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# Empowering Teachers to Build a Better World

## How Six Nations Support Teachers for 21st Century Education

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# Editor and Contributors

## About the Editor

**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 Harvard University. Being 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.

Recent books include Teaching and Learning for the twentyfirst Century, Preparing Teachers to Educate Whole Students: An International Comparative Study, Letters to a New Minister of Education, Learning to Improve the World, Empowering Global Citizens, Empowering Students to Improve the World in Sixty Lessons. Version 1.0, Learning to Collaborate for the Global Common Good, Fifteen Letters on Education in Singapore, Empowering All Students at Scale, and One Student at a Time. Leading the Global Education Movement.

He serves on the Massachusetts Board of Higher Education, where he chairs the strategic planning committee, and serves on the board of directors of multiple education organizations, including Facing History and Ourselves, Teach for All, World Teach.

In 2019, he received a Centennial Medal from the International Institute of Education for his work advancing international education. In 2017, he received the Global Citizen Award from the Committee on Teaching about the United Nations for his work advancing global citizenship education. In 2015, he was appointed the C. J. Koh Visiting Professor of Education at the National Institute of Education in Singapore in recognition of his work in global education. He received an honorary

doctorate from Emerson College for his work advancing human rights education. He is a fellow of the International Academy of Education and a member of the Council of Foreign Relations.

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# Chapter 1
# Building Teacher Capacity to Educate the Whole Child. Lessons from Comparative Experience


**Fernando M. Reimers**

**Abstract** How should teachers be prepared in order to educate their students to address the most pressing issues of the future? Conducted over the years 2018–2019, this book presents the results of a study of large-scale teacher professional development programs that aimed at equipping students for the uncharted territory of a rapidly changing world. This introductory chapter traces the roots of the impetus to educate students holistically, helping them develop a broad range of cognitive and socio-emotional skills. The chapter explains the value of comparative analysis to advance a robust theory of the role of professional development in instructional improvement which can guide implementation of large scale programs, and introduces a staged model of development of education systems, contingent on the level of skill and preparation of teachers and summarizes the key contributions of the chapters in this book. The chapter reviews previous research on the role of large-scale teacher professional development in preparing teachers to lead their students in deeper learning and in developing a broad range of cognitive and socio-emotional skills. Given that much of that research has been generated in highly resourced environments, a staged model of development of education systems contingent on level of teacher preparation justifies attention to the role of professional development in more diverse contexts. The chapter further examines some literature on the implementation of large-scale educational change, setting the stage for a comparative study of large-scale programs of teacher professional development. The chapter examines data from a recent cross-national survey of teachers to discuss their expressed needs for professional development and perceptions of the characteristics of the most effective professional development programs. Finally, the chapter synthesizes the findings of this study and draws out their implications for teacher development in ambitious system level reforms that aim at preparing students with a broad range of skills to invent the future.

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## 1.1 Goals of This Book

As countries around the world embrace more ambitious goals for schools, in order to prepare students for the demands of a rapidly changing world and for the uncharted territory of the future, there is growing interest in the question of how best to support teachers so they can lead powerful and relevant instruction aligned with those aspirations. This book is an analysis of six large-scale efforts at building teacher capacity to lead instruction in an ambitious range of cognitive and socio-emotional domains essential for our times. These large-scale programs of teacher professional development were implemented in Cambodia, Colombia, England, India, Mexico and the United States.

The book builds on previous work of the Global Education Innovation Initiative, a research and practice consortium I lead that aims to understand how to transform public education systems so they can empower students with the competencies essential for civic and economic participation in the twenty-first century. We advance this goal through three inter-related activities that seek to create synergies between education policy, research and practice: conducting applied research, leading informed dialogues designed to develop collective leadership and developing tools which can support powerful instruction aligned with the development of the breadth of skills essential to build a better world. We have so far conducted four applied studies and a fifth theoretical study. The first study is a comparative analysis of curriculum in light of what is known about the cognitive, inter and intrapersonal competencies essential for civic and economic participation in our times (Reimers & Chung, 2016). The second is a comparative analysis of teacher professional development programs that prepare teachers to help their students gain the breadth of skills essential in our times (Reimers & Chung, 2018a). The third is a cross-national evaluation of the impact of secondary school curriculum designed to empower youth to become entrepreneurial (Reimers, Ortega, & Dyer, 2018b). The fourth study is a comparative analysis of ambitious national curriculum reforms in eight different countries (Reimers, 2020a). The fifth study develops a theoretical model to account for the multidimensional nature of educational change, used to integrate a vast empirical literature in the field of global education, explicating how change is concurrently a cultural, psychological, professional, institutional and political process (Reimers, 2020b).

The informed dialogues we have organized seek to make visible the knowledge education leaders and practitioners have gained as they advance educational change, and to integrate this knowledge with knowledge based on research and with practical instruments to further educational change for the purpose of supporting collective leadership that can align schools and school systems with the urgent need of relevance. We have published three books based on these informed dialogues. The first book is an analysis of opportunities to transform teacher education in Massachusetts, informed by a study of the way in which Singapore aligned teacher preparation with an ambitious vision for education in the twenty-first century conducted by several educators from Massachusetts (Reimers & O'Donnell, 2016). The second, an expert

report on the challenges of scaling ambitious education reforms and innovations that aims to support the development of a broad range of competencies in schools (Reimers, 2017). The third book is a study of the lessons learned by system-level leaders as they advanced ambitious national education reforms (Reimers, 2019).

Finally, we have developed a series of practical tools and curriculum protocols to support ambitious educational change that helps students gain the necessary competencies for civic and economic participation in rapidly changing contexts. These include a guide to lead a process of consensus building to establish systems that support a high-quality teaching profession (Reimers et al., 2017a), and three project-based, interdisciplinary, curriculum resources aligned with a broad range of cognitive and socio-emotional competencies necessary to achieve the United Nations Sustainable Development Goals and Universal Human Rights (Reimers, Chopra, Chung, Higdon, & O'Donnell, 2016; Reimers et al., 2017b, 2018c).

I have carried out this work in collaboration with colleagues from various countries and with varied disciplinary backgrounds. This diversity of experience and backgrounds has enriched our thinking and enhanced the relevance of the products of our work to the realities of diverse education contexts. I have included my graduate students at Harvard in some of these collaborations, for example, in the design of curriculum resources aligned with the United Nations Development goals. Not only are the graduate students education professionals, who bring with them experience in diverse countries; I believe professional preparation must bridge the worlds of research with the worlds of practice, by actively engaging graduate students with the worlds of policy and practice as part of their studies.

Conducted over the years 2018–2019, this book presents the results of a study of large-scale teacher professional development programs. The 22 authors of the six-country studies analyzed in this book are educators with professional experience in 17 countries, including the six countries studied. Their experience covers a variety of education roles, including teachers, coaches and managers in professional development organizations, consultants to schools and school districts, government officials, and education specialists in foundations, international development organizations. These six-country studies started in the context of a graduate course I teach in comparative education policy analysis. This course reflects some of the intellectual interests and research questions which also inform the Global Education Innovation Initiative. I invited my graduate students to identify national education reforms or large-scale programs aimed at helping build the capacity of teachers to prepare the students with the breadth of skills necessary for civic and economic participation in the twenty-first century. Students in this course read the first two books resulting from the applied research of the Global Education Initiative: Teaching and Learning in the Twenty First Century, and Preparing Teachers to Educate Whole Students, and used them to frame their studies. They were specifically invited to take the conclusions of our recent study of teacher professional development as hypotheses, and to test them against the case studies they themselves would conduct. We discussed their studies as they progressed, and I provided feedback to their papers analyzing their findings, which they then presented at a conference where they received additional feedback from peers and leaders in the field of international education, such as the director of

education of the World Bank, former vice-ministers of education and senior leaders of international development organizations. Further discussions and revisions to their chapters extended beyond the course, in efforts to have coherence across these chapters in this book which was completed once these students had all received their masters' degrees from Harvard.

## 1.2 Content of the Book

In the studies presented in the chapters that follow, we examined large-scale reforms which explicitly focused on building the capacity of teachers to teach to a broader set of goals, either higher levels of cognitive goals, or a breadth of cognitive and socio-emotional skills. The chapters were written from an available evidence base of program documents, evaluations (if available), as well as interviews with senior leaders and participants in the programs studied. The goal of these studies was to document carefully how these large-scale efforts of teacher education had been designed, how they were been implemented and, where the necessary information was available, with what results.

The resulting book is a comparative study of how large-scale teacher professional development programs are designed and implemented. This book does not attempt to answer the question of which of these programs is more effective than others, or even to assess whether these programs achieve their goals, but rather to illuminate how these large-scale efforts were designed, delivered in practice and with what results to date. We also examine whether these case studies confirm or disconfirm the conclusions reached in our previous study of large-scale programs of teacher professional development, and other conclusions of studies of professional development reviewed in this chapter. We hope this book will be of use to education leaders interested in designing and implementing programs of teacher professional development that are aligned with ambitious instructional goals.

In my experience working with ministers of education and other senior education leaders I have learned that it is often valuable to them to know how others have addressed problems similar to their own. This is especially crucial in the case of teacher professional development policies because, while there is a growing body of evidence supporting the importance of having skilled teachers, evidence about how to increase teachers skills, particularly at a large scale, is scarcer. This places many policymakers in the conundrum of realizing they must increase teacher quality but not necessarily knowing how to achieve this. The consequences of having to design strategies to implement large scale teacher professional development programs in the absence of knowledge can be disastrous, as will be discussed later.

For example, in 2011 the Grattan Institute, a public policy think-tank in Australia, conducted a study about the factors which contributed to the educational performance of countries in East Asia where students achieved at high levels in cross-national studies and where there was high equity in how students from different social background performed in such tests. The study identified that a key factor undergirding the high

levels of performance of those teachers was high-quality teacher initial preparation and professional support that includes mentoring, opportunities for teachers to conduct research, classroom observations and peer-feedback, and access to master teachers (Jensen, Hunter, Sonnemann, & Burns, 2012, 13). While this report describes what these high-performing systems do, it does not explain how they got to be able to do it and how the process of putting in place the supports to do these practices developed. The same limitation in understanding the process of change is evident with other studies that rely on cross-national evidence which identify high-quality teacher professional development as a correlate of high levels of students learning (Schleicher, 2018) or on synthesis of studies that identify which factors contribute to higher levels of student learning (World Bank, 2018). Knowing that countries like Singapore or cities like Shanghai provide teachers high-quality initial and ongoing professional preparation does not explain how they developed the capacity to do it or what processes they followed to get to the point at which they are at present. But it is precisely the development of such institutional and teacher capacity, via policies and programs, and especially via the design of effective implementation strategies, which is of greatest interest to the education reformer that is trying to improve a system where such supports for teachers are not yet available. A reformer in a country in need of high-quality professional development cannot just wish to be Singapore or Shanghai, they need to develop a detailed plan to carry out activities that will offer such development and the details of such plan, whether coaching will be involved, who will provide the coaching, whether professional communities and networks will be established, how, with what support; hence clarity about those details is fundamental. It is one thing to know that coaches should be selected on the basis of certain attributes such as deep knowledge and pedagogical knowledge, it is quite another to know what steps to follow to ensure mechanisms of selection that actually deliver what is intended. We hope that the analysis of the process followed by six countries as they built this capacity will contribute to filling that crucial knowledge gap regarding the process of supporting the development of teacher capacity on a large scale.

The instructional goals that guide the six programs included in this book are similar in that they all represent efforts to broaden and deepen curricular aspirations, but they differ in that each program takes this expansion of curricular goals in different directions. In the work of the Global Education Innovation Initiative we have learned that various groups use different terminologies, and different meanings, to reflect such broader education goals. In fairness, ambitious education goals for education are not exactly new. In advocating the cultivation of autonomy and the capacity for independent thinking Jean Jacques Rousseau was proposing goals for education that were as ambitious as the idea that ordinary people could govern themselves, which he and other philosophers of the enlightenment proposed in the eighteenth century (Soëtard, 1994b). Inspired by Rousseau, Johann Henrich Pestalozzi also proposed that the goal of education was to educate the full range of human capacities (Soëtard, 1994a). Similar ambitions were advanced by educators such as John Dewey or Maria Montessori in the early twentieth century (Röhrs, 1994; Westbrook, 1993). When the goal of educating all children was included in the Universal Declaration of Human Rights, in 1948, the implicit rationale was that education would help develop

a broad range of competencies, as education was expected to help advance all other human rights, a tall order indeed involving a broad range of knowledge, skills and dispositions. UNESCO, the organization established to help achieve universal education, has thrice in its history, established high-level commissions with the mandate of helping inform global conversations about how to align education to growing skill demands in a rapidly changing world. The first of those commissions produced the report "Learning to Be" which emphasized the importance of cultivating not just basic literacies, but the capacity for lifelong learning (Faure et al., 1972). The second of those commissions produced the report "Learning: the treasure within" which highlighted that in order to prepare individuals to address the challenges of the present, a broad range of competencies would be essential: learning to know, learning to do, learning to be and learning to live together (Delors et al., 1996). The third of those commissions on the Futures of Education was established at the meetings of the United Nations General Assembly in September of 2019 and is expected to produce a report by 2021.

Around the same time the Delors Report was being prepared, arguably motivated by technological and social developments and globalization, other international organizations and governments engaged in rethinking what skills and competencies would be necessary to participate in the twenty-first century, among them, the Definition and Selection of Key Competencies OECD Project. These efforts inspired changes in the curriculum in many countries, broadening their goals. A conclusion of our study of such efforts of curriculum revision in six countries was that it placed the topic of teacher professional development squarely at the center of reform efforts (Reimers & Chung, 2016).

When we started the work on the Global Education Innovation Initiative 6 years ago, we adopted the term "Twenty-first century skills" to describe the broad range of competencies necessary to participate in the twenty-first century. Our first study of curriculum goals built on a report of the National Research Council in the United States synthesizing skills for life and work in the twenty-first century as encompassing: cognitive, inter- and intrapersonal skills (Pellegrino & Hilton, 2012). Because we realized not all nations used the term twenty-first century skills to describe their efforts to broaden the curriculum, in our first study of teacher preparation programs we used the term "educating whole children". Other authors use the term "deeper learning", or cognitive and socio-emotional development, and others use breadth of skills (Jones & Doolittle, 2017; Mehta & Fine, 2019). One of the questions the studies presented in the chapters in this book answer is how does each of these reforms define these broader goals. Specifically, we examine their stated goals against the framework developed by Pellegrino and Hilton to summarize twenty-first century skills, summarized below.

1. **Cognitive Skills**

   1.1 Processing and cognitive strategies
   - Critical thinking
   - Problem-solving
   - Analysis

- Logical reasoning
- Interpretation
- Decision making
- Executive functioning

1.2 Knowledge
- Literacy and communication skills
- Active listening skills
- Knowledge of the disciplines
- Ability to use evidence and assess biases in information
- Digital literacy

1.3 Creativity
- Creativity
- Innovation

2. **Interpersonal skills**

2.1 Collaborative group skills
- Communication
- Collaboration
- Team work
- Cooperation
- Coordination
- Empathy, perspective taking
- Trust
- Service orientation
- Conflict resolution
- Negotiation

2.2 Leadership
- Leadership
- Responsibility
- Assertive communication
- Self-presentation
- Social influence

3. **Intrapersonal skills**

3.1 Intellectual openness
- Flexibility
- Adaptability
- Artistic and cultural appreciation
- Personal and social responsibility
- Intercultural competency
- Appreciation for diversity
- Adaptability
- Capacity for lifelong learning
- Intellectual interest and curiosity

3.2 Work Ethic. Responsibility

- Initiative
- Self-direction
- Responsibility
- Perseverance
- Productivity
- Persistence
- Self-regulation
- Meta-cognitive skills, anticipate future, reflexive skills
- Professionalism
- Ethics
- Integrity
- Citizenship
- Work orientation

3.3 Self-efficacy

- Self-regulation (self-monitoring and self-assessment)
- Physical and mental health

Whereas our previous study of teacher professional development focused on programs most of which were led by organizations of civil society, the six programs examined in this book are government programs advanced by national or state governments. Some have been developed with the aim of supporting a significant number of teachers in the national education system, while others are more targeted programs focused on networks of schools, or schools serving particular groups of students. We find interesting complementarities between the strategies followed by these two kinds of programs, and think that the design of future large-scale government programs might benefit from combining the implementation of these strategies and practices. The national programs include a program to improve mathematics instruction in England, a national program to improve the quality of instruction in rural schools in Colombia and a national program of teacher professional development to support the implementation of an ambitious education reform in Mexico. The programs of professional development in networks of schools include one in a network of schools serving marginalized students in the state of Telangana in India, one in a network of innovative schools in Cambodia and one in Burlington, a small school district in the United States. The specific focus of these programs is summarized below.

The chapter "Supporting mathematics instruction for mastery in England" examines an ambitious national reform aimed at providing all teachers with the pedagogical competencies to improve levels of mathematical knowledge and understanding and closing equity gaps in mathematics, beginning in 2014. Embedded within a set of broader education reforms initiated in 2010 to raise education standards, the focus of this reform is on the development of higher order math skills. The reform sought to promote more collaboration among teachers within and between schools in a context of increasing school autonomy and accountability. The reform was introduced alongside a new knowledge-based national curriculum and reformed assessments. The new primary mathematics curriculum was informed by curricula in East Asian countries, which sought to develop fluency, reasoning and problem-solving. The

teaching for mastery reform was a pedagogical reform that sought to complement the new national curriculum. It included study trips for headteachers and teachers to see schools and math teaching in Shanghai. The three core elements of the reform include a lead specialist teacher exchange program between England and Shanghai, a professional development program led by Maths Hubs and specially designed textbooks. The Maths Hubs bring math teachers in a network of 37 hubs, each lead by an outstanding school or college to develop and disseminate outstanding practice. Lead specialists in schools are trained as Mastery specialists and are then responsible for leading whole school training on the mastery approach in their school, as well as working with local teachers from other schools. The focus of the professional development activities includes strengthening teachers' subject knowledge, pedagogical knowledge of mastery teaching, practice to support student differentiation, lesson planning and assessment.

The chapter "Supporting all teachers in learning in Colombia" examines a national program of professional development (Todos a Aprender) launched in 2012 as a large-scale effort to close the urban–rural achievement gap. This program resulted from a partnership between a private education advocacy organization and the Ministry of Education. Initially, the program involved multiple interventions to support rural schools, such as in-service training, support of school management, infrastructure, nutrition and stakeholder support. Over time, the program evolved to focus exclusively on teacher professional development and classroom materials. With a teacher-centered design, and following a cascade training model, the program reaches over 100,000 teachers with 4,200 lead teachers led by 100 trainers. Teachers participating in the program engaged in four workshops a year and in follow-up coaching in their school by lead teachers. The program also created professional learning communities that provided ongoing opportunities for teachers to collaborate, reflect on their practice and develop instructional materials. Textbooks with lesson plans and suggested instructional activities became an integral component of the program, facilitating teacher collaboration and communication.

The chapter "Policies for Teacher Professionalization in Mexico's Education Reform" examines the role of professional development programs in the context of an ambitious education reform which revamped the curriculum to align it with twenty-first century skills. The reform created a new education model, which encompassed five core elements: (1) schools at the center, (2) standards and curriculum, (3) teacher professional development, (4) inclusion and equity, and (5) governance. The reform included increased accountability for teachers, principals and students, and catalyzed greater governmental control in education. The reform created a professional teaching service law designed to professionalize teacher selection and advancement. The National Institute of Educational Evaluation, which received constitutional autonomy under the reform, was tasked with devising an evaluation framework to evaluate principals, teachers and students. Professional development contemplated the creation of networks within and among schools to promote the exchange of best practices. Online training and lectures reached the most teachers. The teacher networks for peer-to-peer exchange of experience allowed teachers to reflect on their practice. However, the supervisory component of this initiative was not well-received

by teachers and did not reflect the goals of the curriculum and did not yield specific instructional plans reflecting the goals of the curriculum.

The chapter "Building teacher capacity at the Telangana Social Welfare Residential Educational Institution Society" examines a school network established in 1984 to provide free, residential, high-quality education to low-income students from scheduled castes and tribes in the state of Telangana, in India. The program received significant political support in 2014, growing as a result to cover 268 schools and colleges and serving 130,000 students. The schools aim to provide a high-quality, holistic, value-based education to students, cultivating skills for work and life. A coherent curriculum framework guides their efforts, supported by a range of programs to build the professional capacities of teachers and administrators, including pre-service and in-service teacher education programs, as well as professional development programs for school leaders. The core form of teacher professional development consists of periodic meetings throughout the year that bring school leaders and teachers together to discuss the ongoing instructional challenges. In addition, support from external providers of professional development assists teachers in developing knowledge and pedagogical knowledge.

The chapter "Cambodia's New Generation Schools Reform" examines a targeted reform launched by the Ministry of Education in 2015, which provides a unique combination of autonomy, accountability and funding to ten "New Generation Schools" tasked with innovating in curriculum and instruction to prepare students for the twenty-first century workforce. Expected to reach 100 schools by 2022, the reform is one of the 15 initiatives of the Cambodian National Education Strategic Plan. This program is anchored in a theory that the creation of a system and culture of high teacher professionalism and high-quality professional development will support innovative teaching and learning. The program includes an innovative and selective initial teacher education program focusing on academic leadership, professional ethics, mentoring and twenty-first century skills. Additionally, New Generation School teachers receive ongoing professional development through the Formative Teacher Support System, which is centered on the practice of reflective teaching, where teachers reflect on their practice individually and in collaboration with colleagues and experienced mentors. The Formative Support System encompasses a range of modalities of teacher professional development: visits to other schools and other countries, professional learning communities, career path planning, individual feedback, classroom observations and ongoing in-service training.

