Vargas Foundation, the various units that engaged with schools began to collaborate more intentionally in the context of the pandemic.

In Morocco, Al Akhawayn University's collaborations with foundations and other nongovernmental organizations allowed it to distribute laptops to students during the pandemic to support their education remotely.

The survey administered to 101 universities confirms that most respondents saw collaborations during the pandemic as opportunities to integrate and create synergies among preexisting collaborations involving various units in the university. In this way, the response to the pandemic created an opportunity for greater intra-institutional integration.

3. Structures and Preexisting Collaborations with Schools

These collaborations were enabled by and further developed the structures that facilitated them. Several of the universities developed networks with schools for collaboration, such as was the case in the University of Chile, the Pontifical Catholic University of Chile, Massey University, and the University of Lisbon. In other cases, the university was already part of an institution that included a network of schools or a network of schools was a part of the university. Preexisting collaborations with schools proved very valuable because they had already developed the structures that made possible the kind of rapid collaboration that the cases illustrate.

The Qatar Foundation had built partnerships with schools prior to the pandemic, all partner universities had outreach programs to schools prior to the pandemic, and the foundation signed an MoU with the Ministry of Education in 2019 for collaboration in a number of areas including teacher professional development. Once the pandemic broke out, the foundation was able to leverage this network to offer support during the pandemic and offer support to over 1,000 teachers.

A number of the private universities we studied, such as Al Akhawayn University in Morocco, drew from their private status the structural flexibility to establish partnerships that funded the outreach activities.

Most of these collaborations built on preexisting partnerships but often extended them to include other schools and scale their reach. In Brazil, the Getulio Vargas Foundation had a number of partnerships with municipal secretaries of education, on which the work to advise them in the development of education continuity strategies during the pandemic was built.

In Chile, the University of Chile had a prior public-private partnership with a foundation and an education authority serving low-income students to improve high school completion for those students and to prevent dropout, and it was this collaboration with the district that was transformed to provide such support during the pandemic.

The Institute of Education at the University of Lisbon also had preexisting partnerships with school networks that were adapted to continue to research during the pandemic.

Tsinghua University in China had a number of programs engaging precollegiate students, and their efforts during the pandemic first took those programs online and in some cases opened participation to other students.

In the Higher School of Economics in Russia, the collaboration with schools also built and expanded on preexisting partnerships.

EAFIT in Colombia had a long-standing preexisting relationship with the Ministry of Education, dating back to the creation of the Ministry's education portal, which included some education resources. The Ministry's strategy consisted first of repurposing that portal to serve as the platform to support teachers, students, and parents in teaching and learning remotely, and EAFIT was a lead partner in this effort.

A number of these collaborations involved universities with schools that were part of the same institution as the university or with schools which were part of the same university. In those cases, preexisting collaborations and institutionalized structures facilitated the collaborations. This was the case for Tsinghua University, Arizona State University, Symbiosis International University, Bahçeşehir University, and Camilo Jose Cela University.

The survey administered to 101 universities confirms that most of them see collaborations with schools as part of their mission and already had a number of collaborations with schools prior to the pandemic, administered—most of them—by an institute or a school of education. About two-thirds of the survey respondents reported that their senior leaders had sought out schools and school systems to offer support, and most of them had developed collaborations with schools during the pandemic. The majority of those collaborations built on preexisting relationships with those schools.

22.5   Conclusion

This cross-national research effort shows that, for the universities included in our study, the high impact disruptions in the external environment caused by the pandemic provided an opportunity to generate educational innovation which contributed to sustaining educational opportunity in schools and school systems. The study also shows that the innovations, generated in this disruptive context, speak to the nature of the university as an entrepreneurial and socially embedded learning organization. The case studies provide some evidence that the processes which supported these innovations, all of them crucial to sustaining a learning organization (a strategy oriented to the external environment, collaboration and internal integration and structures and preexisting collaborations), were enhanced as a result of participating in these collaborations.

These collaborations fed back in particular into the research function of the university, redirecting existing or novel research efforts towards themes made salient by the pandemic: the importance of learning a breadth of skills, the importance of attending to school inequality, or the role of digital learning. There was some feedback from this community outreach into the teaching function of the university, but this appears to have been more modest. Only a few of the universities examined in this book, such as Arizona State University and the Camilo Jose Cela University, translated their collaborations into new teaching opportunities for their students or into knowledge that transformed the way in which they approached teaching for their own students.