The chapter "Twenty first century learning in Burlington Public Schools" examines how a high-performing school district in the State of Massachusetts, in the United States, promotes curricular and instructional innovation fostering a culture of collaboration, trust and professionalism. Burlington's strategy is anchored in building a collaborative and participatory culture in the six schools in the district, promoting instructional coherence and alignment around a balanced set of education goals that include cognitive skills as well as socio-emotional competencies, and in building trusting relationships among all key stakeholders in the school. Relying on a participatory process to define district goals, Burlington engages all key stakeholders (students, parents, teachers, staff, administrators and school board members) to develop

3-year improvement plans with agreed upon goals and with strategies to build the capacity necessary to achieve those goals. The district uses periodic assessment of the intended outcomes as a way to manage the improvement process. Scheduled staff meetings and specific training develop the capacities of teachers to support socio-emotional learning and the cognitive goals of the district. Professional development opportunities include a wide range of approaches, from formal staff meetings, observing classroom instruction, reviewing assessment data and discussing improvement strategies, receiving feedback from coaches in specific subjects, as well as working collaboratively with colleagues. As a result of these efforts, schools in the district offer a range of curricular and extra-curricular opportunities for students to master academic competencies, develop socio-emotional skills and engage in service-learning projects. Central to these efforts is the role of district leadership in supporting a coherent and collaborative culture of ongoing improvement.

## 1.3 The Value of Comparative Analysis to Understand How Professional Development Improves Instruction

The importance of teacher quality has long been understood. As an intentional process designed to support learning, it stands to reason that the effectiveness of this process is the result of the knowledge and skill of those guiding it. One of the persons who exerted most influence in placing the topic of teacher education on the agenda of governments and international development institutions in the 1960s was Clarence Beeby. As New Zealand's director of education and chief education advisor to the government between 1940 and 1960, Beeby led one of the most ambitious education reforms to equalize educational opportunity, well before this goal would be embraced by other nations in the 1960s (Beeby, 1992). In that role, Beeby discovered the importance of teacher professional development to transform policy intentions into changed classroom practices. He distilled those lessons in the book "The Quality of Education in Developing Countries", which he wrote at Harvard University, where he spent several years in the early 1960s (Beeby, 1966). Beeby's ideas exerted great influence in the international development community through his leading role in the executive board of UNESCO and in the early years of UNESCO's International Institute for Educational Planning.

Beeby theorized that the quality of education in a nation developed through a series of four stages, and that each stage was defined by the level of professionalism of teachers. The first stage, which he called "the Dame school", had teachers which were largely untrained and poorly educated. The second stage, which he termed "Formalism", was characterized by trained teachers, but still ill-educated. The third stage, which he called "Transition", featured teachers who were trained and better educated. The fourth stage, called "Meaning", featured teachers who were well educated and well trained. These stages shaped distinct characteristics of the education systems. In the Dame school stage, education was unorganized, the focus was on very narrow

subject content, with very low standards, and memorization was the main goal. In contrast, in the stage of Meaning, the focus was on meaning and understanding of what was learned, a wider curriculum, offering more variety of content and methods, individual differences were recognized, pedagogy relied more on active learning emphasizing problem-solving and creativity, and the goals were to develop cognitive skills as well as emotional and aesthetic dispositions (Beeby, 1966, p. 72).

At a time when the primary pre-occupation of governments and international development institutions was with the quantitative expansion of education in order to achieve education for all, Beeby's ideas offered a model that gave paramount importance to quality and provided a strong rationale for teacher professional development, as an avenue to help countries move their education systems to stages where students could find more meaning in their education.

Beeby's idea that the quality of teaching was one of the most important influences on student opportunity to learn has been confirmed by subsequent research, as demonstrated in a synthesis of over 800 meta-analysis of factors influencing student achievement (Hattie, 2009). An analysis of cross-national teacher reports on professional development in 35 countries similarly demonstrates that access to high-quality professional development increases the range of instructional strategies teachers use (Barrera-Pedemonte, 2016, p. 9).

While there is a robust body of knowledge on the importance of teacher quality and about the principles and practices which are effective in helping teachers gain knowledge and skills, much of that knowledge has been generated in highly institutionalized and well-resourced contexts. It is therefore reasonable to ask whether the effectiveness of those principles and practices "transfers" to other settings. While Beeby's model assumed that the education systems in all countries should progress through the same stages, his model suggests that for countries at different stages different interventions may be appropriate to improve quality. For instance, while many authors argue that school autonomy is desirable to recognize and foster teacher professionalism, it is not self-evident that in schools where teachers are ill-educated and ill-trained, autonomy will lead to greater opportunities to learn for students, or even to greater professionalism.

We might conclude then that the focus, and perhaps even approaches, on teacher professional development should be aligned to the "stage" of an education system, to the characteristics of the majority of their teachers. For instance, in a system in which teachers have very limited knowledge of the subject matter they teach, or of the pedagogies effective in teaching it, professional development based on learning communities in schools is unlikely to yield the same results as in contexts where teachers are highly trained. The value of comparative analysis is to inform what educational approaches, to preparing teachers in this case, are most appropriate in any given context. For instance, a recent cross-national study of teachers and principals, covering mostly early industrialized countries, concludes that given that most teachers already attend training focused on knowledge, this is not an area of great need in OECD countries, instead training opportunities in information and telecommunication technology, teaching methods for multicultural settings and teaching for students with special needs are a much greater priority (OECD, 2019, p. 152). Clearly, this

conclusion regarding the low priority of knowledge-based professional development should not be extrapolated to countries where similar opportunities are not available to most teachers. While most researchers know that research findings should not be extrapolated outside the observed range of variation of the factors which they have studied, this fact is sometimes forgotten when those looking for 'good practices' draw insights from 'high performing systems' and try to generalize their validity to contexts which are quite different from the contexts of such high performers. One should think carefully about the generalizability of cross-national studies such as the OECD PISA studies, or the studies of the International Association for the Evaluation of Educational Achievement, or of research conducted on school settings in nations such as Australia, Canada, the United Kingdom or the United States, to countries where education systems are at different stages of development, in terms of Beeby's characterization of the term. It is not that those findings should be dismissed entirely, but rather that they should be treated as hypotheses, in need of further empirical confirmation. It is also helpful to keep in mind, when looking for comparative experience, that some countries have shown greater improvement over the last two decades in cross-national assessments such as PISA than others.

A review of the research on teacher professional development in developing countries identifies a shift from the traditional view of "staff development" or "in-service training" consisting of workshops or short-term courses, toward a recognition of the importance of a broad range of activities that support professional development, understood as "a long term process that includes regular opportunities and experiences planned systematically to promote growth and development in the profession" (Villegas-Reimers, 2003). This new perspective of professional development recognizes that "professional development may look and be very different in diverse settings, and even within a single setting, it can have a variety of dimensions" (Ibid., 15). This review identifies a variety of teacher professional development models which fall into two broad categories: organizational partnership models and small group or individual models. Organizational partnership models include: professional development schools, other university-school partnerships, other institutional collaborations, school networks, teacher networks and distance education. Small group or individual models include: supervision, student performance assessment, workshops and seminars, case-based study, self-directed development, cooperative development, observation of excellent practice, teachers participation in new roles, skill-development models, reflective models, project-based models, portfolios, action research, teacher narratives, cascade models and coaching (Ibid., 70).

Another review of a decade of research on teacher professional development published in the journal Teaching and Teacher education highlights the contextual nature of determining what kind of professional development is most appropriate:

> The instruments used to trigger development also depend on the objectives and needs of teachers as well as of their students. Thus, formal structures such as courses and workshops may serve some purposes, while involvement in the production of curricula, the discussion of assessment data or the sharing of strategies may serve other purposes. Not every form of professional development, even those with the greatest evidence of positive impact, is of itself relevant to all teachers (Avalos, 2011, 10).

There is a growing recognition that we need more nuanced conceptualizations to understand what constitutes quality in professional development. Desimone has proposed the following features as key: content focus on subject matter, collective participation of teachers from the same school, active learning for teachers, duration with longer programs being more effective and coherence with the goals of the education policies that support them (Desimone, 2009).

Education specialists at the World Bank have developed a conceptual framework to facilitate cross-national education comparisons and benchmarking: the Systems Approach for Better Education Results (SABER). The framework documents policies and practices in place in countries with respect to early childhood development, workforce development and tertiary education; with respect to four quality and system support domains: student assessment, teachers, information and communication technologies and school health and school feeding; and in four governance and finance areas: school finance, school autonomy and accountability, education and management information systems and engaging the private sector. For each of those cycles, domains and areas, countries practices are scored on a rubric that characterizes it as latent (indicating there is no policy), emerging (reflecting some good practice), established (signaling good practices in place) and advanced (reflecting international best practice).

The SABER framework can be used to provide a systemic characterization of a country's education policies and institutions. For example, a World Bank study of education in Shanghai finds very high coherence between policy and implementation using the framework (Liang, Kidwai, & Zhang, 2016). Central to such high fidelity in the implementation of coherent education policies is attracting and developing an excellent teaching force, aligned with "Clear learning objectives and standards, compact and well-aligned teaching learning materials, and efficient evaluation systems for all subjects across all grade levels" (Ibid., xviii). The education law creates accountability mechanisms and clear expectations for teachers to foster the holistic development of students, as well as their own professional development. Among all the eight domains of teacher policies identified in the SABER framework, Shanghai's policies score was either established or advanced. Those domains are: setting clear expectations for teachers, attracting the best into teaching, preparing teachers with useful training and experience, matching teachers' skills with students' needs, leading teachers with strong principals, monitoring teaching and learning, supporting teachers to improve instruction and motivating teachers to perform (Ibid., 21).

"Shanghai designs professional development activities to be collaborative and to focus on instructional improvement. School principals are responsible for creating targeted teacher training plans based on each teacher's evaluation results. Professional development is often a substantial part of schools' operational expenditure. The city pairs weak and inexperienced teachers with high performing and experienced ones. Important platforms for teacher professional development and performance evaluation—teaching-research groups and lesson observations—are also practiced universally in schools. Teachers are expected to be researchers who evaluate and modify their own pedagogy in relation to student outcomes. The city requires new teachers to complete at least 360 hours of professional development in their first five years of service, and an additional 540 hours to be considered for a senior

rank…Overall, Shanghai is characterized by a coherent and comprehensive system of teacher professional development that incorporates multiple layers of in-service training, school-based teacher research groups, evaluation of teacher performance, and a structured career ladder that provides both motivation and a mechanism for teachers to progress in their careers, which is key to Shanghai's demonstrated excellence in education" (Idem, xix).

A study of the characteristics of effective teacher professional development programs in Australia, which examined the reports of 3,250 teachers who had participated in 80 professional development programs, found that a number of characteristics of those programs were critical to their effects (Ingvarson, Meiers, & Beavis, 2005). The program's focus on content and follow-up in the classroom was the main contributor to teacher's knowledge. Opportunities for active learning and reflection on practice were the main contributors to practice. In terms of impact on student learning and efficacy, feedback is an important predictor, as well as content focus and active learning (Ibid., 14–15).

A recent study of teachers conducted by the OECD in 44 countries shows that teachers describe the most impactful professional development programs are "based on strong subject and curriculum content and involve collaborative approaches to instruction, as well as the incorporation of active learning" (OECD, 2019, 44).

The existing knowledge about characteristics of effective professional development programs underscores the importance of embedding these programs in the context in which teachers work. It is in the context of doing their work that most teachers must find opportunities to examine their practice and learn about new approaches to improving instruction. An evolving perspective of schools as learning organizations highlights the many ways in which professional development requires the creation of a school culture that supports it. A recent summary of that literature highlights that schools as learning organizations: develop a shared vision centered on the learning of all students, create and support continuous learning opportunities for all staff, promote team learning and collaboration among staff, establish a culture of inquiry, innovation and exploration, establish systems to collect and exchange knowledge and learning in school, learn with and from the external environment, and model and grow learning leadership (Kools & Stoll, 2017). A corollary of this literature is that sustainable programs of teacher professional development should seek to create such culture in schools.

Fullan had earlier identified the importance of organizational culture of the school to successful teacher development (Fullan, 1987). Changing school culture is a tall order indeed, one that requires sophisticated policy initiatives that can recognize the importance of local context and allow for "mutual adaptation" between policy intents and school realities. The need for policies to allow for "mutual adaptation" from particular schools is a corollary of Beeby's model of how education systems, understood here as schools, reflect the kind of teachers they engage, or of the more recent model to conceptualize how professional development influences teacher change developed by Guskey positing that change is a gradual and difficult process for teachers. In order to change, teachers must receive regular feedback on student learning progress, and to achieve sustained change teachers must receive continued follow-up, support and pressure (Guskey, 2002).

## 1.4 The Importance of Studying the Implementation of Large-Scale Programs of Teacher Professional Development

Given the robust evidence supporting the importance of teacher quality, and suggesting approaches to improve it, it is paradoxical that many of the ongoing government efforts of teacher professional development do not have more impact. A review of teacher professional development studies in the United States concludes: "Despite recognition of its importance, the professional development currently available to teachers is woefully inadequate. Each year, schools, districts, and the federal government spend millions, if not billions, of dollars on in-service seminars and other forms of professional development that are fragmented, intellectually superficial, and do not take into account what we know about how teachers learn" (Borko, 2004, 3).

A possible reason is that many government policies in practice still reflect a traditional view of development as in-service training model, whereas the evidence supports a more complex view of development. Reviews of research on teacher professional development conclude that research in the field has moved away from the traditional in-service training to understanding professional development as a complex process which can be supported by a range of approaches (Avalos, 2011; Villegas-Reimers, 2003). A recent review of teacher professional development programs in the United States acknowledges that many professional development initiatives are ineffective in changing teacher practice and student learning (Darling-Hammond, Hyler, & Gardner, 2017). This study reviewed 35 studies demonstrating a positive impact of professional development, teacher practices and student outcomes, and identified that these programs shared these characteristics: focused on curriculum content, incorporated active learning, supported teacher collaboration, used models of effective practice, provided coaching and expert support, offered feedback and reflection, and provided extended time to learn, practice, implement and reflect (Ibid).

However, much of what we know about the contributions of teacher professional development to teacher knowledge and practice comes from small-scale studies designed to create an existence proof "to provide evidence that a professional development program can have a positive impact on teacher learning" (Borko, 2004, 5). Given this limitation in our knowledge base, the task of designing large-scale programs of professional development inevitably involves design, a process of invention where the interventions designed can be informed by the evidence based, but must necessarily go beyond the knowledge-based making assumptions about how best to scale the principles documented in research. For instance, while many studies documenting the impact of professional development programs are based on well-selected and trained facilitators, and often on self-selected participants in the programs, designers of government programs must make assumptions about what is likely to work with facilitators who may not be as highly selected or trained, and for teachers who may be required to participate in professional development, rather than elect to participate in them. The imperatives of creating programs at scale

thus translate the ideas about what works which are supported by evidence into program theories and theories about the implementation of those programs which are hypotheses, rather than empirically demonstrated facts.

It is arguably this process of "translation" that explains why so much professional development is of low quality. Simply put, it is easier for governments to implement professional development of low quality. Given that research shows that it is the quality of professional development that is critical, an important question is how best to design quality programs of professional development which can be implemented at scale. Examining the design of large-scale programs of professional development, in their program theory as well as theory of implementation, and in their results, is critical to informing the design of future programs.

On absence of such intentional design, it is likely that the implementation of teacher professional development policies will continue to transform them in ways that render them ineffective. For example, there is good evidence across 35 countries that engaging teachers in collaborative professional development is associated with teachers using pedagogies that foster deeper learning. In contrast, simply offering professional development engaging large numbers of teachers in school, without collaboration, is negatively related to the use of deeper learning pedagogies (Barrera-Pedemonte, 2016). A national program which tried to scale such processes with existing staff, teachers or school supervisors, without the skills to facilitate effective collaboration, is more likely to conflate training a large number of teachers in the school with true collaboration, and therefore unlikely to have impact, or to have negative impact, in fostering deeper learning.

Another example of the challenges of scaling effective approaches to professional development will reinforce this point of how easily the scaling process can transform programs in unintended ways which diminish their impact. A recent meta-analysis of 60 studies on the effect of teacher coaching found that teacher coaching had a positive impact on teacher practice and on student learning (Kraft, Blazar, & Hogan, 2018). But developing the skills for effective coaching for large numbers of coaches is a demanding task. Governments trying to implement large-scale programs based on school embedded coaching without providing opportunities to build coaching capacities in schools are unlikely to achieve the same results documented in the studies just mentioned.

Existing evidence supports the idea that governments follow approaches which are easier to implement teacher professional development, even if they are ineffective. The latest OECD cross-national survey of teachers shows that while most teachers in the 44 countries participating in the study partake in some form of in-service training, the most popular approaches are attending courses and seminars outside of schools, whereas only 44% of the teachers participate in peer-learning and networking, even though collaborative learning is identified by the teachers in this study as the most impactful (OECD, 2019, 14).

Under pressure to achieve results in the short run, at low cost and depending on existing human resources, it is all too easy for administrators of programs to underestimate the level of skill necessary to support teacher development, such as the skill necessary to support true collaborative learning or to conduct effective coaching,

or the investments necessary to build such level of skill. Many national programs still depend on cascade models of training, which too often result in a progressive loss of fidelity and quality of training with each successive level of replication.

Arguably, this difficulty in devising effective approaches to teacher professional development which can be implemented at scale is at the root of the paradox that in spite of the fact that teachers receive much professional development, and that they value it, too few teachers use pedagogies which foster deeper learning and too many students still learn significantly less than is expected, as documented in national or cross-national evaluations of student knowledge and skills. A recent cross-national study of teachers conducted by the OECD, for example, documents that only about half of the teachers in the 44 countries participating in the study use pedagogies that promote cognitive activation, such as getting students to evaluate information or apply knowledge to solve a problem, less than 60% give their students tasks that require critical thinking, 50% have students work in small groups to collaborate in solving a problem, 45% ask students to decide how to solve a complex task, 35% present tasks for which there are no obvious solutions and less than 30% have students work on projects that require at least a week to complete (OECD, 2019, 56). About a third of the teachers reports low self-efficacy in activating student motivation to learn or in supporting their students learning through technology (OECD, 2019, 66). Only 40% of the teachers allow students to evaluate their own learning (OECD, 2019, 60).

Even though this study shows that the majority of teachers and principals participate in professional development programs and most teachers report that such training positively impacted their teaching (OECD, 2019, 152), there is, however, great variation in the kind of professional development available to teachers, as most of them have access to courses and seminars outside their schools, but fewer participate in peer learning or networking. There are good practical reasons why governments rely on training designed in a top-down fashion, often depending on "cascade" or train the trainer models of professional development. This is easier to do than organizing school improvement networks in which teachers participate in multiple forms of professional development over an extended period, or in which they learn collaboratively. Evidently, what is easier to do or more practical to undertake may not be what is most effective. This is the reason evidence on what can be implemented at scale is necessary to design large-scale efforts of teacher professional development.

Another cross-national study of teacher professional development in 35 education systems, using data from the OECD Talis survey in 2013, demonstrates that curriculum-based professional development is more likely to influence instruction than subject-based or pedagogy-based curriculum, yet most professional development is subject matter and pedagogy-based, and there is great variation across countries in the percentage of teachers who participated in curriculum-based professional development. As a result, the focus for professional development most related to instructional change is the type of professional development least frequently available to teachers (Barrera-Pedemonte, 2016). The same study examined whether the professional development teachers had participated in featured four characteristics which have shown to contribute to teacher development: collective participation of

several teachers from the same school, active learning, collaboration and duration. Most teachers participated in programs which did not have those characteristics, and less than half of the teachers indicate that their professional development includes these four attributes. Only professional development that involved collaboration was consistently associated with the use of teacher instructional practices that are beneficial to support deeper learning, such as engaging students in projects that take at least a week to complete, organizing them in small groups for cooperative learning and encouraging them to use information and communication technologies (Ibid., 10). The same study shows that in at least half of the countries, teachers with less pre-service training received professional development of lower quality (Ibid., 12).

Our recent study of teacher professional development programs aligned with educating the whole child shows that across diverse education systems, these programs shared a number of characteristics such as:

- They reflect a conception of adult learning that sees it as socially situated and responding to current needs of teachers for learning.
- They involve sustained and extensive opportunities for teachers to build capacities, often extending an entire school year, or spanning across multiple school years.
- The modalities of professional development are varied. They include independent study of new material, discussion with peers and others, individual or group coaching, demonstrations of new practices, independent research projects and opportunities for reflection.
- The curriculum of the programs examined covers a blend of capacities, from a broad focus on helping students develop particular capacities to a highly granular identification of particular pedagogies and instructional practices that can help students gain those skills.
- The curriculum of these various programs reflects a view of learning which includes cognitive skills, in interaction with dispositions and socio-emotional skills.
- Professional development includes exposure to visible routines, protocols and instructional practices, where teachers see in practice new forms of instruction or assessment.
- These programs rely on a mix of opportunities for learning situated in the context of the schools where teachers work.
- To support the intensive and sustained activities of professional development that these various programs advance, the organizations in charge build a range of partnerships with institutions outside of schools that contribute various types of resources.
- These programs see teacher practice as situated in specific organizations and social contexts, and in general adopt a whole-school approach, rather than helping individual teachers increase their capacity.
- These programs all develop capacities among teachers to advance pedagogies with the goal of developing competencies that are not formally assessed in the school or school system. The organizations that support these various programs all model a learning orientation.

There is consensus that teacher professional development is part of a system in which other processes influence the quality of teachers. This has been called the continuum of professional development (Villegas-Reimers & Reimers, 1996). With a group of colleagues including ministers of education, deans of teacher education institutions, exemplary highly effective teachers and other educators, we developed a protocol to support the creation of a shared vision which would enable the creation of a coherent continuum to support teacher quality. In this document, which we titled "Connecting the dots to build the future teaching and learning" we argued that there is only so much initial teacher education can do if the criteria to attract and select teachers into the profession are not aligned with professional standards. Similarly, we thought there were limits to the extent to which in-service professional development could remedy deficient initial teacher preparation (Reimers et al., 2017b). We proposed seven actions to achieve such systemic coherence and alignment:

1. Build a narrative about improving teaching quality as a national priority
2. Map and audit the system of programs and policies that sustains teaching quality
3. Develop a strategic teaching quality framework and professional standards that create coherence in the system which supports teacher quality
4. Empower teachers as professionals. Develop career pathways
5. Ensure a robust pipeline of qualified entrants into teaching
6. Support highly effective initial teacher preparation
7. Support developmental professional trajectories for teachers that produce highly effective teaching.

This protocol emphasized the importance of translating each of these seven steps into a clear sequence of activities, a real implementation plan, which could help execute bold ambitions into changed practices.

One of the elements in that continuum, the design of programs of teacher professional development which can be implemented at a large scale, would benefit from knowledge based on what has been attempted in practice. Five decades ago, the study of the results of government policies showed that implementation often does not follow the intended design and that the way in which policies were transformed at the implementation process could transform outcomes in important ways. This realization led scholars of evaluation to propose that any program evaluation should include a direct study of what exactly was the program which had been evaluated (Weiss, 1998). An entire field of practice in public policy has been developed focusing on the implementation of public policy, including techniques such as project planning, project management and approaches such as "Deliverology", the science of delivery (Barber, Moffit, & Kihn, 2011).

Because much of the evidence about "what works" in teacher professional development has been derived from small settings, and from a limited set of national and institutional contexts, structuring the delivery of professional development programs at a large scale requires more than knowledge about evidence on which principles have proven to influence teacher knowledge and skills. Implementing large-scale programs must be informed by knowledge of how other large programs have

been designed and implemented. We hope this book contributes that kind of knowledge with the necessary nuance and granularity to inform specific implementation strategies.

## 1.5 Conclusions

The six chapters which follow show that around the world, in diverse education systems, governments are advancing policies to support teacher professional development at scale. The cases included in this study reflect two basic approaches: those that provide professional development opportunities to the majority of teachers in the system, and those that work with a defined target population of teachers. These approaches reflect partially the principles supported by the research-based evidence reviewed in this chapter as particularly effective. In this section I examine how these six cases compare with the conclusions of our previous study of teacher professional development (Reimers and Chung 2018a), and with some of the principles of effective teacher professional development practice summarized in this chapter.

Most of these programs reflect a conception of adult learning that sees it as socially situated and responding to current needs of teachers for learning. The three national programs recognize the socially situated nature of professional development in providing opportunity for local adaptation and for job embedded training in what is otherwise a fairly focused program of development. In contrast, the programs focusing on smaller networks of schools not only focus on broader needs for teachers but also reflect a view that sees teachers' learning as socially situated.

The mastery math program in England is designed to involve professional communities of teachers in schools, led by the lead specialists, recognizing the importance of job-embedded professional development and of collaborative practice. The program reflects a combination of top-down with bottom-up approach in that the focus on math instruction comes from top mandates, but there is ample autonomy for teachers to adapt the mastery learning approach in their schools in ways that best fit the needs of their teachers.

The program of professional development in rural schools in Colombia implements a coaching model in schools, providing even greater autonomy for communities in schools to focus on learning goals defined locally. There is indeed a clear recognition of the importance of offering professional development in schools.

The education reform in Mexico contemplated the need to create opportunities for professional development and collaboration at the school level, depending on existing structures and personnel. In that sense it, recognized the primacy of responding to the current needs of teachers.

The programs of residential schools in Telangana and the New Generation Schools in Cambodia create multiple forms of professional development at the school level, focusing on a wider range of competencies for teachers.

The program in Burlington public schools is the one that most clearly focuses on transforming school culture, aligned with the idea of building schools as learning organizations. This program too reflects a view of teachers learning as socially situated, perhaps more so than any of the other programs.

All programs in this study involve sustained and extensive opportunities for teachers to build capacities, often extending an entire school year, and often spanning across multiple school years. All of them reflect the contemporary conception of teacher professional development that sees it as a long-term process as identified by Villegas-Reimers (2003) and not as the traditional staff development or in-service training. All of these programs reflect also the principles identified by Desimone (2009) as typical of high-quality professional development: content focus on subject matter, collective participation of teachers from the same school, active learning for teachers, long duration and coherence with the goals of the education policies that support them.

The intensity and frequency of these multiple opportunities for professional development is greater for the programs of smaller scale in Telangana, Cambodia and Burlington. The large scale of programs in England and Colombia provide more limited opportunities to teachers and have a narrower focus. The mastery approach was very systematic and apparently effective for the lead specialists, but not so much for the other teachers. This may illustrate the limitations of the cascade approach, and the limits of a program that allows for local adaptation which makes the program vulnerable to uneven support of local education authorities, to different interpretations of what mastery learning is, and to different choices at the school level regarding the use of textbooks. The program which was part of the education reform in Mexico was advanced too late in the term of the administration to effectively take hold; had it been implemented, the intention was to provide such opportunities.

Are the modalities of professional development varied? Do they include independent study of new material, discussion with peers and others, individual or group coaching, demonstrations of new practices, independent research projects and opportunities for reflection? This is less clearly the case for the three national programs in England, Colombia and Mexico than it is for the more focused programs in Telangana, Cambodia and Burlington. Perhaps this reflects a tradeoff between scale and complexity of the program. Institutional capacity of education ministries is limited, and it is arguably easier to scale relatively focused and simple initiatives than it is to scale the multitude of changes and supports necessary to help a school become a learning organization. It is noteworthy that in Burlington, where this approach is most visible, the effort involves only six schools. Telangana and Cambodia reflect mid-range efforts which offer a rich suite of opportunities for professional development in schools. Mexico's education reform seems to have contemplated doing this, but was constrained by the limited timeframe the administration had to implement the reforms.

England and Colombia depended on more limited and focused approaches of teacher professional development, in fact Colombia's program shifted from a program with a broader set of interventions at inception, to a simplified version focused exclusively on coaching and instructional materials on a narrow set of subjects,

apparently with good results. Perhaps the first choice in developing an implementation strategy of an ambitious professional development agenda requires clear focus as to what will be the first steps. One option is to focus them on a small number of schools, as done in Telangana, Cambodia and Burlington, in which case it is possible to try a more complex theory of change. This approach assumes that the reform cycle will be long enough to allow learning from the small-scale effort to then feed that learning into a scaled-up version of the program. Alternatively, if a reform is going to be scaled from the outset, less may be more, and a clear focus as that illustrated by the examples of Colombia and England may be warranted. Mexico seems to have attempted to do too much in too little time, with no clear implementation strategy—or time to execute it—to produce visible results and with it the crucial support to stay the course. Mexico attempted to radically transform its education system, but was unable to secure initial buy-in from all relevant stakeholders. This compromised the ability to secure crucial support to stay the course, especially under the time pressure of a limited presidential term.

It is noticeable that none of the reforms examined in this book seems to be based on a theory of how education systems change. Beeby's powerful insights that educational change proceeded as countries moved through stages of educational development, reflecting largely the characteristics of their teachers, are still relevant. Not necessarily in that the stages he proposed may still be the most helpful, or in the idea that change needs to proceed sequentially from one stage through the next, or that no stage can be skipped, the idea that holds currency is the idea that one needs a clear model of how a system changes in order to have a strategy. An education system, or a school network, comprises a large number of individuals, with varying capacities. A strategy for educational change makes demands on the capacities of those individuals. A professional development strategy is a plan for how to close the gap between the capacities necessary to achieve the education strategy—as reflected in the curriculum goals, or in the new model of education—and the current capacities of those who work in the system. A clear model for how to close that gap is necessary, and it needs to be more specific than to propose that staff should be trained in accordance with the new curriculum goals. Who should learn what? With what modalities? In what timeframe? With what resources? Answering these questions requires a model of how systems change. Beeby's contribution was precisely that it illustrated the power of having a model. I have elsewhere offered a multidimensional model of how educational systems change that emphasizes the importance of attending to the cultural, psychological, professional, institutional and political dimensions of the process (Reimers 2020b). As evidenced by the chapters in this book, the absence of such models is a serious gap in the development of the implementation strategies of these reforms.

Does the curriculum of the programs examined cover a blend of capacities, from a broad focus on helping students develop specific capacities to a highly granular identification of particular pedagogies and instructional practices that can help students gain those skills? This is only visible in the three programs taking place in more focused networks of schools in Telangana, Cambodia and Burlington, but not in the national programs in England, Colombia and Mexico.

Does the curriculum of these various programs reflect a view of learning which includes cognitive skills, in interaction with dispositions and socio-emotional skills? All the programs examined reflect an expansion in the ambition of curriculum goals, but not necessarily a broad conception of goals, including cognitive and socio-emotional skills. For the national programs in England and Colombia, the focus is decidedly on cognitive skills. The program in Mexico had an ambitious set of curriculum goals, but it was not immediately implemented, largely because of political discontinuities, but perhaps also because of the complexity of developing a large-scale implementation strategy and an effective communication strategy to implement it. The programs in Telangana and Burlington reflect a focus on a range of cognitive and socio-emotional skills, and the program in Cambodia reflects a broader and deeper set of cognitive goals.

Do these programs of professional development include exposure to visible routines, protocols and instructional practices, where teachers see in practice new forms of instruction or assessment? This is most clearly the case in the Math Mastery program in England and in Todos a Aprender in Colombia where textbooks offered clear structure and focus to the professional development, and in the professional development offered in some subjects in the Telangana residential schools program. In addition, lesson planning and follow-up and specific feedback were important features of the programs in Colombia and England. In Mexico, with a long-standing tradition of national textbooks and instructional resources, several publications were produced to guide teachers in understanding the goals of the new curriculum and to suggest activities to implement it, but these were not integrated into effective programs of professional development that reached a significant number of teachers by the time the end of the period of the administration interrupted the reform. The programs in Burlington used various resources, particularly evaluative resources, to support teachers in developing specific goals for instruction and for their own development. Similar to Burlington, teachers in Cambodia are engaged in structured career path planning, setting and monitoring their own professional development goals with the support of a mentor.

Do these programs rely on a mix of opportunities for learning situated in the context of the schools where teachers work? This is particularly the case in the three programs focused on networks of schools, most clearly in Burlington Public schools, and also in Telangana and Cambodia. There is a narrower focus in the cases of England and Colombia. The Mexico program only implemented a few professional development activities and they too had a narrower focus.

Is it the case that to support the intensive and sustained activities of professional development that these various programs advance, the organizations in charge build a range of partnerships with institutions outside of schools that contribute various types of resources? The national programs in England, Colombia and Mexico have a decided government and top-down emphasis, with limited opportunity for building institutional partnerships among schools and other organizations. In Colombia's case, however, the inception of the program benefited from the leadership of an advocacy organization in civic society. Telangana and Burlington do illustrate the development

of such partnerships to enhance the capacity of the school, as did the New Generation Schools program in Cambodia.

All these programs see teacher practice as situated in specific organizations and social contexts, and in general adopt a whole-school approach, rather than helping individual teachers increase their capacity. All these programs develop capacities among teachers to advance pedagogies with the goal of developing competencies that are not formally assessed in the school or school system, although several of them also use the results of regular assessments to support professional development.

To some extent all the organizations that support these various programs model a learning orientation. Because these are all government-led programs, the units that lead these programs demonstrate the capacity to use feedback loops to monitor implementation and course correct when necessary. This is less clear in the case of national programs in England and Mexico, but evident in Colombia's national program which was reformulated as a result of evidence that it was not achieving the intended impact. The smaller scale programs all demonstrate the capacity to adapt and course correct as a result of learning from implementation.

There are several additional lessons emerging from these studies which go beyond the conclusions of our earlier study of teacher professional development. Several of these efforts, especially the national reforms in England, Colombia and Mexico, used the results of cross-national assessments, highlighting the low levels of student achievement and the disparities in achievement, to open space for reform.

Clearly politics plays an important role in a national effort of professional development. While all these programs benefited from strong support from the national government—or from the district in the case of Burlington and from the State in the case of Telangana—such support was also a double-edged sword in the case of Mexico. The ambitious education reform was so clearly a priority of the administration, and so visibly identified with it, that a change in government caused the reform to be discontinued. In contrast, in Colombia, Todos a Aprender, while it received strong support from the Minister, the reform was not visibly identified as one of the flagship programs of the administration—in the way in which another program, a scholarship program to promote college access was—in this way the reform continued after a change of President in Colombia—but the more visible college access program did not. There are additional reasons the design of the reform in Colombia received more political support than Mexico's reform. In Colombia's case there was extensive dialogue among teachers and with teacher unions about the program. Such dialogue was impossible in Mexico's case given that a crucial component of the reform was to eliminate the control that the teacher union exercised over teacher appointments and promotions. Most of these programs garnered sufficient political support to stay the course, with the exception of Mexico's. Civil society played a key role in providing such support and in ensuring the continuity of these efforts in Cambodia and Colombia.

While these chapters do not tell us which programs "worked" in terms of achieving their intended results or in terms of being able to stay the course for a sufficiently long period to transform the culture of schools and transform them into "learning organizations", they show that it is indeed possible to design programs that aim at

professionalizing teaching at scale. Such design can be informed not only by known principles about what has been shown to be effective, mostly in studies of programs of a smaller scale, but also by what is known about how to design an operational strategy that governments can implement. There are obvious opportunities to combine what these various programs did in designing new programs. Mexico's strategy, for example, given the ambitious goals of the reform, would have benefited from a strategy of teacher professional development at the level of specificity of the strategies illustrated in the programs in Telangana, Cambodia or Burlington. If Colombia's and England's strategies are the first step in a long-term process that hopes to eventually make schools and learning organizations embrace the ambitious curriculum goals that Mexico's reform embraced, they need to show how they will evolve to produce conditions along the lines of those contemplated in Burlington, Cambodia and Telangana. Those three in turn, if they are the first step of more ambitious plans to scale these reforms to greater numbers of schools, teachers and students, will need a strategy that shows how what is achieved in a small number of schools will be used to support change in greater numbers of schools. We hope the analysis of these six programs will contribute to more effective design of such implementation strategies of large-scale education reform in the future so that all students can develop the skills they need to find purpose for themselves and to contribute to building a better world.

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# Chapter 2
# Supporting Mathematics Teaching for Mastery in England


**Hannah Blausten, Christopher Gyngell, Hannes Aichmayr and Natalie Spengler**

**Abstract** Supporting Mathematics Teaching for Mastery in England examines the mathematics mastery reform introduced in England in 2014. The reform sought to develop a new pedagogical approach to teaching mathematics in England through an innovative professional development program and initiative to design and introduce new textbooks. The pedagogical approach, professional development, and textbooks were strongly influenced by approaches studied in high-performing South-East Asian countries. The chapter begins by identifying the catalysts for the reform's inception, before describing the pedagogical approach and implementation of the reform. Finally, the chapter provides an outline of what has been achieved to date, and the preliminary conclusions of interested stakeholders.

In this chapter, we will analyze the mathematics mastery reform in England since 2014. This reform aims to introduce a new pedagogy inspired by high-performing South-East Asian countries to improve mathematics teaching and student outcomes and address England's stagnant performance in mathematics in international league tables. The reform seeks to implement a mastery approach to teaching mathematics, developed through innovative professional development programs. The initial focus of the reform from 2014 was to develop mastery teaching in primary schools for pupils aged 4–11 years, and the first stage of expansion into secondary began in 2018–2019. It is an opt-in reform, funded by the Department for Education, which is currently being scaled up. Our study focuses only on the mastery reform at the primary level. This reform will be situated within the context of wider educational

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reform and mathematics teaching since 2010. We will then examine the pedagogical approach and professional development programs that have been implemented to support educators in teaching for mastery. The chapter will conclude by evaluating the results that have been achieved so far.

We draw on information from the *National Centre for Excellence in the Teaching of Mathematics* (NCETM), the main body responsible for implementation, and from official statements and reports by the Department for Education (DfE). To compare the intended goals of the reform with twenty-first century skills, we utilize frameworks presented by Reimers and Chung (2016) in *Teaching and Learning for the Twenty-First Century* as well as the 2012 report by Pellegrino and Hilton on the development of transferable knowledge and skills in the twenty-first century, *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century*. Weiss' (2001) theory of change framework is used to analyze the implementation of the reform and to examine whether outcomes have been carried out in alignment with the intended goals. Additionally, evaluations conducted by Boylan Maxwell, Wolstenholme and Jay (2018, 2019) as well as reports from randomized controlled trials (Jerrim & Vignoles, 2015) are utilized to evaluate the results of the reform. In order to gain a better understanding of the reform, we conducted interviews with headteachers; deputy headteachers; mathematics Mastery Specialists; teachers; a professor of mathematics focused on curriculum, pedagogy and assessment; and the Director for Primary at the NCETM. This evaluation is limited by the relatively short time-period since the implementation of the reform. Due to this constraint, changes in national and international standardized test results cannot be utilized to evaluate the impact of the reform on mathematics achievement.

## 2.1 Context

The introduction of the reform originated within the coalition government's agenda for education reform from 2010 to 2015 to raise standards in education through a school-led system. Preceding efforts to improve mathematics teaching shaped the context for the reform.

Mathematics teaching in England changed dramatically with the National Numeracy Strategy, implemented in 1998 as part of the National Strategies reform. This was the first "systematic attempt at a national level to drive improvements in standards through a focused programme of managing changes in the way that core subjects are taught in classrooms" (DfE, 2011, p. 2). It was a government-mandated professional development program, providing schools with teacher training and detailed schemes-of-work. The implementation of the National Numeracy Strategy, which promoted prescriptive whole-class interactive teaching and was based on comparative studies of international practice, was a decisive move away from textbooks. An impact evaluation published in 2011 found that a key success of the reform was focusing attention on how to improve teaching (DfE, 2011). While national and international data suggested a positive impact on attainment in the early years, by 2011, the improvement in standards and progress had slowed down (DfE, 2011,

p. 4). In 2011, the coalition government recognized the successes of the reform but announced that it was abandoning the National Strategies in favor of moving toward more collaborative practice between teachers and schools (DfE, 2011).

Another preceding reform aimed at improving primary mathematics teaching was the Mathematics Specialist Teacher programme (MaST), implemented in 2007 in response to Peter Williams' report for the Department for Education identifying professional development as a key priority. The aim of MaST was "to provide each participating teacher with a Masters-level programme of training and professional support in order that they can carry out their mathematics specialist role working with teachers in their school" (DfE, 2013, p. 13). An evaluation of the programme in 2013 suggested not only initial success but also challenges to whole-school improvement due to mathematics specialists facing a "lack of senior leader support to work with colleagues across the school" (DfE, 2013, p. 21) as well as teachers with a lack of mathematical subject knowledge and confidence in teaching the subject.

In 2010, the government published the white paper *The Importance of Teaching*, detailing the new government's focus on looking to lessons learnt by high-performing countries (DfE, 2010). The OECD PISA survey results from 2006 were cited as evidence for the need for education reform. The White Paper stated that the most important lesson that can be drawn from international educational comparisons "is that no education system can be better than the quality of its teachers" (DfE, 2010, p. 3). It continued to describe the lessons learnt from high-performing education systems of devolving power to the front line, while maintaining high levels of accountability (DfE, 2010).

As part of the educational reform to raise standards, a new knowledge-based National Curriculum was implemented in 2014. The Department for Education conducted an extensive review of mathematics curricula and teaching in a number of South-East Asian countries to inform the new mathematics curriculum (Jerrim and Vignoles, 2015). The new mathematics curriculum stated three aims: fluency, reasoning and problem-solving (DfE, 2013, p. 99). Key changes to the mathematics curriculum were an emphasis on high expectations, less content taught in primary school but in more depth and a focus on building firm knowledge foundations. Assessments were reformed at all ages in line with the new curriculum, increasing expectations and seeking to address issues of grade inflation. For example, in primary schools at the end of Key Stage 1 and Key Stage 2, and in secondary schools, the standardized tests taken at age 16 (GCSEs) and age 18 (A Levels) were reformed. As the new assessments and method of reporting results were only implemented in 2015, it is not possible to compare pre-2015 and post-2015 results. Due to this and the timeframe we evaluate in this paper, we have not used standardized assessment results to measure the impact of the mastery reform.

Mathematics became more prominent on the government's agenda of education reform following the 2012 PISA rankings, which were cited as a major driver of the need for reform. England was placed 26th in the 2012 PISA rankings (with a score of 494 points), with 22% of 15-year-olds performing at the lowest level of mathematics proficiency (OECD, 2012). While the UK's performance was average, the contrast between the UK's score and top-performing South-East Asian countries

was significant: Shanghai scored 613, Singapore scored 573 and Hong Kong scored 561 (OECD, 2012). The OECD estimates that the difference of 119 points between the UK and Shanghai is equivalent to nearly three years of schooling (OECD, 2012, p. 4). Moreover, England was identified as having the widest spread in attainment internationally (OECD, 2012). In 2010, only one-fifth of students in England were studying mathematics past age 16, the lowest rate in 24 developed countries (Hodgen & Nuffield Foundation, 2010).

In response to these results, the government reviewed their existing strategies for mathematics. Several issues were identified as areas of concern: children had difficulty in understanding mathematic instruction; instruction was too mechanical and lacking emphasis in thorough comprehension; there was a lack of positive attitudes toward the learning of mathematics; and students performed poorly in the subject (Education Endowment Foundation, 2015, p. 8). Quality of teaching was identified as an ongoing concern. This was not new: in 2006, Ofsted stated that "in promoting a really secure understanding of mathematical ideas, in stimulating students to think for themselves and to apply their knowledge and skills in unfamiliar situations, the picture was less encouraging" (Ofsted, 2006, p. 1). Alongside this, the Department for Education reported concern within the business community that numeracy skills in school and among college leavers were weak (DfE, 2013).

The Department for Education looked upon top-performing South-East Asian countries and cities such as Singapore, Shanghai and Hong Kong, which had demonstrated sustained high achievement in international tests, including PISA and TIMSS. Their curricula, pedagogies and "mastery" approaches were studied. A mastery approach to teaching and learning is not new and was first coined by Benjamin Bloom through his Taxonomy model. However, it is important to note that there are many interpretations and definitions of a mastery pedagogy. Singapore adopted a mastery framework in 1990, building it around five key cornerstones: concepts, skills, processes, attitudes and meta-cognition (Oxford Education Blog, 2018).

## 2.2 Differences Between South-East Asian Countries and England

There are significant differences between the education systems in top-performing South-East Asian countries and England. These contextual differences are crucial to understanding the different challenges faced in England, the contextual constraints and the adaptations necessary in England's mastery approach.