The collaborations universities developed with schools during the pandemic did influence views on what students should learn in schools, emphasizing in particular the importance of emotional well-being, but did not seem to have had broader impact in influencing the agenda of what competencies and skills students should learn in school, a timely topic on the agenda of a number of governments. In most cases, these collaborations also appear to not have influenced views on what university students should learn.

The collaborations created multiple learning opportunities for the faculty and staff directly involved in them, causing some faculty to reorient their research interests or develop novel interests as a result of the strengthened communications with schools.

The collaborations depended on and reinforced collaboration, team learning, a culture of experimentation and innovation, and new forms of rapid exchange of information resulting from intra- and inter-institutional collaboration.

The survey administered to 101 universities indicates that the strategy guiding these efforts is incipient, as only a third of the respondents indicated that these collaborations were guided by a clear theory of action, while an additional third of respondents indicates that such theory of action is "emerging."

This study provided a snapshot of how a group of universities around the world responded to a major global disruption. Our study examines such response narrowly, looking at how universities collaborated with precollegiate educational

institutions in the immediate aftermath of the pandemic. The results confirm that universities are learning organizations that consider outreach to society to be an important aspect to their mission. In so doing, they also change themselves, in ways that deepen their capacity to not just respond to emerging social needs but to imagine and build a better future.

It is clearly too early to tell whether the disruptions caused by the pandemic will result in an enduring transformation of education systems, or of the universities, and whether these emerging collaborations will be sustained and deepened as the effects of the pandemic unfold. If the innovations created to sustain educational opportunity during the pandemic end up anticipating a reimagined education system, sustained by more robust networks where schools and universities collaborate, and if the engagement of universities in the enterprise is sustained and deepened, the responses of universities to the pandemic will have reshaped the larger teaching and learning ecosystem and will have in indeed contributed to "building back better."

Perhaps the efforts documented in these case studies are the incipient signs of such commitment of the university to transforming educational opportunity broadly. Should these efforts evolve into robust partnerships with schools and other learning institutions to supporting learning in many ways and throughout the lifespan, making greater commitments to contributing to "build back better," this might be good not just for universities and for schools but, even more importantly, for human flourishing in the communities in which the universities are located at a time when the looming challenges and fractures caused by the pandemic make such leadership indispensable.

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Fernando M. Reimers is the Ford Foundation Professor of the Practice of International Education and Director of the Global Education Innovation Initiative and of the International Education Policy Masters Program at the Harvard Graduate School of Education. An expert in the field of global education, his research and teaching focus on understanding how to educate children and youth so they can thrive in the twenty-first century. He is a member of UNESCO's high-level commission on the Futures of Education.

He has written or edited forty academic books and, since the onset of the COVID-19 pandemic steered the Global Education Innovation Initiative to carry out research that can sustain educational opportunity or contribute to building back better. With his graduate students, he has developed three curriculum resources aligned with the UN Sustainable Development Goals, which are translated into multiple languages and widely used by schools and school systems around the world.

Francisco Marmolejo is Higher Education President at Qatar Foundation (QF), where he leads QF's support and coordination activities to the unique ecosystem of eight prestigious universities offering in Education City in Doha, Qatar, more than 70 undergraduate and graduate programs to students from 60 countries. Previously (2012–2020), he worked at the World Bank, where he served as the Global Higher Education Coordinator, based in Washington, DC, and more recently as Lead Higher Education Specialist for India and South Asia, based in New Delhi. From 1995 to 2012, he served as founding Executive Director of the Consortium for North American Higher Education Collaboration, a network of more than 160 universities mainly from Canada, USA, and Mexico, based at the University of Arizona, where he also worked as Assistant Vice President, Affiliated Researcher at the Center for the Study of Higher Education, and Affiliate Faculty at the Center for Latin American Studies. Previously, he has been American Council on Education Fellow at the University of Massachusetts, Academic Vice-President of the University of the Americas in Mexico, and International Consultant at OECD in Paris. He has received honorary doctorate degrees from his alma mater, the University of San Luis Potosi, and the University of Guadalajara in Mexico.