Around 30,000 participants enter Initial Teacher Training in England each year, through a number of routes (Foster, 2019). These options fall into two main categories: school-led routes or higher education-led routes. There is currently a teacher recruitment shortfall; in 2018–2019, recruitment at the secondary level was below target by 17% (3,300 places), with 921 of these places being for mathematics trainees (Foster, 2019). As well as addressing continuing recruitment shortfalls, teacher retention is a primary area of current government policy. On the contrary, in Singapore,

there is one route into teaching: all teachers are trained by the National Institute of Education (NIE). The NIE partners with the government to oversee this teacher preparation and assists with the placement of teachers in government schools to complete their professional training. To help develop a pipeline of suitable candidates, "prospective teachers are carefully selected from the top one-third of the secondary school graduating class, by panels that include current principals" (OECD, 2010, p. 169).

Another major difference between Singaporean and English approaches is the level of mathematics specialization required. In England, primary school teachers do not specialize and typically teach all subjects. Moreover, they are not required to have any qualification in mathematics apart from a pass in mathematics GCSE. In contrast, both in Singapore and Shanghai, primary schools are subject-specific and have specialist mathematics teachers (OECD, 2011).

Alongside the differences in the composition and training of the teaching workforces, there are some fundamental differences in the requirements of teachers in the job and their opportunities for in-service professional development. As Boylan et al. (2019) point out, teachers in Shanghai have "relatively low levels of pupil contact … typically a teacher has 60–80 min of contact per day, plus one-to-one or small group remediation or extension teaching" (p. 35). Thus, a significant amount of time is set aside for planning and preparing for lessons, reflecting on lessons and assessment to guide teaching, as well as carrying out interventions. In comparison, in England, primary school teachers are entitled to 10% of their teaching time for planning and assessment per week, with the rest of their time typically being devoted to whole-class teaching. In Singapore, teachers are entitled to 100 hours of professional development time a year (OECD, 2011). In Shanghai, teachers "report engaging more regularly in deeper forms of professional collaboration compared to teachers in other TALIS countries" (OECD, 2014). In England, while there are recent government-initiatives to increase funding in certain geographical areas for professional development, teachers do not have entitlement to set number of hours of professional development per year. This remains at the discretion of individual schools.

Lastly, ability grouping and differentiation by content and task has been a common practice in England, especially in mathematics. In contrast, both in Singapore and Shanghai, there is much less emphasis on differentiation, and in-class grouping by ability is avoided (Boyd & Ash, 2018). It is also important to note that compared to top-performing South-East Asian classrooms, on average, there is a much widespread attainment in English classrooms in mathematics (Jerrim & Shure, 2016). Research has shown that "teachers think about, and respond differently towards, pupils according to perceptions of their ability" (Francis et al., 2017, p. 5). There is also evidence that teachers of high ability groups have higher expectations for their students than those teaching low ability groups (Boaler, Wiliam, & Brown, 2000).

## 2.3 Theory of Change

The theory of change of the reform conceives that if teachers have deep mathematical subject knowledge, pedagogical knowledge and skills, and quality teaching resources, then students' mathematical knowledge, skills, learning and therefore attainment will improve. If lead teachers in schools are trained as Mastery Specialists, with extensive knowledge and expertise in applying the principles of Teaching for Mastery, then they can lead change in practice in their own schools and local schools (Boylan et al., 2019). Mastery Specialists would be trained through a specialist program, with the opportunity to observe practice in Shanghai. Mastery Specialists would then introduce other teachers to the approach by facilitating group observation and analysis of the pedagogical approach. All professional development would be underpinned by the "five big ideas" that inform the approach. If schools, educators and school leaders are connected through networks and given the opportunity to work with educators within and across schools in a collegial manner, then structural change will take place. The outcomes of the activities are observed as the development of the Teaching for Mastery pedagogy, along with professional learning through the school mastery exchange. The results are improved outcomes for students, which are displayed through an increase in conceptual understanding and procedural fluency, which in turn leads to an improvement in pupil outcomes (Boylan et al., 2019).

The program began with Mastery Specialists going on the Maths Teacher Exchange (MTE) for two weeks to Shanghai and a week-long visit to England. The desired outcome was to change practice in the schools of the Mastery Specialists, and improve pupil mathematical outcomes (Boylan et al., 2019). After the first year, the theory of change evolved into large-scale building of capacity, acknowledging that not all teachers would go on the MTE. Thus, the NCETM created a new solution which amalgamated the core concepts of "Mastery", the creation of Maths Hubs to develop networks of schools and build a professional development program for teachers across England, who in turn trained Mastery Specialists (not all of whom would go on the MTE), who then replicated training for local teachers. This was implemented through Mastery Specialists leading Teacher Research Groups (TRGs), small work groups in which teachers regularly meet to plan, observe and discuss practice over the course of a year, leading to change and impact in other local schools (Boylan et al., 2019).

By 2016, the range of professional development designed to catalyze change had expanded, including working with Mastery Specialists, TRGs, Maths Hubs events, high-quality resources from NCETM and adoption of accredited textbooks. The desired outcomes in schools now included embedding the Mastery approach, improved subject knowledge for mathematics teachers, pedagogical change including whole-class teaching, carefully structured lesson planning, high-quality resources and careful questioning of children. This would, in turn, then lead to improved student outcomes: conceptual understanding and procedural fluency and improved pupil mathematical outcomes.

## 2.4 Description of the Reform: Pedagogy

The NCETM was contracted by the Department for Education to lead the design and implementation of the reform. The Teaching for Mastery is a pedagogical reform to improve mathematics achievement, through a process of professional development and school-led improvement, based on best practices in Shanghai and Singapore. Its aims align with and support those of the national curriculum, to equip students with mathematical skills and ensure learners themselves have the confidence, metacognition and competencies required to succeed (DfE, 2014). In 2013, 46 head-teachers and teachers went on a trip organized by the Department for Education to visit schools and observe mathematics teaching in Shanghai. The following year, the Junior Minister for the Department for Education, Liz Truss, led a delegation of experts on a research trip to Shanghai, "to study successful methods and potentially adopt them in schools here" (DfE, 2014, para. 4). The NCETM has called its new approach to teaching mathematics "Teaching for Mastery".

The Teaching for Mastery approach is underpinned by the rejection of the "idea that a large proportion of people '*just can't do maths*'" (NCETM, 2016a, para. 1). Central to the approach is the belief that with the appropriate resources, support, teaching and time, all children can succeed mathematically (Boylan et al., 2019, p. 34). The approach aims to develop a uniform expectation of high standards of achievement in mathematics for all students (NCETM, 2014a, 2014b). Thus, the aim is that "the large majority of pupils progress through the curriculum at the same pace. Differentiation is achieved by emphasizing deep knowledge and through individual support and intervention" (NCETM, 2014a, 2014b). All students in the class are introduced to mathematical concepts at the same time, with time given for all learners to master these concepts before moving on. This is a significant shift away from the previous practice of differentiation through content, task, resources and ability groupings.

An important feature of the Teaching for Mastery approach is the focus on methodical, careful curriculum design and lesson planning to "foster deep conceptual and procedural knowledge" (NCETM, 2014a, 2014b). Lesson planning should reflect the *five big ideas*, which have been influenced by South-East Asian approaches and articulated by the NCETM: variation, fluency, coherence, representation and mathematical thinking. In order to achieve these, teachers need deep subject knowledge to plan lessons in incremental steps, scaffolding concepts, carefully chosen vocabulary, models, representations and tasks. The approach encourages teachers to move away from the traditional three-part lesson structure to one with more parts and an emphasis on increasing direct instruction. This is combined with a focus on the importance of teacher questioning and formative assessment so that teachers can effectively identify students' conceptual understanding. Lesson planning should pre-empt and plan for misconceptions, as well as provide ample opportunity for teacher–student as well as student-to-student dialogue. An example of this is the use of stem sentences that scaffold how children can articulate concepts and reason mathematically.

## 2.5 Implementation

The reform consists of three main components to implement this approach to teaching mathematics: the England–Shanghai teacher exchange program, a professional development program led by Maths Hubs and the development of government-approved mastery textbooks.

The principal goal of the NCETM is "to ensure that all teachers of maths … have easy access to high quality, evidence-based, maths-specific continuing professional development" (NCETM, para. 2). Building capacity of teachers is one of the central components of the reform's implementation and combines a variety of models. There is an acknowledgment that "not all aspects of teacher professional development can be (or should be) addressed in courses" (Villegas-Reimers, 2003, p. 142). The professional development programs address four elements of teaching practice: teachers' subject knowledge, pedagogy to reflect the mastery approach, practice for student support and differentiation, and lesson planning and assessment.

The MTE was initiated between England and the municipality of Shanghai in 2014. Approximately, 70 Mastery Specialists from England (2 from each Maths Hubs) travel to China in autumn for one week each year, with a reciprocal visit from Chinese counterparts in the spring. During the teachers' stay in Shanghai, they visit schools, take part in TRGs and learn about the approach to teaching mathematics from Chinese teachers as well as the NCETM delegates. When the Chinese teachers visit England, "Maths Hubs organize 'showcase' events so that local teachers can observe and ask questions about the teaching approach" (NCETM, 2018). The principal aim of the exchange is to expose English teachers to the pedagogy that have informed the Mastery approach. This scheme is now in its fifth year and is scheduled to run until the 2019–2020 academic year.

The Maths Hubs play a central role in organizing the promotion of mastery in local schools through recruiting schools for the MTE, recruiting Mastery Specialists, overseeing the work of trained Mastery Specialists and coordinating professional development events (Boylan et al., 2017). Importantly, they facilitate local schools working together on professional development, as well as sharing expertise and resources. Unlike previous efforts to reform mathematics, this reform was designed to be led by schools themselves, rather than a central organizing body such as the NCETM or government. Each Maths Hubs creates a network of schools in its local vicinity and coordinates the training of Mastery Specialists, who then work with Senior Leadership teams in their school to implement a whole-school approach.

Mastery Specialists form an integral part of the reform as they are required to implement training for local schools. Maths leaders have to obtain the support of their headteacher and commit to participating in the program for 2 years to apply to be a Mastery Specialist. To become a Mastery Specialist, teachers undergo a 1-year training program involving three, two-day residential stays. Each year, a group of Mastery Specialists in training (one or two from each Maths Hubs) also have the opportunity to go on the MTE. In their second year they begin training other teachers from local schools in TRGs. However, they do receive continuing support

and professional development from the NCETM, as well as resources to carry out the training. Approximately 140 Mastery Specialists are trained each year, with the intention that 700 specialists would be trained by the end of the 2019–2020 school year, and a total of 11,000 primary and secondary schools, approximately one-third of all schools, will be reached by 2023 (Boylan et al., 2017).

The Mastery Specialist training aims at developing deep subject knowledge, pedagogical training in Mastery techniques and teacher educator training to enable specialists to lead and train others. While on the program, specialists are expected to set up a TRG within their own school, introduce their colleagues to the approach and begin to embed it within their own school. The way in which TRGs are run varies depending on the Mastery Specialist, but they are supposed to follow a common format. The Mastery Specialist introduces the session with theoretical background based on the "five big ideas", using resources provided by the NCETM. They then conduct a "Teaching for Mastery" style lesson to a class of students in their school, observed by the teachers in the TRG, demonstrating the approach. After the lesson, the Mastery Specialist facilitates a discussion with the TRG, analyzing the lesson and approaches seen. In the second year, the Mastery Specialist is expected to create and lead a TRG for teachers from local schools, for which they receive funding. TRGs offer demonstration lessons and professional development in the teaching of mathematics six times throughout the year. Each TRG is asked to work with six schools, which each put forward a Maths leader and one other teacher to be trained (preferably a Key Stage 1 teacher). "The programme promotes collaborative forms of development found in Shanghai such as TRGs, and provides a forum through which teachers share learning and experiences" (Boylan et al., 2017, p. 80). Through this dissemination network, 12 maths teachers, six of whom are Maths Leads, can be trained each year by just one Mastery Specialist, which greatly accelerates the rate of change. The aim is that the Maths Lead will work with the maths teacher to implement the approach in their classrooms in their own schools before scaling the approach across the school.

Each school must opt in to the reform by providing a signed letter of authorization from the headteacher and enter into a contract. The NCETM created a range of videos to explain the approach to headteachers, as well as to advise how to implement it within their school. Maths Hubs host launch events to build on the online resources and explain the program and expectations to school leaders.

Another major area of implementation is the development and introduction of new mastery-style textbooks in the classroom. The drive for implementation of textbooks was a considerable shift in policy away from the National Numeracy Strategy, which had explicitly eschewed the use of textbooks in classroom. Schools initially viewed the reintroduction of textbooks with skepticism. The cost of implementation of the new textbooks has also been seen as a barrier, despite the offer of a £200 grant toward approved primary textbooks. The key importance of textbooks was noted by Tim Oates of Cambridge Assessments:

> We've missed the fact that we have picked up some bad habits, and failed to notice the emergence, in other nations, of extremely well-theorised, well-designed, and carefully-implemented textbooks. We've also missed the fact that high quality textbooks support both teachers and pupils—they free teachers up to concentrate on refining pedagogy and developing engaging, effective learning (Oates, 2014).

The NCETM asked publishers to create a primary textbook series in line with the new pedagogical approach. As of June 2018, two textbook series have been approved by the Department for Education awarding committee (Debbie Morgan, Tim Oates and Bruno Reddy): *Maths-No Problem!* and *Power Maths*. The committee's assessment criteria for the textbooks stated the required features: the need to "integrate understanding of mathematical concepts … with the development of factual and procedural fluency"; use "representations in the form of pictures and diagrams which reveal underlying mathematical structures and help make sense of mathematical ideas"; include "exercises which embody the concept of variation and reinforce the underlying structure of concepts and relationships"; and "ensure that assessment activities allow pupils to review key ideas and concepts and to check their own understanding, ensuring that they are ready for the next stage of teaching" (Maths Hubs, 2017).

Textbooks have been recognized as a core element in the implementation of the mastery approach, as well as a resource to address teacher workload. A good textbook that meets the requirements of this approach needs to be viewed as a "comprehensive tool, providing support for the development of both procedural fluency and conceptual understanding in mathematics as exemplified by proven practice in the high performing Asian jurisdictions" (Maths Hubs, 2017). Mathematical coherence, or explaining concepts in logical steps, along with a focus on the representation of concepts are the key elements in the design of the textbooks. Accurate use of mathematical language within textbooks is seen as a critical factor toward building a sound knowledge in mathematics. Well-designed practical activities and practice are designed with the aim of deepening knowledge and understanding of mathematical concepts for all learners.

According to Vanessa Pittard, Assistant Director for Curriculum and Standards at the DfE, "The textbook doesn't teach; the teacher does. But having access to an elegant, coherent and comprehensive resource makes it easier. Teachers are liberated to focus on designing and delivering the engaging, interactive lessons that are characteristic of Mastery teaching" (2017, para. 11). A key component of the implementation of textbooks is providing teachers with adequate training on how to most efficiently use the textbooks in the classroom. Tim Oates has commented that the textbook development program "includes vital exchange and development of appropriate professional development to accompany curriculum innovation led by textbook adoption" (Oates, 2014, p. 11).

Nick Gibb, the School Reform Minister, stated in 2015, "mathematics for mastery … is another of the evidence-based approaches we have put at the heart of our education reforms" (Gibb, 2015). By looking to place empirical evidence at the center of the case for change, successive governments have looked to move ahead of some of

the ideological criticism that reforms of this nature can produce. An influential supporter of the reform was OFSTED, the schools' inspectorate. Jane Jones, OFSTED's National Lead for Mathematics, addressed this concern, "The notion that headteachers might encourage their staff to retain previous ways of working because they fear criticism from an Ofsted inspector is a concern but one that everyone can play a part to dispel" (NCETM, 2015). The high-profile backing from the inspectorate helped secure buy-in from school leaders to engage with the reform.

Securing school leaders' buy-in was important for the NCETM. As the reform was designed to be opt-in, incentives were structured to encourage schools to take part. Secured funding from the government assisted the NCETM in attracting schools with free professional development. In addition, schools were offered compensation for the time that Mastery Specialists or teachers attending TRGs would be out of class to cover substitute teachers.

Despite the broad support that the reform had from key stakeholders, there were distinct groups of opposition. Some Local Education Authorities (LEAs), who managed state schools, showed reluctance to engage with the NCETM, believing that reforms were being implemented unilaterally between schools and the NCETM, and not in partnership with the LEAs. The media conveyed mixed definitions of the Mastery approach to the general public. Articles in the press which referenced teacher exchanges between China and the United Kingdom were often accompanied with pictures of children rote learning in rows in classrooms. Others took aim at the concept of "borrowing" policy from elsewhere in hopes that it would work in a different context (Roberts, 2018). One reason for this opposition may stem from confusion over the meaning of the term "Mastery", and what the approach entailed. This policy is not a faithful replication of "Mastery" as it is known in Singapore and China. The NCETM has coined its own definition of the approach.

There have been concerns from teachers and parents that the focus on teaching the whole class at the same place will negatively impact lowest-achieving children who will not be able to access the learning. There is also a critique that due to a lack of personalized support, higher-achieving children will not be adequately challenged.

Misconceptions about the Teaching for Mastery approach can have significant ripple effects into its delivery. The NCETM reinforces that Teaching for Mastery is a pedagogy and that its implementation is to be achieved through schools themselves.

## 2.6 Twenty-First Century Knowledge and Skills

The goals of the Teaching for Mastery approach in England can be analyzed within the framework for twenty-first century skills created by the National Research Council in the report *Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century.* Three domains of twenty-first century competencies have been identified as being necessary for life and work. As discussed in the first chapter of this book, this framework group skills together under the cognitive, intrapersonal

and interpersonal domains can be used to "represent the distinct facets of human thinking" (National Research Council, 2012, p. 21).

## 2.7 Cognitive Competencies

The majority of the skills promoted by the mastery approach fit within the cognitive domain. Responsibility, perseverance, grit and self-regulation are evident within the goals of how maths is taught according to this reform. The mastery approach challenges the mindset that a large proportion of people "just can't do maths" (NCETM, 2016b, para. 1). Grouping students according to their abilities, along with other styles of differentiation, had previously been a common practice, contributing to a culture of low expectations. In order to counteract this way of thinking, the approach sets out to develop high expectations and standards of achievement for all students. This serves as a reflection of the important shift in skills identified as being important for the twenty-first century (Reimers & Chung, 2016, p. 11).

One of the main motivators behind the implementation of the mastery approach was to develop students' fluency, problem-solving and reasoning skills. Variation is one of the key approaches to teaching mathematics within the reform. Students are encouraged to make connections between concepts in mathematics through procedural and conceptual variation. The "variation theory of learning points to variation as a necessary component in teaching for students to notice what is to be learned" (Kullberg, Runesson Kempe, & Marton, 2017, p. 559). This provides students with the ability to discern what concepts are, as well as what concepts are not. At the core of the approach is teaching students to think critically through "intelligent practice" rather than relying on the mechanical repetition of facts.

Fluency extends beyond simply recalling facts and procedures. Students are encouraged to make decisions in an effective manner, which can then be applied to a variety of contexts. The NCETM highlighted how evidence form cognitive science "suggests that learning key facts to automaticity "frees up" working memory to focus on more complex problem solving rather than reaching cognitive overload trying to calculate simple operations" (NCETM, 2018, para. 6).

The emphasis of high standards for all corresponds with Carol Dweck's statement that "students who believe that intelligence or math and science ability is simply a fixed trait (a fixed mindset) are at a significant disadvantage compared to students who believe that their abilities can be developed (a growth mindset)" (Dweck, 2008, p. 2).

The training of Mastery Specialists focuses on introducing participants to core mastery concepts as well as building deep subject knowledge, developing subject-specific pedagogy, and an approach to assessing pupils within this pedagogical approach. Developing deep subject knowledge and presenting mathematical problems in various ways during classroom instruction, including visual representations, corresponds to the twenty-first century competencies of variation, critical thinking and fluency.

## 2.8 Intrapersonal Competencies

Within the intrapersonal domain, we can see the strongest alignment to skills that fall under the domains of intellectual openness and work ethic or conscientiousness.

According to the new National Curriculum, confidence has been pinpointed as the base for success in mathematics. As Dweck (2008) explains, "a considerable body of research is emerging from top cognitive psychology and cognitive neuroscience labs demonstrating that fundamental aspects of intelligence, and even intelligence itself, can be altered through training" (p. 3). The NCETM states that in the Teaching for Mastery approach "all pupils are encouraged by the belief that by working hard at maths they can succeed" (NCETM, 2016a, para. 2), a view that is central to the concept of mastery as it is implemented in Singapore (Kaur, 2018).

## 2.9 Interpersonal Competencies

There is less alignment in the explicit stated goals of the reform to the interpersonal domain. However, some of the pedagogical approaches do promote the development of interpersonal competencies, even though they are not stated explicitly as aims. Building in ample time for effective classroom talk and partner work allows students to develop teamwork and collaboration skills. Removing ability grouping and catering to the learning of all learners encourage students to develop skills such as empathy and perspective taking, especially among high-achieving students who are able to grasp concepts more readily.

## 2.10 Evaluation and Challenges

The following section evaluates the success of and challenges to implementation. It also provides summary of the current results of the reform, based on existing evaluations.

The implementation of the MTE was evaluated by Boylan et al. (2017). They investigated the first tranche of schools participating in the exchange and found that 30 out of 48 show good levels of implementation, meaning that teaching focused on the core components of the mastery pedagogy: conceptual understanding, procedural fluency, increased use of representations and adoption of textbooks. Only nine schools were identified as actively using textbooks in class, whereas other schools only used them for preparation, if at all. An evaluation of the MTE published in 2018 concluded that the exchange program continues to be one of the most important pillars of the mastery reform (Boylan et al., 2018). Lead primary teachers referenced valuable learning, increased subject knowledge and positive impact on pupil performance as results of the exchange. Many teachers also reported an increase in professional

dialogue about maths and how to teach maths in school. While positive impact on subject knowledge, pedagogical approaches and beliefs were reported throughout the cohort of participants, the main effect of the exchange program was an increased confidence in teaching mathematics based on the mastery approach. In addition to their own visit to Shanghai, participants also specifically emphasized the importance of the teachers from Shanghai visiting classrooms in England. One mathematics teacher noted, "the most powerful experience is then bringing those teachers back here so we can see those teachers teach our children and that really supports us in terms of thinking about how can this realistically work in our school in our culture with our curriculum" (Boylan et al., 2019, p. 91). With regards to pupil outcomes, teachers especially recognized a change in attitudes toward math and soft skills. "Most children would say it's their favourite subject now … that engagement in maths and their belief that they can achieve and that mistakes are valuable" and "I think as a whole the children have absolutely loved doing maths this way … they feel really part of the process of solving problems" (Boylan et al., 2019, p. 118). The teachers also report increased participation and a better feeling of equality within the classroom. "The way children view each other is brilliant now because they feel like they're on a level playing field and they're all learning together, whereas before it was very separate" (Boylan et al., 2019, p. 119).

It is difficult to evaluate the implementation and success of the TRG model. Boylan's evaluation of TRGs run by participants of the MTE showed wide variation in models of TRGs implemented (Boylan et al., 2018, p. 19). While implementation of TRGs has been varied, some evidence was found that cascade models mirroring those used in the previous National Numeracy Strategy were being implemented. Boylan has suggested that Mastery Specialists experience difficulties in impacting non-lead primary teachers due to teachers' lack of subject knowledge and confidence in applying the Mastery approach (Boylan et al., 2017). More evidence is needed about the quality assurance of the TRGs led by Mastery Specialists, especially as this is the primary way the approach is to be scaled.

To date, there is inconclusive evidence of the impact of the mastery approach being promoted by the NCETM. The latest evaluation published by Boylan et al. (2019) concludes that the different mastery pedagogies developed through the MTE can have a positive impact on student performance. However, quantitative evidence is currently at best mixed or not available at all. A randomized controlled trial conducted by Jerrim and Vignoles (2015) evaluated the impact of the *Mathematics Mastery* programme, which is based on similar mastery approaches but not designed and implemented by the NCETM. The study, which involved 10,000 pupils in 90 English primary schools and 50 secondary schools, found a small but positive impact of the Mastery reform. However, they also conclude that several other curriculum and pedagogical interventions in the UK have shown very similar results.

Based on these quantitative findings, there is a significant disparity between measurable results on standardized tests and what teachers report in qualitative interviews. There can be several reasons for these findings. A simple reason might be that there has not been sufficient time yet for changes to impact attainment at various testing stages. It might take more than two years of mastery approaches to produce

measurable impact. Another factor could be the curriculum and assessment changes since 2014 that led to changes in schemes of work and practices for primary schools in general. Establishing the relationship between innovation and possible impact at a time of national large-scale change is always difficult. Thus, it may be that the finding of no impact could mean that the mastery approach, as implemented by participating schools, was more impactful than the schools' previous practices, but that it was not more impactful than new practices implemented in comparison schools. Lastly, a plausible explanation for the lack of measurable impact of engagement in the MTE alone lies in the variation of implementation. As reported, not all schools that participated in the first MTE went on to implement the mastery approach, and of those who did, levels of implementation differ.

The NCETM has encountered misconceptions surrounding the mastery approach, especially due to multiple understandings and definitions of mastery, as well as the creation of schemes of work and non-government-approved textbooks by private companies (NAMA, 2015). Another area of concern is that the implementation of this reform requires a significant time and financial commitment from schools. As the NCETM explains, "Schools that have been most successful in introducing teaching for mastery have people in leadership positions putting time, energy and resources into supporting the approach" (NCETM, 2019, para 1). However, the majority of training is given to maths leaders to lead implementation, but the reality is the majority of maths leaders are also class teachers. Without time allocated to middle leaders to implement these changes, work with teachers and develop the approach in school, middle leaders' capacity to enact change is limited. They often do not have the time or the holistic overview that is available to senior leaders.

It is positive to note that 37 Maths Hubs have already been set up, and by the year 2019–2020, there will be 700 Mastery Specialists working with more than 8,000 primary schools, representing around half of all primary schools in England (Maths Hubs, 2018, para. 1). Furthermore, there are early qualitative indications that the Maths Hub activities are warmly received by schools and teachers and have increased teachers' confidence in teaching the subject. A school headteacher taking part in the scheme stated, "It is an effective way for mathematics education staff to collaborate with others to achieve best practice, in turn boosting their own personal development" (City of London Academy, 2018, para. 5). There are a few Maths Hubs, such as the White Rose Maths Hub, which are widely successful and have served as valuable resources for maths teachers across England. In addition to providing basic information about professional development opportunities, they also offer curriculum resources and assessment resources for primary and secondary schools, which are being used in schools nationally.

One key issue in the implementation of Maths Hubs has been the regional disparities between coverage and provision. There have also been differing levels of Local Education Authority support for the program. This indicates that Local Education Authorities were not brought into design and implementation planning early enough to build support and involvement. To rectify the regional disparities, the government tried to enhance the reach of Maths Hubs with an additional investment of six million pounds in October 2017 to create Hubs in areas where they will make the biggest

difference and are not yet active (Boylan et al., 2017). While this has strengthened the coverage of Maths Hubs, the current distribution of the 37 Maths Hubs across England shows a clear gap along the East Coast. In order to ensure consistency of implementation, these gaps in provision must be addressed. Even if Maths Hubs were evenly distributed throughout England, each Hub would have to serve about 100 state-funded secondary schools and 500 state-funded primary schools. As the scheme grows and the program expands into secondary schools, Maths Hubs will require increased funding to serve more schools.

Another issue is that Maths Hubs are either led by a primary school, secondary school or college. The lead school usually defines the focus of the Hub and thus, if a Hub is led by a secondary school, the focus may tend more toward secondary school professional development than primary, and vice versa. As the number of schools supported by a Maths Hub grows and the program expands into secondary, the leadership capacity of the lead school may be stretched. Maths Hubs were originally asked to build a network of strategic partners and spread the Maths Mastery approach through work groups attached to them. The implementation has been piecemeal to date. Only a few Hubs list their partner organizations and most Maths Hubs do not mention their work groups. If they do, the number varies considerably from Hub to Hub. In general, access to clear and easily accessible information is hard to come by and the amount and quality of published information varies widely. This indicates that there are big differences in effectiveness and involvement between Hubs.

A further important part of the reform is the development of teaching for mastery resources, especially the creation and adoption of textbooks based on those found in East Asia. The NCETM has produced high-quality professional development resources that have been created by groups of maths specialists and teachers. These are freely available on their website and provide a comprehensive guide to teaching mathematical concepts, with carefully selected representations and guides for teachers.

The main argument used by the Department for Education to promote the implementation of textbooks was that they reduce teacher workload and promote "deep and connected knowledge". However, it is important to recognize that their effectiveness is highly dependent on how they are used by teachers and cannot only be analyzed in terms of content. The only empirical evidence that has been collected on the impact of "mastery" textbooks is a one-year trial of *Inspire! Maths*, a textbook that did not receive government accreditation (Hall, Lindorff, & Sammons, 2016). Evidence of the effect of textbook use is limited and usually focused on comparing textbooks rather than comparing the use of textbooks to no textbooks at all (Boylan et al., 2018). In a qualitative study conducted a year into the Mastery Program by NCETM Maths Hubs, teachers commented that the implementation of textbooks had contributed to student learning and had helped to foster a more positive attitude toward mathematics. They also reported gaining confidence in their teaching from increased subject knowledge (NCETM, 2018).

Despite the government subsidy, the majority of schools have yet to implement new textbooks. This is reportedly large because of cost and remaining skepticism over whether textbooks are an effective investment. One issue reported by schools

that did implement textbooks was that students with lower reading abilities had to be paired with a more skilled partner to assist them; teachers commented that they often had to rewrite material in textbooks to make it more accessible to students, or project the page and explain the content to students step-by-step (NCETM, 2018). This undermines one of the aims of the textbook to streamline teachers' workload and allow them more time to prepare and teach effectively.

The NCETM has not addressed the role of parents in the Teaching for Mastery approach, both in terms of communicating the approach and offering them ways to support their children at home. This conflicts with research emphasizing the importance of parent involvement for success in primary school (Knowles & Fair Education Alliance, 2017).

## 2.11 Conclusion

There is currently growing buy-in from schools for the teaching for mastery approach. Expansion of government funding and support for the policy, as well as the support from key stakeholders, including Ofsted, means that the reform has become a central part of education policy. To date, 37 Maths Hubs are supporting schools nationally; more than 1,700 schools have already opted-in to the reform and over 280 Mastery Specialists are working in or with these schools. In 2018, the program began expanding into secondary schools with the first cohort of secondary teachers attending the MTE.

However, the impact on student performance is difficult to evaluate at this point in implementation. As the reform is mainly focused on primary schools, we do not yet have PISA results or other standardized maths results of involved pupils. Furthermore, the lack of internal evaluation for the reform means we also do not have solid evidence of the extent to which teachers have implemented these methods. This is also partly due to the varying forms that a mastery approach can take within a school; some schools are adopting mastery schemes created by a variety of publishers, some are using government-approved textbooks, some are using schemes created by White Rose Maths Hub and others are implementing their own take on the mastery approach. With this level of variation in methods of current implementation, it is challenging to evaluate the successes of the reform. The level of implementation has so far only been evaluated for the first cohort of schools participating in the MTE. This evaluation showed that, while there were areas of success, Mastery Specialists have had difficulties in disseminating the approach due to primary math teachers' lack of subject knowledge and confidence. Additionally, many schools have chosen not to use accredited, government-approved textbooks.

In conclusion, this is a critical point as the reform expands its reach into secondary mathematics. At present, while the reform has been implemented in parts, there is a lack of information about the sustainability and quality of implementation. Importantly, there is a need to put in place rigorous systems of quality assurance in order to assess the impact of the MTE, Mastery Specialist programme and Maths

Hubs. Maths Hubs that have shown higher levels of success in recruiting schools and leading the development of sustained whole-school approaches should be studied. These Hubs should share their implementation methods to foster more partnership between Hubs.

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# Chapter 3
# Supporting Teacher Professional Development: Program Sustainability in Colombia


**Chelsea Raubenheimer, Milena Rosenzvit, Laura Ospina and Rin Kim**

**Abstract** In 2012, the Ministry of Education of Colombia introduced a large-scale teacher professional development program called Todos a Aprender (PTA) to reduce the urban–rural education divide in the country. Over two presidential administrations and in the face of initial opposition, PTA has proven to be a public policy success in a country where program sustainability is historically a challenge. This case study attempts to distill the salient lessons from the Todos a Aprender story to provide policymakers with insight into mechanisms to generate long-term support for such type of program. Above all, PTA centered teachers in their programmatic decisions by recognizing their deep skill-set and contextual knowledge, thus allowing them to be the primary agents of change. Textbooks and learning materials were also of the utmost priority, as schools in many rural regions of Colombia lack adequate supplies. Finally, effective and efficient implementation, and a focus on continuous improvement, solidified the program's gains. Results from impact evaluations conducted by the Universidad de los Andes in 2016 indicated that PTA was shown to have raised the percentage of students that achieved a satisfactory or advanced level on the national Saber exams. As such, Todos a Aprender has now become a fully integrated policy of teacher professional development in Colombia.

## 3.1 Introduction

In 2012, the Ministry of Education of Colombia introduced a large-scale, in-service teacher professional development program in primary schools called *Todos a Aprender* (*PTA*), with the goal of closing the urban–rural student achievement gap. As in many Latin American countries, Colombia exhibits multipronged disparities in

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resources and opportunities between urban and rural regions. In 2015, 97.9% of urban households had access to clean water, compared to 66.5% of rural households. In that same year, 40.3% of the rural population was living under the poverty line, while only 24.1% of the urban population was classified as such. As for education, only 9.6% of the population in rural areas had completed secondary schooling in 2015, while the percentage of the population in urban areas was double that amount (O'Boyle, 2016).

However, despite these challenges, Colombia is also in a period of transformation. Economic growth, a reduction in drug violence and a recent peace deal with the FARC, Colombia's largest armed rebel group, has increased stability in the country. This has attracted the attention of international businesses and tourists alike, encouraging foreign investment and propelling Colombia onto the world's stage. In the education sector, following significant reform efforts during the administration of Minister Cecilia Maria Velez, the primary school enrollment rate increased significantly from 67% in the early 1990s to 91% in 2017 (World Bank Data, 2019). Yet, despite making gains on access to education, the quality of education in Colombia, specifically in the rural regions, remains low. Since 2012, *Todos a Aprender, abbreviated PTA from the Spanish name Programa Todos a Aprender,* has become the government of Colombia's primary initiative to address this enduring challenge focusing on the improvement of teacher quality.

In the face of initial resistance to its implementation, unfavorable impact evaluation results, and a shifting political climate, *Todos a Aprender* (*PTA*) has continuously improved to ultimately produce measurable, positive effects on student outcomes. This chapter analyzes the salient factors of this reform to better understand how the program not only remained in existence despite many potentially crippling challenges but also became a desirable model of large-scale professional development which, we believe, could be of value in other contexts aiming to improve teacher quality. In detailing the mechanisms behind the political perseverance of *Todos a Aprender*, we provide insight for current and future policymakers' intent on improving educational quality pursuing an educational intervention of similar scope and scale.

We will begin by addressing the recent history of education in Colombia and the development of *PTA* in Sect. 3.2. Section 3.3 will describe the teacher-centered design of the program. Understandably, teachers are among the most important factors in education quality. As such, it was paramount for the program to keep them at the center of all programmatic decisions. In addition, the most important stakeholder of *Todos a Aprender* were the teachers themselves, so their trust and long-term support were key to realize the intended goal of improved student learning. Section 3.4 examines the allocation of learning materials and textbooks. Quickly realized to be a critical component of the program, textbooks were a highly visible manifestation of *Todos a Aprender* and a resource to support instructional change. In the absence of a national curriculum, they were exceedingly useful sources for unit and lesson planning. They were also the visible beneficiaries of program participation and, as such, translated much of the philosophy and goals of PTA into tangible tools to support instructional practice that operationalized those aspirations. Section 3.5 will illustrate unique factors that contributed to the successful implementation of the program.

From public–private partnerships to a commitment to efficiency, Colombia's Ministry of Education capitalized on innovative solutions to facilitate the implementation of *Todos a Aprender.*

Research for this chapter included interviews with several program administrators and educators involved in the program and analysis of different program reports, including evaluations of its impact. Those interviewed included a former Deputy Secretary of Education of Colombia, the current program director (as in May, 2019), two former program directors, a former pedagogical coordinator, teachers in participating schools, a *PTA* tutor, as well as other Ministry staff. Documents reviewed included the reports of the two large-scale impact evaluations conducted in 2014 and 2016 by the *Universidad de Los Andes*, an evaluation of the implementation of PTA in 2015 and subsequent presentations of evaluation results released by the Ministry of Education in 2017. The two National Development Plans of President Santos, national curricular materials as well as other official documents from the Ministry of Education were helpful to understand the broader political and educational context in Colombia. We also analyzed information about the program available in the media, online marketing materials and press releases.

## 3.2 Background

Prior to *Todos a Aprender,* the largest teacher professional development program working to address the educational disparities between urban and rural schools was called *Escuela Nueva* (EN), or New School. Developed by an NGO in the 1970s, EN's mission was to improve the quality of multigrade teaching in rural schools with one or two teachers. With momentum from the success of EN, the Ministry of Education of Colombia sought to further support the education of students from its most rural schools, who consistently obtained the lowest levels of achievement in national assessments of knowledge acquisition and skills development. Fortuitously, around that time, *Empresarios por La Educación*, an alliance of business leaders committed to improving the quality of education in Colombia, learned of a successful intervention run by McKinsey to address similar challenges in the rural Brazilian state of Minas Gerais. The program comprised three key components: capacity building at the local level coupled with regional and national support, school involvement in creating improvement targets and distribution of high-quality teaching materials. From 2006 to 2010, the percentage of eight-year-olds from Minas Gerais reading at grade level increased from 49% to 86% as a result of their participation in the program (McKinsey&Co., 2018).

The publication of these positive results from the rural improvement program in Brazil coincided with the release of the 2009 results of the OECD Program for International Student Assessment (PISA) measuring knowledge and skills of 15-year-olds in language and maths. Despite improvements relative to the results of the 2006 assessment, the knowledge and skills of Colombian students still lagged behind those of their Latin American peers. The results of the 2009 SABER tests—Colombia's

national standardized assessments—confirmed the low levels of student skills and the significant gaps in learning outcomes between students attending rural and urban schools. Over 80% of students in the most disadvantaged regions of the county did not reach the minimum standards in maths in grades 5 and 9. While the language scores had slightly improved, still only 20–40% of those same students achieved the minimum standards. On average across the country, the scores of rural students were significantly lower than the scores of urban students (Nacional M. d., 2012). In response to these findings, the Ministry of Education of Colombia proposed the development of an intervention to support rural schools similar to the one which had helped students in Minas Gerais. With the support of Empresarios por la Educación, *Todos a Aprender* was designed and introduced by the administration of the newly elected President Manuel Santos.

Initially, *PTA* relied on a wide range of supports to address the low-performance of rural schools: in-service teacher training, strategic support of school management and administration, improvement of school infrastructure, nutritional programs for students, and stakeholder building in communities. Due to the comprehensive nature of the reform and its large scale, *Todos A Aprender* became its own division at the Ministry of Education. By 2014, however, it was apparent that PTA was not achieving the intended results of lifting student learning outcomes in rural areas, perhaps because managing the multiple components of the program was proving challenging. An evaluation conducted by researchers in one of Colombia's leading universities demonstrated that learning outcomes were stagnant and that the coaches were not visiting schools as regularly as planned (Universidad de Los Andes, 2014). As a result of these disappointing findings, the Ministry of Education decided to redesign the program and made instructional improvement the core of its theory of change. This new iteration of the program, known as *PTA 2.0*, streamlined the various programs components to include only two: teacher professional development and instructional materials.

In 2016, the University of the Andes conducted a second impact evaluation of *Todos a Aprender*. At the time of the study, *PTA 2.0* had only been in effect for one year which researchers noted was an inadequate amount of time to study the impacts of an educational intervention. Moreover, the SABER scores used in the evaluation were from 2015, as the 2016 scores were not available at the time of the study. Given these limitations, the research team concluded that *PTA* still was having no effects on student learning outcomes (Universidad de los Andes, 2016). Once the results of the 2016 administration of the standardized assessments SABER were available, the researchers of the University of the Andes released an updated report on the impact of the program demonstrating that *PTA 2.0* had indeed induced positive effects on the learning outcomes of students in language arts and math in the 3rd and 5th grades. More specifically, PTA 2.0 was shown to have raised the percentage of students that achieved a satisfactory or advanced level on the national SABER exams (Tiempo, 2017). The redesign and more focused program implementation were deemed a success. Upon release of the results, President Santos announced in a celebratory speech that *Todos a Aprender* had been contributing to closing the gap in educational opportunities available to urban and rural students as shown by the narrowing gap in learning outcomes (Mineducación, 2017).

In the lead up to the presidential election in May 2018, key figures at the Ministry of Education were concerned about the sustainability of *Todos a Aprender*. Historically, new administrations in Colombia have tended to end projects initiated by prior presidential administrations as a way to make space to introduce their own policies. As many considered this to be the likely fate of *PTA*, a key program of the Santos presidency, preparations began to create a new role within each school called the *líder de transferencia*. This person would have been directly responsible for maintaining the practices, structure and support historically provided by the coaches in *Todos a Aprender*. Since *PTA* had garnered massive stakeholder support over the years, however, from teacher unions and the private sector to the parents of children enrolled in participating schools, ending *PTA* would have been very unpopular among those benefiting from the program. Thus, the Ministry of Education under the new President Iván Duque Márquez made the decision not only to maintain the program but to merge the once isolated *Todos a Aprender* division of the Ministry with the branch dedicated to improving the quality of Colombia's public schools. As a result of this restructuring, *PTA* will be a more stable and permanent institution within the education system. With plans to expand the program to reach more at-need schools around the country, the future of *Todos a Aprender* looks promising.

## 3.3 Teacher-Centered Design

The teacher-centered design was a critical element of PTA success, the largest in-service teacher professional development program in Colombia's recent history. Since its inception, the program has followed a cascade model in which it employed 100 facilitators (formadores), 4,200 tutors and 100,000 teachers. The facilitators train tutors who in turn train teachers. As of 2017, PTA operated in 4,500 schools in Colombia, reaching 105,000 teachers and benefiting over 2 million students (Colombia Aprende: La Red del Conocimiento, 2017). The cascade model was specifically designed to support communities of practice among and within schools that would allow teachers to develop their skills and support each other while improving their practices. This networked model allowed reaching the teachers at the classroom level and at the same time scaling the program to an unprecedented number of teachers. A key component of the program was that those chosen to be tutors were also teachers, often from the same regions as the teachers. This allowed teachers to learn from and with colleagues with whom they had a shared experience. At the same time, tutors received training from the facilitators focused on classroom practices that could be modeled throughout the training cascade until reaching the classroom.

Teachers participate in two major activities which define the teacher-centric nature of the program in its design and implementation: periodical workshops (usually 4 in a year) and continuous follow-up and mentorship in their school (*acompañamiento*). A week-long training workshop takes place four times a year. The workshop is first carried by the facilitators with the tutors, and then the tutors model the same activities with their groups of teachers. This represents the "top-down" component

of the program, through which the Ministry assures that all teachers get access to the same guidelines. The second intervention activity, follow-up and coaching, however, was successful in providing personalized support and guidance to teachers. Once tutors enter the teacher's classrooms, they observe lessons and model better teaching strategies, as well as provide feedback to teachers. With the goal of helping teachers deeply reflect on their own classroom practice, tutors applied various resources from student-centered pedagogical documents to classroom management strategies.

Initially, the evaluative element of the coaching cycle was profoundly intimidating to the teachers, as they had not traditionally been the subject of formal assessment and appraisal. This led to a temporary loss in teacher trust and ultimately to a teacher strike in the early years of the program. This was the lowest point in the implementation trajectory of the program. However, teachers soon began to appreciate the role of evaluation (which results were confidential) as a useful component of the program and which calmed their fears about being evaluated. As a result, teacher's trust in the program increased and this contributed to a turnaround point, garnering significant support for the program from a wide range of stakeholders. Apart from regular coaching in classroom, tutors spend additional time with teachers, reviewing subject matter and curricula materials and following up with the most challenging concepts and issues. Part of teachers' duties includes developing curricular and instructional strategies tailored to the needs of their students. This opportunity to receive support in curriculum and lesson planning was especially significant given the fact that the Colombian education system is highly decentralized and devoid of national curriculum, and that teachers are generally informed only of general educational standards but not provided a curriculum to help their students attain them. Given this context, teachers benefited from the personalized follow-up coaching framework focused on curriculum development and lesson planning.

Other positive results of the teacher-focused intervention activities included a PTA developed network of professional learning communities where teachers empowered teachers. This was possible owing to the program's built-in trust in the expertise and experience of teachers, in contrast to the traditional viewing of teachers as having "deficits" to be "fixed". The Ministry of Education of Colombia had previously promulgated the idea of learning communities as "to promote an exchange of experiences and best practices, teamwork, reflection, and collective problem solving to classroom-specific challenges" (MEN, 2011). Following this idea, peer coaching and collaborative practice were established as the norms in which teachers regularly observed each other's practice, exchanging feedback and learning from each other's strengths and weaknesses. Such proximity and interactions rapidly disseminated good teaching practices to large numbers of teachers with different teaching styles. Teachers could observe how the differences in instructional practices drove changes in student outcomes, and thus were held accountable for leveraging this evidence-based inquiry into finding out what would work best for their students. The creation of this inquiry stance and learning orientation helped shape a common aspiration and motivation for teaching not only in improving one's individual practice but that of others as well. As a result, effective collective learning was generated.

## 3.4 Provision of Textbooks and Learning Materials

In addition to the teacher-centered approach of the program, the development and distribution of textbooks and learning materials was another key component that positively impacted the instructional improvement. Most importantly, given the lack of national curriculum in Colombia, PTA textbooks served as guidelines for unit plans across the year, thus facilitating planning and communication across learning communities. Colombia underwent an ambitious education reform in the 1990s, characterized by institutional capacity building in both national and local institutions. While the national ministry centralized some functions of the system (i.e. the consolidation of information systems), other functions were transferred to local government or individual schools. Until the recent introduction of national education standards (*Estándares Básicos de Competencias*), curriculum remained one of the decentralized functions. In the absence of a national curriculum, each school was responsible for selecting the topics to be taught each year.

In 2006, the Ministry of Education developed a series of curricular frameworks which, while not officially national standards, served as a guide of what the year plan could look like in a school. One of these documents was *Derechos Básicos de Aprendizaje* (*DBA*), or Basic Learning Rights. Despite being a great resource for teachers, its use was not mandatory and the frameworks did not reach a wider audience. As such, *PTA* became an ideal mechanism for these curriculum resources to reach schools. *PTA* developed and distributed a series of textbooks, learning guides and other learning materials based on these curricular documents. The use of the book was not mandatory. However, thousands of teachers found this resource extremely helpful in organizing the progression of content within and across years and as a guide for lesson planning. Furthermore, learning communities of teachers in the same schools could collaborate in the adoption of these resources and in this way coordinate instruction across subject matter and grades.

The second key feature of the textbooks was their content. Educators know that teaching quality usually improves when teachers learn about new effective teaching practices, not only by reading or being lectured about them but by engaging themselves in those new instructional practices. This is the reason the in-service component of the teacher training of *PTA* was instrumental to the success of the program: tutors had the chance to model practices with the children in the classrooms, and to give direct feedback to teachers whose instruction they observed. Textbooks provided a guide to teachers about possible instructional practices. *PTA* textbooks did not include isolated content but suggested activities to be implemented in the classroom aligned with the teaching practices promoted by *PTA*. Both language and math textbooks were focused on higher order cognitive skills rather than memorization of factual knowledge. These practices and textbooks differed considerably from those aligned with the use of traditional textbooks, and tutors were essential in helping teachers learn how to use these resources to transform their practice.

The third reason the use of textbooks for *PTA* was a success was that they allowed children from underserved families to have access to resources that had historically been limited to children from privileged families. In Colombia, access to textbooks and learning materials was mainly restricted to urban and higher income family children. Since *PTA* targeted schools and communities that were vastly isolated, children in those schools had access to school textbooks for the very first time. Parents appreciated that their children had gained access to high-quality materials that had historically been absent from their communities. As mentioned, there were questions about the sustainability of *PTA* as the change in administration was expected. The high appreciation of the textbooks led to the support of families in rural areas.

## 3.5 Successful Implementation

The disappointing results of the 2014 impact evaluation led the Ministry of Education to redesign the program. The evolution of PTA to *PTA 2.0* narrowed the scope of the program to focus exclusively on teacher-training and on the design and delivery of instructional materials. The Ministry realized that the multiple components of the original program design made implementation challenging and as a result the intended impact was unrealized. Eliminating some components of the program would also minimize the bureaucratic hurdles that could impede successful program implementation in the vast, diverse areas of Colombia. As a result of such streamlining of the program, Ministry staff transformed the purpose of the school visits from oversight of the various program components to a clear focus on in-classroom training and provision of feedback to teachers. Learning from the results of the impact evaluation and soliciting feedback from the tutors, the program leadership streamlined program implementation. This illustrates the value of evaluations to revise program and implementation theory and enhance program implementation. Using evidence to support the need for program restructuring the Ministry was able to focus on the areas which needed redesign. This use of evidence for program redesign illustrates a culture of evaluation use in program management.

*PTA's* implementation success was also due to its unique ability to reach diverse areas of the country, including remote rural schools in the states of Amazonas, Guainía, Guaviare, Chocó, Vaupés, Vichada, and the Guajira. As one interviewee noted, *PTA* was known for going "the last mile", reaching remote and isolated parts of Colombia that had typically been beyond the reach of government. Especially after the program was redesigned, efficiency became a primary goal of the Ministry. They wanted to be thorough and swift in their implementation, committing to send tutors and textbooks regularly across the country, despite the immense geographic barriers. This vision came directly from the top. Although a program of such scale had yet to be successful in Colombia, the team would not allow past failures to dictate the future success.

Former program administrators also considered the partnership with the private sector as an important contributor to implementation success. From the outset of the implementation of *Todos a Aprender*, the Ministry of Education maintained a robust relationship with *Empresarios por la Educación*, the organization which had played a key role in the adoption of the program. The partnership between *Empresarios* and the Ministry was vital to the launch of the program. Acting as the program sponsors, *Empresarios* suggested to focus *PTA* on rural areas of Colombia. They also advocated for program evaluation, encouraging the completion of impact evaluations by the University of the Andes.

Moreover, the Ministry was also able to rely on the private sector to hire tutors, which directly aided in the rapid implementation of Todos a Aprender. In the first few years, the Ministry was in great need of tutors, as they sought to engage qualified teachers with strong leadership and pedagogical abilities. A new legal mechanism provided the necessary flexibility in the government's hiring process to recruit tutors from beyond the public sphere. Relieved from the standard bureaucratic obstacles, the Ministry was able to quickly and easily fill the openings for tutors around Colombia.

Lastly, another factor which contributed to the sustainability of *Todos a Aprender,* across two different presidential administrations, was its relative invisibility to the public eye. This low political visibility of the program is evident when it is contrasted with another flagship program from Colombia's Ministry of Education, a college access scholarship program named *Ser Pilo Paga*. The program enabled high-achieving, low-income students to attend a university of their choice, including the most selective and prestigious universities in the country, by funding the cost of their studies if they gained admission. The program was widely publicized within the media, making it a recognizable public policy achievement of the Santos administration. Such high visibility also brought increased scrutiny from opposing political parties. Despite markedly expanding access to higher education for marginalized students, *Ser Pilo Paga* was controversial among adversaries who claimed that the program was an unsustainable investment (Semana, 2019). The new President Ivan Duque ended the program within a month of entering office. While visibility was certainly not the sole reason for the downfall of *Ser Pilo Paga*, it is notable that *Todos a Aprender*, which was also a flagship program of the Santos administration, did not face the same level of political backlash. Ultimately, *PTA* lacked political branding and therefore it never became politicized. As a program for teachers, the only people who were aware of the existence of the *PTA* were those who directly benefited from it, school stakeholders and engaged parents. As a result, when President Duque took office *Todos a Aprender* survived the typical policy cleanout that is customary in political transitions. While not explicitly outlined in the strategic implementation plan of *PTA*, keeping the program out of the public eye allowed for a seamless transition from one government to the next. Thus, while it is advantageous at times for a policy's success to be heavily marketed to garner support, in this case, the discretion of the program likely contributed to its survival.

## 3.6 Conclusion

*Todos a Aprender*, Colombia's most ambitious program for teacher professional development, has been operating successfully in reducing the existing rural–urban gap in educational achievement. With a teacher-centered approach, the inclusion of valuable textbooks and learning materials, and strategic implementation, the Ministry of Education was able to overcome many of the obstacles that tend to inhibit the success of education policies. Now spanning the lifetime of two presidential administrations, *Todos a Aprender* is improving teacher quality in Colombia. As a mature program, shaped by constant evaluation and renewed commitment from program staff, PTA is becoming an international reference for the education community. In 2018, the Regional Program for the Development of the Teacher Profession in Latin America and the Caribbean (PREDALC) recognized Todos a Aprender as an innovative example of teacher professional development. The program is intended to reach all teachers in Colombia in the next 8 years.

Another key lesson learned from the implementation of this large-scale program is that it is possible to both improve the learning of traditional contents (such as basic math and language) and spread a twenty-first century skills framework. *Todos a Aprender* has managed to change language and math teaching practices across the country in a way that allows students to develop a breath of cognitive, intrapersonal and interpersonal skills needed in this rapid changing world.

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# Chapter 4
# Policies for Teacher Professionalization in Mexico's Education Reform


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**Abstract** This chapter examines the role of teacher and principal professional development introduced as one of the five central elements of the 2012 Reforma Educativa (RE), a large-scale education reform that sought to profoundly alter the Mexican educational system. Chief amongst the reform's objectives was regaining governmental control of the education sector from the powerful teacher unions; this was meant to inject accountability into all facets of the system and reprofessionalize a weak teaching force through higher barriers of entry, in-service teaching assessment, and widely available and effective professional development activities. The theory of change underpinning these actions was that these measures would improve student learning outcomes and better prepare young people for success in the twenty-first century. Political considerations hindered the RE's ability to achieve these ambitious goals. A lack of engagement with key stakeholders, especially unionized educators, before the RE was signed into law resulted in an illogical implementation sequence in which revamped teacher and principal professional development was preceded by educator evaluation. This initial focus on evaluation allowed opponents of the RE to cast it as punitive toward teachers and not in the best interest of educators. Spaces that allowed teachers to exchange best practices, develop pedagogical techniques, and more actively participate in governance and planning of school communities were welcome innovations in efforts to improve teacher professional development. However, bureaucratic obstacles, political pushback from unions, weakness in the supervisory component, and inconsistent implementation among local authorities ultimately prevented these initiatives from achieving their intended effects.

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Article 3 of the Mexican Constitution states that education should be public, secular and free, as well as scientific and absent of discrimination in its pursuit of "optimal human coexistence" and the "maximum academic achievement of learners" (Mexican Constitution, Carranza, 2017). Through constitutional change, Mexico's Education Reform (abbreviated RE from the initials of the Spanish term, *Reforma Educativa*) sought to profoundly alter the key components of the educational system by providing a definition for quality education. It sought to do so by changing the existing structure of evaluation and promotion; articulating the role of federal and local educational authorities as well as schools themselves, and improving both pre-service and in-service teacher professional development. Reprofessionalizing a weak teaching force was seen as a prime mechanism to boost student learning; in this way, both teacher policies and teacher professional development were central to the reform's aim of promoting higher-quality instruction to catalyze improved academic outcomes and better equip students for success in the modern world.

The results of the 2012 administration of the Organization for Economic Cooperation and Development (OECD) Program of International Student Assessment (PISA) were released the same year the reform was introduced. The detailed report for Mexico revealed that, while student knowledge and skills as reflected in the 2012 test scores had increased relative to levels in 2003, the average level of student achievement on the tests, 413 points on a scale normed to average 500, was still well below, almost a full standard deviation, the OECD average of 494 (OECD, 2013). Further, 55% of Mexican 15-year-old students did not meet the minimum achievement benchmark in mathematics, meaning that between Mexico and the OECD average, there was a two-year gap in mathematical knowledge (Cabrera Hernández, 2018). This gap was much greater relative to high-performing countries. Compared to student knowledge and skills in Shanghai, the highest-ranking PISA participant in the mathematics assessment, the gap between Mexican students and their counterparts in the top-performing OECD member state increases by two more years. This indicates that the math skills of 15-year-olds in Mexico are, on average, four years behind the math skills of 15-year-old students in Shanghai and other high-performing countries (OECD, 2013). The low levels of knowledge and skills of students were confirmed in other assessments, Mexico's national curriculum-based assessment of student knowledge and skills, the National Plan for Evaluation of Knowledge (PLANEA), demonstrated overall low levels of achievement as well as significant inequality between the learning outcomes of students in urban and rural areas, between students in more affluent and less affluent states, and between students of different socio-economic groups. More than half of the students scored in the lowest level of knowledge in the assessment of Spanish language and communication, while nearly two-thirds of pupils did not achieve past the lowest level in mathematics (INEE, 2015). These dismally low levels of student outcomes on both international and national assessments furthered a pre-existing perception that teachers were the reason for underperformance, and the reform was proposed as an effort to remedy this perceived deficiency (Tirado, 2018).

It is in this context that Mexico's RE was introduced in 2013. The stated objectives of the RE were to ensure quality education for all Mexican students; bolster equity

and inclusion by closing gaps in access; and promote a shift in the school community paradigm, focusing especially on increasing social participation and parental investment in improving the educational system (SEP, 2017a). To meet these challenges, the reform created the New Educational Model (NME), a set of standards, as well as an updated curriculum, with new pedagogical guidelines and community engagement activities designed to foster continuous dialogue between school-level stakeholders to impact practice at the classroom level. The reform also reasserted governmental control over the educational sector and instituted evaluation mechanisms to introduce accountability in the teaching profession (SEP, 2017a). Finally, professional development was designed to prepare the country's teaching force to be able to meet these new accountability demands and specifically designed teaching standards. The theory of change underpinning these components of the reform was that wrestling control of the educational systems away from teacher unions and empowering communities to actively participate and invest in the educational process would reprofessionalize teachers, empower principals and catalyze better student outcomes aligned with the demands of the twenty-first century. Much of the professional development introduced by the reform coincided with the strengthening of mechanisms that had previously lacked rigor or were absent from the educational system, such as a comprehensive evaluation system and school level initiatives to promote in-service training.

## 4.1 Chapter Outline

In order to understand these ambitious goals, this chapter will begin the description and analysis of the reform by detailing the mechanisms that it used to professionalize Mexico's teaching force, arguing that, in terms of both curricular and pedagogical strategies, the reform could have been well-positioned to reorient teaching activities and student learning to improve learning outcomes. However, a lack of engagement with key stakeholders, especially educators, before the reform was signed into law, necessitated an illogical sequence of implementation in which teacher and principal evaluation preceded updated teacher training and curricular development. Thus, the reform was largely perceived as punitive toward teachers, lacking sufficient support. Although other support mechanisms of the reform were subsequently implemented, the success of these measures was mixed and their effects were often overshadowed by the strong opposition to evaluation (Schmelkes, 2018).

This chapter details the context that surrounded the introduction and implementation of the reform and describes the work of the National Institute of Educational Evaluation (INEE). Created in 2002 but granted autonomy from the Ministry of Education by the reform, the INEE was responsible for creating the evaluation framework for Mexican principals, teachers and students vital to understanding the RE's push toward accountability (SEP, 2002).

Next will be a description of the implementation of the reform along three axes. The first axis, as mandated by the General Education Law (LGE) and the General

Law of the Professional Teaching Service (LGSPD), was teacher evaluation and the creation of the Professional Teacher Service (SPD). The SPD was designed to professionalize the system of teacher selection and advancement as well as stamp out decades of bad practices and corruption through the establishment of transparent merit-based selection and promotion assessments (Granados Roldán, 2018a). There was a shift in the role of principals and supervisors, as well as a change in the process by which they were selected and promoted. Crucially, neither teacher training nor professional development was properly aligned to or streamlined with evaluation content.

The second axis was the creation and publication of the NME. This chapter will analyze the tools the NME provided for teachers and how it helped promote curricular development.

The third axis was the introduction of measures to shift the paradigm of the education community in order to promote more effective teaching practices that allowed students to develop skills to facilitate their civic and economic participation in the twenty-first century. This chapter will examine the actions taken to catalyze this shift and the obstacles they faced in achieving their intended objectives. School Technical Councils (CTEs) and District Technical Councils (CTZs) were promoted to create a space for teachers and principals to discuss educational practice and school goals. In addition, the SPD created the Technical Pedagogical Assessor (ATP) to facilitate educator-to-educator and school-to-school learning. School Technical Assistance Services (SATE) were organized to promote best teaching practices across regions. Finally, School Social Participation Councils (CONAPASE) sought to foster learning communities where all stakeholders in the educational community were represented.

Finally, the chapter will analyze the successes and shortcomings of the reform on each of the three aforementioned axes, discussing how the reform's theory of change failed to counter a narrative, one largely put forth by specific factions of the country's teacher union and adopted by then-presidential candidate Andrés Manuel Lopez Obrador, that the provision of evaluation was draconian and disrespectful to teachers (López Obrador, 2018). It will conclude by reviewing the RE's main achievements and shortcomings.

## 4.2 Historical Context

Mexico has experienced a profound political transformation over the past several decades. In 2000, for the first time since the Mexican Revolution, the National Action Party (PAN), helmed by Vicente Fox, won the presidential election against the Institutional Revolutionary Party (PRI), ending a 70-year period of hegemonic party control. This event is often referred to as the beginning of a "democratic-electoral normality" where older power structures had to adapt to a new era of political plurality (Woldenberg, 2012). During the preceding hegemonic party system, interest groups enjoyed the privileges of being connected to those in power (Gindin, 2008). The most power-

ful labor union in the educational sector, the National Union of Education Workers (SNTE), oversaw assignment of teaching positions, promotion decisions and salary allocation. A prime challenge for the reform was replacing this deeply entrenched system, which had captured the education system for political patronage, with a more accountability-oriented approach focused on education results (Nuño Mayer, 2018).

Earlier administrations had attempted to reduce the control the teacher union had on teacher careers, with limited results. In 1993, the then President Carlos Salinas de Gortari began laying the foundations of the teacher career ladder (Gómez Zamarripa and Navarro Arredondo, 2018). In 2002, President Fox created the National Institute of Educational Evaluation (INEE) to provide the public with information on the performance of the education system (SEP, 2002). Both measures were meant to increase accountability of schools to address the enormous social and economic inequalities that hindered Mexico's path toward increased development. The teacher career ladder proved insufficient because the SNTE and one of its most prominent sections, the National Coordinator of Education Workers (CNTE), maintained their influence over key aspects of teacher evaluation, reducing the teacher career ladder to a mere mechanism of political control (Reimers, 2018). The INEE, on the other hand, has proven to be an essential tool in a push toward teacher and principal professionalization as well as objective assessment of the education sector. It has done so by generating guidelines for the evaluation of students, teachers and policies in order to fill a void of information that was historically lacking in Mexico (INEE, 2018a; World Bank, 2018). The INEE's institutional framework measures strengths and deficiencies in the sector and is fundamental to the reform's evaluation component.

In the 2006 presidential election, the unions flexed their political muscle, throwing their weight behind candidate Felipe Calderón of the center right PAN, who defeated Andrés Manuel López Obrador, of the center left PRD, by a narrow margin of 0.56%. This allowed unions to secure continued control over key elements of the SEP during this term. The PAN, both during the Fox and Calderón administrations, continued employing the same governance mechanisms adopted by the PRI rather than breaking the cycle of corporatism that had characterized the PRI's 70 years in power. This was especially evident in the appointment of Fernando González as Undersecretary of Elementary Education in December 2006. González was the son-in-law of Elba Esther Gordillo, the leader of the SNTE. In this way, González's appointment only strengthened the union's influence over educational policy formation.

In 2012, Mexico elected Enrique Peña Nieto of the PRI as president, reinforcing political plurality as the new norm. This created a culture in which political parties understood that dialogue and compromise were necessary to overcome the legislative paralysis that prevented major constitutional reforms (Woldenberg, 2012). A day after Peña Nieto took office, Congress signed the *Pacto por México*, a set of structural reforms meant to promote growth and bring Mexico into modernity. The RE was a cornerstone of this legislative initiative (IFE, 2014).

## 4.3 The Role of Evaluation in Teacher Professionalization

The reform's theory of change relied on institutional and legal modifications to underpin the three main axes of the reform and catalyze student achievement by aligning curricular goals with 21CC, improving teacher quality, and producing principals well-equipped to take the helm of schools. In 2013, the INEE became an autonomous constitutional body independent of control by the executive branch of government, and thus independent of the Ministry of Education to which it had previously reported (LINEE, 2013). This change was meant to eliminate any conflict of interest and allow the INEE to create an evaluation framework to objectively and independently evaluate all educational activities of the Ministry of Education. This expansion of the INEE mandate allowed it to oversee the union's role in teacher selection and promotion (LINEE, 2013), creating friction between the two bodies that had not previously existed. Additionally, Article 3 of the Constitution and the LGE were both reformed and the SPD, along with the LGSPD, was instituted to create a rigorous system of teacher selection and promotion. Educator evaluation was the central tenet of achieving the reform's stated objective of improving educational quality by diagnosing educators' weaknesses and then using professional development to bolster teachers' pedagogical competencies and principals' leadership abilities. It also created a path to replace union influence over the educational sector with increased governmental control, both at the federal and state levels. Undoubtedly, one of the key tools of the reform was the creation of the SPD, a body responsible for "reprofessionalizing" teacher selection, in-service teacher training and promotion as well as eliminating the aforementioned legacy of decades of bad practices, nepotism and corruption in the appointment and promotion of teachers (Granados Roldán, 2018a).

The theory of change also necessitated updating several facets of the educational model. The NME focused on five areas: (1) the "schools at the center" (*escuelas al centro*) initiative; (2) curriculum; (3) educator training and professional development; (4) inclusion and equity; and (5) governance of the educational system (CIDE, 2016). The curricular component of the NME sought to modernize education and prepare students for the twenty-first century by incorporating cognitive, intrapersonal, and interpersonal competencies into the national curriculum as well as in principals' and teachers' job descriptions to be able to support their students in meeting the NME's goals (SEP, 2017a; National Research Council, 2013). In this way, the implementation of in-service training prepared teachers for curricular changes and the new expectations these changes introduced.

A focus on 21CC necessitated the transformation of the educator's role from a transmitter of knowledge to an active participant in the learning ecosystem. Teachers were not only expected to help their students develop skills and gain knowledge, but they were also charged with creating and maintaining ties with a larger school community (SEP, 2017a). This new conception of the teachers' role necessitated ample support in the form of professional development in order to prepare teachers for expanded job responsibilities. Integrating the 21CC into principals' responsibilities also reimagined the role of the school leader in the Mexican educational

system. Under the reform, the ideal principal would provide both administrative and instructional leadership for teachers; create collaborative learning environments; and proactively forge connections with families, the surrounding community, businesses and non-profit organizations in order to better prepare students for success in the twenty-first century (INEE, 2018b).

A final strategy that informed the theory of change of the reform was a paradigm shift in the educational community. This placed schools themselves at the center of all learning objectives, which created a sharp contrast to a previous model in which schools were seen as one of many elements in the educational community and were not given full decision-making power (Reyes, 2018). The updated model sought to ensure that the learning objectives outlined in the NME were met. This change was meant to result in improved access to educational opportunities as well as quality instruction (Reyes, 2018). This shift was promoted by an improvement in infrastructure thanks to the "A + Schools" (*Escuela al Cien*) program and the implementation of mechanisms to foster a change in work culture (SEP, 2017c). Teachers had a central role in reclaiming school governance with community members, and professional development was designed with this objective in mind.

Within this strategy, educator professional development consisted of creating networks within and between schools in order to facilitate the exchange of best practice ideas among principals and teachers (Reyes, 2018). It also sought to provide guidance for school development plans. The reform established CTEs and CTZs to facilitate discussion of teacher's practice and assessment of the school community (LGE, 2013). ATPs were installed to facilitate school-to-school collaboration and learning alongside the SATE (LGSPD, 2013). Finally, school, local, state and national CONAPASEs helped create learning communities made up of several schools, rather than schools' learning activities being confined to the immediate surrounding community (LGE, 2013).

Central to the idea of empowering schools with increased autonomy was ensuring that principals, all of whom had been promoted to their post from a teaching position, were fully equipped to exercise effective leadership. Another important figure was that of the supervisor, who was meant to act as another support mechanism for school communities and educators (Schmelkes, 2018). Developing school leaders was, therefore, the main focus of the reform (Reyes, 2018). This would be key to dispelling the perception that principals were under the political control of unions, as had been the case in the previous system when unions determined principal placement (Schmelkes, 2018).

This reimagining of the educational system entailed a variety of intertwined principles. From a governance standpoint, the Ministry of Education would focus on gathering existing best practices and disseminating them to schools nationwide. Although the federal government would oversee the distribution of human and financial capital as well as didactic materials, decisions about where to ultimately allocate these resources were the responsibility of the local education authorities, in accordance with Article 19 of the LGE (LGE, 2013). Further, school communities would benefit from their newly gained agency to determine how to use these resources

(Reyes, 2018). These changes created a system in which professional development was jointly managed by the federal government and the local education authorities.

## 4.4 First Axis of the RE: Evaluation as a Tool of Professional Development

A key barrier to aligning the country's education to success in a new century was an opaque system of teacher selection and promotion that depended more on union ties than professional merit (Nuño Mayer, 2018). In order to ensure improved student outcomes, the reform defined quality in education as its cornerstone and implemented technical and political accountability mechanisms that had historically not existed to assess educators and contribute to their professional development (Nuño Mayer, 2018).

**Professional Teacher Service**. International evidence overwhelmingly shows that educational programs, didactic materials and technology may strengthen and amplify the effects of good instruction, but do not replace bad instruction (Majgaard and Mingat, 2012). The main goal of the RE, then, was to ensure, through assessment, that there was a good teacher in every classroom (Granados Roldán, 2018a). This meant deep changes in the LGE, as well as the creation of the LGSPD. The LGE and the LGSPD instituted evaluation procedures to ensure that only professional merit determined hiring decisions (Granados Roldán, 2018a).

One of the fundamental innovations of the reform was the creation of the SPD because it established the criteria, terms and conditions used to assess teachers, ATPs, principals and supervisors in four facets: entry into the profession (*ingreso*), ability to keep a teaching position (*permanencia*), recognition of performance (*reconocimiento*) and career progression (*promoción*) (LGSPD, 2013). That is, teachers could either advance within the teaching profession to be recognized for their performance (horizontal promotion), or move up to leadership roles such as principals, supervisors or ATPs (vertical promotion). The reform mandated that assessment would be the first aspect of the RE to be implemented (LGSPD, 2013). Before this system was introduced, years in the profession and union loyalty were the indicators used to determine promotion. The criterion used by the SPD to assess teachers was based on the evaluation framework developed by INEE (INEE, 2018b).

**National Institute of Educational Evaluation**. The INEE operated as a constitutional autonomous body that was a state entity, not under government control, and started in 2013. This autonomy is a key difference from the way the institute had been governed since its creation in 2002, which was under the jurisdiction of SEP (LINEE, 2013). INEE's mission was to generate the framework for assessing students, teachers, principals and policies in order to provide sectoral information which had been historically lacking (LINEE, 2013; World Bank, 2018). The INEE had five main functions:

1. Assessment of the educational sector (LINEE, 2013).
2. Coordination of the National System for Educational Evaluation (SNEE), comprising the SEP, the AELs, unions, teachers, parents and the private sector (World Bank, 2018).
3. Creation of guidelines and framework to evaluate teachers, principals, policies and programs (UNESCO, 2017).
4. Publication and analysis of evaluation results.
5. Analysis of policies implemented by the SEP with the authority to ask questions and make recommendations that must be addressed by the SEP.

This institutional framework to measure teacher performance provided a foundation on which the RE's assessment component would be built.

**INEE rubric for ideal teacher performance**. The reform explicitly defined a high-quality educator using INEE's framework, across two dimensions: curricular and didactic knowledge and lesson and course planning. The curricular and didactic knowledge dimension described the ideal primary school teacher as the following:

> An ideal level-four teacher recognizes the key stages and trajectory of children's development and learning processes, keeping in mind the important influences that family, society and culture have on their students. They recognize the importance of the formative nature of learning goals and demonstrate knowledge of school and curricular content. They know how to measure progression such that it promotes student achievement and results in the attainment of learning goals. Ideal teachers recognize the characteristics of didactic approaches incorporated into a curriculum that is based on pedagogical references. They identify strategies aimed at improving their own professional development (INEE, 2018b, p. 7).

The lesson and course planning dimension described the ideal primary school teacher as the following:

> A level-four or ideal teacher argues about how to link the individual characteristics of students to their sociocultural, school and family contexts, in order to enhance the probability that achievement goals are met while students experience learning environments that motivate them to learn. Such teachers are able to explain evaluations and feedback methods that they use with students to improve their learning. When reflecting on the results of their practice, level-four teachers legitimize their actions based on accepted philosophical, normative and ethical principles that regulate the teaching profession. In addition, they offer arguments in favor of the strategies to enrich their professional development and teaching capacity, and explain clearly how new techniques can be operationalized to strengthen their students' learning expectations (INEE, 2018b, p. 6).

**Four levels of teacher evaluation**. Teacher evaluation was divided into four categories: initial teacher assessment (*ingreso*), continued teacher assessment (*permanencia*), performance recognition assessment (*reconocimiento*) and career progression assessment to advance within the SPD (*promoción*).

***Initial teacher assessment***. Before the reform, graduates from teacher training colleges, which were the only institutions that could train teachers, were ensured teaching positions (Reimers, 2018). Teacher training colleges have shifted over time from being equivalent to a secondary education to being equivalent to an undergraduate degree (Reimers, 2018). The reform instituted requirements to restrict entry

into the profession for candidates with the best results on the initial teacher assessment, regardless of previous training (SNTE, 2015). Today, degrees in primary or secondary education as well as pedagogy are all viable entryways into the profession.

The reform reimagined a teachers' role from a mere transmitter of knowledge to a facilitator of learning, an active participant in the academic environment and a key driver in creating harmony among students and the school community (SEP, 2017a). All teachers who passed the entrance evaluation were expected to demonstrate these competencies. The results of a national assessment are reviewed to ensure that only the most prepared teachers are selected and allowed to retain positions (SEP, 2017a). This procedure is meant to eradicate the nepotism, favoritism and low standards that had earlier permeated the profession. Previously, any graduate of a teacher vocational school was guaranteed a position without having to pass an exam. Professional development was vital in helping teachers who had attained positions through the old system in updating their skills and conforming to new standards. It was also key to ensuring teachers who entered the profession through the new system continued to meet the established benchmarks.

***Continued teacher assessment***. Continued teacher assessment became one of the defining characteristics of the reform. It was introduced to evaluate the competencies of teachers who were already part of the country's teaching force and dictated if they would keep their teaching position (Nuño Mayer, 2018). It is important to note that teachers had three opportunities to pass this exam, which consisted of a questionnaire as well as a test of subject knowledge (INEE 2018). If teachers were unable to pass the exam after a third attempt, they would not be removed from the teaching force altogether, but they would no longer be able to teach in the classroom. This applied only to teachers who had entered the profession through the entrance exam in 2015, not to those that had already secured a position (LGSPD, 2013). This exam arguably generated the most controversy and opposition from specific factions of teachers and the union. Insufficient performance on the initial two attempts on this type of assessment did not lead to immediate removal from the classroom, but instead mandated that teachers who did not pass receive professional development to bolster their performance.

***Performance recognition assessment***. Evaluation for recognition of performance had three objectives (LGSPD, 2013). First, it would recognize and support individual teachers as well as schools in their pedagogical activities. Second, it would introduce temporary or one-time incentives. Any monetary recognition was awarded with consideration of student outcomes as well as the socioeconomic status of the school in which the teachers were placed. Finally, it would link professional development to incentives so that even the highest achieving teachers were encouraged to improve their skills.

***Career progression within the SPD***. In addition to advancing horizontally in the teaching profession through performance recognition, educators in Mexico may also pursue leadership roles. There are great disparities worldwide in candidates' knowledge of and preparation for school leadership positions (Chapman & International Institute for Educational Planning, 2005). All principals, ATPs and supervisors in the Mexican educational system possess at least 2 years of classroom experience and have

either completed teacher vocational school or earned a degree in education (LGSPD, 2013). The LGSPD states that principals plan, program, execute and evaluate school functions; organize and support teachers, perform administrative work and facilitate communication between schools, families and mentors (LGSPD, 2013). The reform reimagines the principal's role as not just administrative but aligned with 21CC and better equipped to implement the NME.

The INEE follows a four-level rubric to analyze each assessment, with each level indicating better preparation. This rubric outlines the specific abilities candidates must possess in order to be ranked at each level. The process for ATP and supervisors follows the same logic (SEP, 2017b). This rubric provides guidance for the ideal type of professional development to offer.

Level 1 indicates a lack of knowledge of school workings, underdeveloped management skills and poor curricular knowledge. Level 2 shows better, but still basic, familiarity with management skills and school functions as well as a rudimentary knowledge of curriculum. Level 3 corresponds to a familiarity with school workings and the role of the principal, but inability to create fully-formed collaborative and inclusive school environments. Level 4 describes mastery of the fundamentals of school work and management as well as firm knowledge of curriculum, best classroom practices and mechanisms to improve teaching; this level describes candidates who have the ability to create collaborative and inclusive work environments and identify actions to connect the school to families, the community and other institutions, such as businesses and non-profit organizations (INEE, 2017).

**Educator training and professional development**. Training and professional development for teachers and principals can be categorized as initial teacher training, in-service teacher training, initial principal training and continuous principal training.

***Initial teacher training***. The RE mandated that all incoming teachers demonstrate mastery of the skills necessary to teach the new curriculum published as part of the NME (LGSPD, 2013), even though it would not be published until years later. In order to accomplish this lofty goal, the SPD emphasized the need to start implementing the NME curriculum goals in the early stages of both vocational schools and other degree programs (LGSPD, 2013). In previous attempts at reform, introduction to new curricular content was done years after teacher training had taken place, causing misalignment between teacher skills and what teachers were expected to teach (SEP, 2017d). The reform included an innovation in the initial teacher training with the introduction of a degree with a focus on primary education. This created an additional path into the profession and helped break the monopoly the teacher training colleges had held on the selection and promotion of teachers (Mexicanos Primero, 2018).

Very few changes have been implemented in teacher training colleges (*escuelas normales*), making it difficult to satisfy the essential components of content for the Model for Teacher Education (*modelo de educación normal*) (Consejo Asesor, 2014). Fulfilling the model's ambitious goals means diversifying training approaches in teacher preparation programs to incorporate pedagogy that explicitly includes 21CC, an essential component of the NME. Effective professional development would also

close the gap in skills between a teacher rated at Level 2, the minimum passing score and one rated at Level 4, the ideal benchmark.

***In-service teacher training***. In-service training is provided by a mixed system: a series of online and lecture-based teacher workshops, which reached 1.2 million teachers to prepare them to teach the new curriculum (Granados Roldán, 2018a), peer-to-peer instruction, discussion of the teaching practice and experience, and learning-through-action mechanisms. CTEs were the fundamental spaces for the new policy of in-service teacher training and development. Beginning in 2013, the SEP set aside monthly four-hour sessions that took place eight times a year so that teachers and principals could plan collaboratively, follow-up with students on school projects and activities, and develop research-based pedagogical abilities (Mexicanos Primero, 2018). The focus of the CTE expanded from training within schools to professional development between schools in hopes of creating a network of educators that could share best practices throughout communities (SEP, 2015). Chronologically, this form of training was harder to implement. Although it was promoted at the same time that the LGSPD and LGE were published, the mechanism took longer to become the norm (Reyes, 2018; Schmelkes, 2018).

## 4.5 Second Axis: The New Educational Model as a Tool for Educators

The NME was a comprehensive approach to changing the educational system in order to address the new challenges of the twenty-first century (SEP, 2017e). Major changes introduced by the NME had a profound impact on teacher professional development because they meant altering or adapting existing resources to be aligned with the goals of this new model. Because educating the whole child is a holistic endeavor requiring systemic alignment, the NME was centered in five key areas: (1) the curriculum, as outlined in the document *Aprendizajes Clave*; (2) schools to the center, which encompasses teachers, the SPD and teacher training colleges; (3) initial and continuous teacher and principal training; (4) equity, which emphasized education as a human right that was not constrained to schooling, but rather viewed as a lifelong learning process; and (5) governance (SEP, 2016).

The NME's curriculum emphasized 11 primary skills that students must develop in the new national education system which fall under three categories: Fields of Academic Knowledge, Areas of Social and Personal Development, and Spheres for Curricular Autonomy (SEP, 2017a). Teacher and principal assessment rubrics and training goals were, in theory, oriented around the ability to teach and internalize these 11 skills. Some of the innovations that were included in this new approach that transformed all the schooling process from pre-school to higher education were: socio-emotional education, a bilingual approach that promoted learning in the child's mother language, a focus on diversity which implied specific goals for individual needs and a promotion of personal and social development.

The NME presented a set of standards and new curricula that represented a novel approach to achieving learning objectives by emphasizing questions, projects and problems which consider the real interests of students and promote personal research, collaborative learning and flipped classroom models (SEP, 2017a). It was a shift in the way the educational system worked because it placed the student at its center (SEP, 2017a) by defining clear learning outcomes as well as ensuring that teachers, teachers in management positions and principals played a new role that envisioned the teacher as a facilitator of key abilities to develop well-rounded students.

The NME established a new pedagogy and stated learning outcomes, new assessments for learners, and a new approach to share this with parents, while also allowing for adaptability to the different socio-economic, cultural, regional and linguistic contexts throughout Mexico (Granados Roldán, 2018b; SEP, 2018).

In 2017, the SEP published the NME curriculum after consultation with national stakeholders. The 2014 "National Consultation on the Educational Model" included 18 regional and three national forums with 28,000 participants in total, including both the general public and experts. This generated 15,000 proposals and four documents totaling 1,943 pages (Nuño Mayer, 2018; Díaz-Barriga, 2018), which received input and feedback from universities, CTEs and CTZs (Nuño Mayer, 2018). The theoretical foundations of the reform are compiled in *Key Learnings for Educating the Whole Child*, which outlines the new curriculum and suggests pedagogical innovations and guidelines for their implementation into the classroom (SEP, 2017a).

## 4.6 Third Axis: Professional Development, Dialogue and Community Involvement

In order to catalyze a shift in the educational community paradigm, the reform moved away from requiring state-mandated mechanisms for meeting curricular goals and entrusted schools with the responsibility for communal strategizing to meet student learning objectives. This was designed to give more autonomy to schools in order to customize instructional methods and better meet the specific needs of their students. The reform instituted the previously mentioned CTEs, CTZs, in addition to the SATE and CONAPASEs, as programs to promote information-sharing, mutual learning and communal goal-setting among local school stakeholders. The inclusion of these new mechanisms in the school ecosystem allowed for professional development and teaching practices that focused more concretely on learning through collaboration with other educators and schools.

SATE were organized to improve school functioning and promote teacher and principal best practices across regions via support, assessment and monitoring of individualized professional development, knowledge, skills and capacities. A key provision of SATE's goal of facilitating peer-to-peer knowledge exchange was a mentorship program between senior and beginning teachers, an arrangement that had been lacking in previous training (SEP, 2017b).

CONAPASEs sought to create learning communities where all stakeholders in the educational community were represented. Both school leaders and families would come together to foster co-responsibility in the learning and holistic development of students. To do so, they would participate in the design and implementation of a school improvement plan, development of a productive learning atmosphere, and vigilance of proper school management and operations. This equipped educators with opportunities to better develop the skills that would allow them to reach the level 4 indicator.

## 4.7 Analysis of the Implementation of the RE's Theory of Change

Countries must address political constraints to realize a reform's objectives and break out of low-learning equilibriums (World Bank, 2018). The reform instituted governance mechanisms to recover the state's control of educational systems from teachers' unions and empower communities to participate in the educational processes, such as the establishment of the SPD, new pathways into teaching positions and the four types of assessments that ensure a merit-based system of entry and advancement. By shifting influence and decision-making from unions to the state, the reform's implementation threatened privileges that teachers had historically enjoyed, such as the abililty to inherite or sell teaching positions or awarding principal positions to those who demonstrated loyalty to the union. The challenge, then, was fashioning a new model that did not appear punitive of teachers. This was vital to ensure buy-in from a stakeholder who had both high interest in and influence over the execution of the reform (Bardach, 2012).

The two necessary elements to any reform or intervention are the program theory, which details stated outcomes and the inputs necessary to achieving those outcomes and the processes which are expected to produce those outcomes, and the implementation theory, which indicates the series of actions that must be implemented to accomplish the theory and its expected outputs (Kemmerer, 1994). In the case of the reform, there was a fundamental misalignment between elements of the reform's program theory, modernization of the education system to align to the 21CC, and its implementation theory, for the state to regain control of the sector by assessments. This misalignment, compounded by resistance from some members, specifically the CNTE in the southern states, of the educational community as well as the improper functioning of organisms meant to promote cooperation and interconnectedness, prevented the reform from fully achieving its goal of improving educational quality and equipping all students with 21CC for success in the modern world.

## 4.8 Analysis of the First Axis: Evaluation as an Indicator for Professional Development

The architects of the reform designed an implementation theory that instituted rigorous teacher and principal evaluation and created a framework for educator selection and promotion. The program theory, then, was to develop a better-trained teaching force and a transparent process for entry into and promotion within the profession. Additionally, the program theory hinged on an effective system of professional development that would support educators at all junctures of their careers. Finally, it was a direct attempt to break the stranglehold that the labor unions enjoyed over the sector for decades. However, several obstacles prevented this vision from coming into full fruition.

Both a desire to take immediate action after the Pact for Mexico had been announced and a restrictive legal framework meant that the evaluation was the first measure implemented by the reform as was mandated in the transitory articles of the LGE (LGE, 2013). While a top-down approach, which was the result of an agreement between the political parties represented in Congress, necessitated decisive action, this did not allow time for a more extended consultation period that could have provided teachers with a clearer understanding of what the reform sought to accomplish. Moreover, these consultations took place after the laws were published and focused on the NME and the curriculum, not on the laws (Consejo Asesor, 2014; CIDE, 2016). Although it is true that many different mechanisms were used to promote dialogue, they came too late. The unnecessarily accelerated pace at which teacher evaluation proceeded reinforced the perception that the RE was punitive, undermining the efforts of the 2014 and 2016 forums conducted by the University of Baja California and the CIDE respectively, which were created to gather the input of all key stakeholders. The positive outcomes of teacher assessment to enhance professional development were never properly explained, which gave more weight to the voice of teachers who opposed the RE (Schmelkes, 2018). That is, the group of educators that did object to the evaluations felt as if they were the targets of mandates and directives rather than collaborators in the authorship of the reform because of the timing of the reform's implementation (Tirado, 2018).

The *permanencia* exam, which determined whether a teacher could keep his or her position, was misaligned and only exacerbated the larger perception that evaluations were a form of punishment, rather than an avenue through which to improve. In fact, since the reform's implementation, the idea of evaluation has been consistently used by its detractors to attack the reform as disrespectful of teachers and more of a labor reform than an educational reform (Granados Roldán, 2018a). Crucially, SEP's framework never secured the backing of the SNTE, and was in fact the target of substantial criticism and the subject of widespread resistance (Reimers, 2018). This lack of acceptance clouded the perception of assessment, not just as a mechanism of the reform, but in the sector as a whole, which had far-reaching consequences, including Lopez-Obrador's decision to dismantle the INEE (Lopez Obrador, 2018).

It should be noted that these mechanisms had different levels of acceptance from the teachers and schools. While the CTEs were widely implemented and quickly became a fundamental space for teachers to collectively discuss their experience in classroom and improvements to their pedagogy, other mechanisms were not well received (Mexicanos Primero, 2018). Although the provision of evaluation did not satisfy all parties involved, it is important to reiterate that there was acceptance from teachers throughout the country, with more than 500,000 teachers to be assessed in the first 2 years of the implementation (Granados Roldán, 2018b). A survey regarding satisfaction of teachers shows the type of in-service training they received as well as how happy they were with it. The results of this survey suggest that there is perhaps enough acceptance of evaluation of educational activities to continue to form part of the educational landscape in Mexico under future administrations.

## 4.9 Analysis of the Second Axis: The New Educational Model as a Tool for Educators

While the reformed curriculum incorporates cognitive competencies as well as intrapersonal and interpersonal skills, there is still a clear imbalance in favor of the first two of these three categories. This suggests that, while the NME standards have pushed for the development of cognitive competencies, the skill area which most closely correlates to traditional conceptions of school learning, it has also catalyzed the development of competencies found in the intrapersonal skill area. In contrast, leadership abilities, which embody the interpersonal skill area, are not similarly prioritized. However, educators were not explicitly trained to deliver the new pedagogical approaches to transmit these specific new skills to learners.

**INEE rubrics**. Mexico's reform made an explicit effort to align its curricular goals with the 21CC, but a more concerted effort to develop interpersonal skills would have created more balance between the three categories and would have more explicitly emphasized collaboration and leadership for twenty-first century education. Only candidates achieving the criteria of Level 4 on the INEE rubrics, and to a lesser extent Level 3, display the capacities that fully realize the reform's expectations, and the ability to incorporate the 21CC into the NME. However, since Level 2 is the passing grade, teachers and educational leaders are selected even though they don't possess the attributes of an ideal educator. This highlights the necessity of promoting professional development so that an increasing number of educators can achieve the Level 4 standard.

Recent data show that 52% of 134,009 applicants were hired (Granados Roldán, 2018b). These numbers reflect a large pool from which to select the most-qualified candidates, but existing data does not show what portion of these 52% scored at Level 3 or 4. More evidence would have made clear how many candidates are at the ideal benchmark and how much additional training is needed to improve the preparedness of the application pool. In spite of advances in explicitly incorporating

21CC into the NME, many criticized the reform for lacking the mechanisms to ensure that 21CC were taught (Cordero et al., 2017). Although the NME is predicated on student-centered learning, the same concept is not applied to teacher and principal training.

## 4.10 Analysis of the Third Axis: Professional Development, Dialogue and Community Involvement

In order to shift the paradigm of the educational community, the reform employed the intertwined strategies of instituting accountability standards, loosening central government control and providing schools with greater decision-making power as well as better prepared leaders. It facilitated exchange of ideas and best practices via continuous professional development and community learning spaces (Reyes, 2018).

Online training and lectures trained large numbers of educators but did not account for peer-to-peer interactions or learning through action, which were a staple of the reform's understanding and teaching of the 21CC.

TALIS found that close to 90% of teachers participated in SATE training workshops. Out of those, 20% of teachers reported that they did not feel prepared to teach the required content (OECD, 2014). Other programs focused more on the strengthening of interpersonal competencies in teacher training, but these were much less utilized.

Teachers reported satisfaction with the program, which created a school learning plan in 170,000 out of the 200,000 CTEs established with a close collaboration between the teachers and principals (Velasco and Treviño, 2018). In sum, CTEs were acknowledged as welcome learning spaces, but few concrete action plans came out of these meetings (Schmelkes, 2018). SATE were meant to reorganize the ATPs, which ended up with a more administrative role than pedagogical, even though that is what the reform had sought to achieve. The short implementation span, which began in 2017, did not allow for them to be correctly understood, leaving them as a task yet to be fulfilled (Bonilla-Rius, 2019).

Additionally, the potential effectiveness of these learning spaces was severely hampered by inconsistent implementation. While some schools were able to put into practice these bodies, others were reluctant to adopt them. To bridge this gap, the SEP tried to make the above-mentioned mechanisms more widely accepted by promoting the use of guidelines and conducting the meetings for them to become actual spaces for co-learning (Reyes, 2018). However, instead of enhancing the dialogue and reflection about teaching practices, government involvement added to bureaucratic tasks for teachers and principals, which made the educational community resent these initiatives more (Schmelkes, 2018).

## 4.11 Advances and Shortcomings of Professional Development in the Reform

A retrospective look at the reform allows for a more holistic analysis that accounts for how the main actors in the educational system reacted to the core tenets of the reform. The principal achievements and pitfalls of the professionalization of educators in the reform provide lessons for other countries and have broad implications for large-scale educational reform efforts.

## 4.12 The Curricular Component of the Reform

The reform sought to infuse the NME's curriculum with 21CC that would catalyze learning and equip Mexican students with the breadth of skills necessary to succeed in the current century. However, the lack of established in-service training programs for teachers was a prime obstacle to achieving this goal. The Level 2 passing score on the entrance exam for teachers and principals required that educators possess a moderate level of cognitive and intrapersonal competencies, but did not establish the same requirement for interpersonal skills required in the curriculum. This made it even more difficult for students to acquire these skills. The new in-service teacher training delivered via the CTEs was a prime opportunity for intentionally developing interpersonal skills, but the lack of sufficient presence from and acceptance of ATPs made it difficult for the CTEs to remedy this specific problem.

## 4.13 Evaluation and Its Impact on Professional Development

An order of implementation that began with laws was logical, but placing evaluation before training only reinforced the narrative of some union factions that the reform was setting up teachers to fail. The evaluation for continuing teachers and the provisions around it were particularly problematic given that the multiple opportunities to pass, and its consequences of removal from the classroom but not the school, may not have been properly understood by all teachers. Better articulating the provisions of this specific evaluation may have helped to soften the blow and make the reform more palatable to teachers.

The task of replacing a decade-long teacher selection and promotion process with a new model was challenging, especially in the face of a powerful teachers union. Nonetheless, implementation of evaluations was a step in the right direction. Assessments were used to control entry into the profession, assign appropriate in-service training, incentivize exemplary teachers with better compensation, remove underperforming educators from the classroom and promote teachers, both within the teaching

track and to positions of leadership. Teachers who reached a "sufficient" grade were not mandated to take part in certain professional development opportunities. This did not go far enough in actively promoting continued improvement and disrupting any remaining complacency in the profession.

In any case, it is important to again emphasize that not all teachers objected to the RE. In fact, many teachers welcomed the performance evaluation, as evidenced by strong and increased participation in these evaluations. Regardless of this, the narrative advanced by the unions was one that characterized the reform as disrespectful toward teachers, a difficult message to counter. In fact, neither the INEE nor the SEP was successful in doing so. Perhaps even more importantly, the architects of the reform were unable to break through the image that they were creating a construct that confined teachers rather than communicating directly with educators in order to forge a path forward. While teachers are arguably the stakeholders most affected by any educational reform, the perception of the reform advanced by its detractors was that teachers were not a central part of its planning.

## 4.14 Key Lesson: Dedicated Professional Development Spaces with Teacher Input

A critical lesson from the reform is the importance of intentionality in dedicating both time and space to professional development. The CTEs and CONAPASEs were essential spaces for teachers to share best practices, develop pedagogy and engage in the governance of and planning for school communities. Ultimately, bureaucratic obstacles and inconsistent implementation prevented CTEs from achieving their maximum potential. CTEs often became groups for completing administrative responsibilities as opposed to promoting in-service teacher training, especially without a fully staffed and trained ATP. An ATP dedicated to meeting NME and teacher needs as revealed by assessment results may have been more impactful in removing bureaucratic red tape and ensuring consistent implementation across schools. While teachers participated in the consultation process and their input often led to the reimagining of specific aspects of the NME, a more concerted effort to shore up teacher professional development may have helped to avoid some of the problems that arose with the CTEs and could have resulted in a type of in-service training that was immediately aligned with curricular needs and teacher skill gaps, minimized bureaucracy and maximized participation through multiple stakeholder buy-in. Different actors in the education sector, especially teachers, have to be heard in all stages of the process from the design, to the implementation, and evaluation in a continuous manner. Ultimately, this was the cardinal lesson of the reform: it is essential to consult educators and include their input into any substantial reforms.

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# Chapter 5
# Building Teacher Capacity at the Telangana Social Welfare Residential Educational Institution Society


**Tanya Kant, Aditi Nangia, Usha Nikita Satish and Aarya Shinde**

**Abstract** In this chapter, we explore the effects of teacher professional development on student achievement at a high-performing public school network in Telangana, India. The school network is the Telangana Social Welfare Residential Educational Institutions Society (TSWREIS). The aim of TSWREIS is to address some of the challenges that students from marginalized castes face when obtaining an education. Our examination of this school network will include an overview of the current public education system in India, caste-based discrimination, program description, teacher and principal development description, and the integration of twenty-first century skills into the school network's curriculum. These core components highlight what makes TSWREIS successful in its mission to provide a quality education to marginalized students. A concluding section discusses the key enablers of that allow the project to have stable leadership and a sharp focus on their vision and goals, rather than the instability that reforms sometime face because of change in leadership.

## 5.1 Introduction

In this chapter, we will examine a network of social welfare schools in Telangana, India, paying close attention to the effects of teacher professional development on student outcomes. The school system that we analyze is the Telangana Social Welfare Residential Educational Institutions Society (TSWREIS). This school system aims to address the education inequality faced by millions of Indians due to caste-based discrimination. The network emerged in response to the failure of the public education sector in Andhra Pradesh, the state in which Telangana originated, to offer adequate educational opportunities to children from lower castes. TSWREIS is thus focused on providing such high-quality educational opportunities to students from marginalized communities in Telangana, India.

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We begin our analysis by first providing social and political context of India and an overview of the education landscape in Telangana. We then describe the core elements of the TSWREIS model as well as the school network's theory of change that undergirds its approach to teacher professional development. We also focus on how teacher and school leadership development contributes to the success of the TSWREIS model. We conclude with key lessons learned from the analysis of this reform and its components.

## 5.2 Public Education in India

The Indian public school system educates over 12 million students of different faiths, beliefs and socio-economic status, making it one of the largest and most diverse school systems in the world. Over the last two decades, the public school system in India has expanded rapidly with policies like the Right to Free and Compulsory Education Act (RTE, 2009), which ensured that children, regardless of socio-economic status, are able to attend public schools for free.

However, the progress made on expanding access to education has not been matched in the improvement of the quality of education being provided. Public schools across India still struggle to meet the infrastructural criteria specified in the RTE, with many schools still not having regular access to fresh drinking water, functional toilets or running electricity. These roadblocks have negative implications on student learning and student performance. On top of these challenges, certain groups of students within the system also face the burden of caste-based discrimination.

## 5.3 Understanding Caste-Based Discrimination

The caste system in India distinguishes people within the Hindu society into four categories based on occupation and social status. Ascription to a particular caste is hereditary and cannot be changed as a result of the desires, effort or ability of an individual. Because occupation is related to membership in a particular caste, the system has historically limited access to jobs and other development opportunities for members of the lower castes. Until a couple of decades ago, lower caste or the *shudras* and the *dalits* lived in the periphery of cities or villages without access to basic human or education rights.

In attempts to make amends and redress the inequalities caused by the caste system, the Indian Constitution outlawed caste-based discrimination and launched India's affirmative action program in 1950. This program reserved seats in the legislature, government jobs and in public higher education institutions to increase participation from individuals from marginalized communities, which were re-grouped as Scheduled Castes (SC), Scheduled Tribes (ST) and Other Backward Classes (OBC). While this bill improved access for some members of these communities, the stigma

associated with lower castes was not eliminated. Thus, caste-based discrimination still prevailed in overt and covert ways, often manifesting itself in the form of barriers to basic education and equal employment opportunities.

## 5.4 Inception of TSWREIS

As a response to the prevalent inequalities based on social classes in the society, in 1984, a network of social welfare schools was established in Andhra Pradesh to provide free, high-quality residential education to students belonging to the SC, ST and OBC. The creation of such a space for minority communities in the state was led by S. R. Sankaran, a bureaucrat in the Indian Administrative Services who established the Andhra Pradesh Social Welfare Residential Schools and promoted policies that empowered the SC community. At a time when the Indian government had made limited efforts to increase enrolment in public schools, the establishment of these schools ensured that students from SC, ST and OBC communities had access to free, good quality education from grades fifth through twelfth. (TSWREIS Note 2, 2018).

A significant shift in the system occurred in 2014 when the state of Telangana splintered from Andhra Pradesh, which caused the existing network of social welfare schools to split, giving rise to the Telangana Social Welfare schools (TSWREIS) as a separate entity. The social welfare schools in Telangana came under the leadership of Dr. R. S. Praveen Kumar, a bureaucrat with the Indian Police Services, who became the Secretary of the TSWREIS network and steered the institution toward innovation, excellence and improved accountability. Before assuming his role as the Secretary, Dr. Kumar had studied at the Kennedy School of Government at Harvard University where he cross-registered ed in a course on comparative education policy at the Harvard Graduate School of Education. His education at the Harvard Kennedy School inspired him to employ diverse strategies to improve the social welfare schools.

A key factor that aided initial progress within the TSWREIS system was governmental support. In the newly formed state of Telangana, Chief Minister K. Chandrasekhar Rao supported the expansion of social welfare schools and supported the opening of 103 social welfare schools and 30 residential degree colleges for women in the academic year 2016–2017. As a result of such support, as of 2019, TSWREIS runs 268 residential educational institutions from grade five to undergraduate level in Telangana and caters to almost one hundred and thirty thousand students from the SC community. This level of outreach has ensured that over the last three decades, students from the SC community, who would have earlier not attended school or attended schools without basic facilities, now have the opportunity to access good quality schooling. The TSWREIS network is also supported by the Ministry of Scheduled Caste Development in Telangana which provides essential support in terms of funding and resources to allow the school network to expand. By 2022, the network hopes to enroll one million students in the social welfare schools across Telangana (P. Kumar, personal communication, Dec. 04, 2018).

## 5.5 Theory of Change

In the following section, we analyze the internal coherence of the TSWREIS model by evaluating its theory of change using Carol Weiss' framework, as explained in the working paper compiled by McCoy and Schindler (2017). The analysis will focus on four key areas: ultimate outcomes, intervention activities, mediating processes and moderators.

### *5.5.1 Ultimate Outcomes*

The TSWREIS schools have a clear vision to develop an institution that can impart quality education to students belonging to marginalized communities in order to promote equality of choice and opportunities.

### *5.5.2 Intervention Activities*

One of the key strengths of the TSWREIS system is the focus on improving the performance of the different actors composing the school system. Over the last six years, they have progressively improved their interventions for teachers, students and principals and have partnered with multiple external organizations, which is a practice that is still gaining momentum in the rest of the government school systems across the country. Their focus on improving the school network is evident in their efforts to build the capacity of their teachers and principals while seeking support from external organizations that are experts in their fields.

Their intervention activities for teacher training and development constitute pre-service and in-service training of teachers. While the pre-service training runs for ten days, the in-service training component is delivered over the course of an academic year. The second type of intervention activity is professional development for school leaders. Over the last three years, several cohorts of principals have undergone training and coaching in key aspects of instructional leadership provided by India School Leadership Institute (ISLI), a non-governmental organization that aims to build capacity and develop strategies for improving student learning outcomes and overall school performance. Another type of intervention is parental engagement and collaboration. The school system provides multiple opportunities for parents to be involved in their children's education, such as having an open channel for parents and teachers to share information and concerns and having programs like home visits by teachers to maintain strong community engagement, even when the parents live far away.

The last intervention that leaves an impact on the quality of education provided in these schools is the curriculum design for the school network. While the academic

curriculum being followed in the schools is the same as that in the rest of the state (Andhra Pradesh State Curriculum), the TSWREIS model has additional provisions in terms of co-curricular activities and opportunities to promote whole-child development. This intervention has increased students' learning time beyond school hours and provides students with the opportunities for physical and co-curricular activities, both before and after school, and during the summer vacation in an attempt to provide students with a holistic education.

### *5.5.3 Mediating Process*

For teacher preparation, the mediating process supporting the intervention includes different levels of strategy meetings that are held throughout the academic year to promote information exchange between the leadership and the teaching staff. For principal development, the accompanying mediating processes consist of the training sessions led by representatives from ISLI, along with monthly inspections and monitoring by regional coordinators. To improve the instructional leadership capacity within the school network, the schools have partnered with *Aavishkaar*, an organization that improves teacher knowledge and pedagogy for teaching conceptual math and science lessons. For parental engagement, the supplementing mediating processes include efforts such as end-of semester home visits as part of the QUEST initiative, which provides a platform for the teachers to share progress reports with parents. Another set of mediating process that is put in place to enhance stakeholder engagement is the interaction camp that is organized to initiate discussions on the art of effective parenting and opportunities available for their students to explore after school, among other topics of discussion.

### *5.5.4 Moderators*

Some of the key moderators that enable the TSWREIS system to function effectively stem from the very design of the initiative. Since the TSWREIS schools are residential in nature, the first benefit they gain is additional instruction time. Another resource that the school systems gain is in the form of additional funding, which comes in from both the state government and the Ministry of Scheduled Caste Development. The government spends approximately one lakh rupees (approximately fourteen hundred US dollars) per child per year (G. Varkey, personal communication, September 28, 2018). This level of expenditure roughly matches the investment that an average middle-income family would make on private school education in the country.

### 5.5.5 *Implicit Assumptions*

The TSWREIS model functions with several implicit assumptions about how the inputs it delivers produce the expected outputs. For instance, the teacher training and development model is based on the assumption that investing in teacher training modules will improve teacher knowledge. Similarly, implicit in the initiatives taken to build teacher–parent interactions is the assumption that regular discussion about student and school performance will help reduce information asymmetry, thereby promoting a culture of trust and collaboration between the parties.

The next section describes the intervention programs for teachers, principals and curriculum development in greater detail, along with a comparative analysis of TSWREIS' approach on each of these components with contemporary frameworks that outline a vision for strong teaching and school leadership. The section will also assess the impact of these programs on the larger TSWREIS school system and improvements in student outcomes.

## 5.6 Program Description: Principal Development

TSWREIS' principal recruitment, training and development are aimed at ensuring that principals are effective administrative leaders. The recruitment criteria require that the candidates have at least eight to ten years of teaching experience and the hiring takes place either from within the teaching staff or through external recruitment. The selected candidates are trained in school administration, school finance, record keeping and instructional expertise. The responsibilities of the principals on the ground are structured such that a majority of their time is spent on school administration, including duties such as monitoring student boarding and nutrition, data analysis for assessments, teacher development through meetings and observations, parent engagement and implementing programs as directed by TSWREIS office. They have opportunities to provide instructional inputs to the teachers; however, these are often generic and not subject-specific, given that they may not have advanced subject expertise required for coaches in grades ninth through twelfth. For this purpose, their work in instructional leadership is supported by regional coordinators. Overall, the tasks undertaken by the principals and vice-principals are heavily focused on administration, management and conducting the activities mentioned in the TSWREIS calendar of events, rather than being aligned to the students' reality and the school's vision and long-term goals (Telangana Social Welfare Residential Educational Institutions Society Calendar of Events, 2018).

In contrast, Singapore's Leaders in Education Program (LEP), which develops principals' abilities to create a strong school culture, navigates diversity in student demographics and works on hands-on projects. While the LEP empowers principals to be adaptable, flexible and helps them be ready to analyze the needs of the school and tailor national policies to the school's context, the TSWREIS training heavily

focuses on the principal's abilities to implement the existing policies and less on the principal's ability to create a vision, build a collaborative teaching team and develop school development plans aligned to their schools needs and vision (Tan & Low, 2018). Providing the TSWREIS principals with similar skills through training and coaching would enable them to identify needs of their schools, use data to inform instructional and administrative decisions at schools and align their school's activities with their school's context and vision. Once they are able to design interventions, monitor progress and facilitate effective trainings, they would have the autonomy to test solutions that work for their schools and make decisions supported by evidence.

## 5.7 Program Description: Teachers

Teacher development in TSWREIS includes both pre- and in-service training. Their pre-service teacher training focuses on improving pedagogy, understanding textbook philosophy, classroom management, effective communication in English, practical teaching experience with feedback and opportunities to build relationships with students and their families prior to the start of the school year. In-service training is delivered over the academic year and includes teacher seminars, regional trainings in innovative pedagogy, peer observations and weekly meetings to discuss focus areas for the school and attend master classes by senior teachers within the school and introduce best practices in their own teaching practice. The principals conduct weekly school team meetings to discuss problems faced by the teachers and brainstorm solutions for those problems.

The TSWREIS teacher training model builds upon the existing models of teacher preparation in the country, but areas of improvement have been identified and are being addressed through the New Quality Policy (NQP) introduced in 2016. The NQP includes guidelines to improve the structure of in-service training and teacher evaluation and seeks to empower teachers to help students develop twenty-first century skills and improve academic achievement among students. It introduced advanced pedagogical practices in the classroom, such as flipped classroom teaching and modular teaching (cross subject, theme-based teaching) and enables the teachers to realize their full potential through peer learning. The NQP also contains guidelines to assess teachers through regional seminars and provides support to struggling teachers through continuous guidance, mentorship and remedial training programs (New Quality Policy, 2016).

While some of TSWREIS' practices in teacher development compare well with widely known frameworks for effective teacher practices and models for teacher development, there are aspects that the NQP does not cover. The eight dimensions about teaching included in the World Bank's Systems Approach for Better Education Results (SABER) Teachers framework (Liang, Kidwai, & Zhang, 2016) comprise setting clear expectations for teachers, attracting the best into teaching, preparing

teachers with useful training and experience, matching teachers' skills with students' needs, leading teachers with strong principals, monitoring teaching and learning, supporting teachers to improve instruction and motivating teachers to perform. While some of these components exist in the NQP framework, some core elements still remain unaddressed. For instance, the components of NQP reward good performance, thereby motivating teachers in TSWREIS schools to perform consistently and strive to improve their teaching methods. Similarly, the pre-service and in-service teacher development framework also aligns with the third, fourth and eighth goals of the SABER-Teachers framework and ensures that teachers are empathetic toward their students. However, a major area that is not addressed is closely matching teacher skills with specific student needs. There is limited evidence to suggest that the teacher training model in place is adaptable to student outcomes in the classroom.

In addition, examining the teacher development model through the wide range of models presented in the comprehensive review of teacher professional development models: "Teacher Professional Development—an international review of the literature" by Villegas-Reimers (2003), we observe that TSWREIS uses observation of excellent practice, supervision, workshops and seminars for creating opportunities for vertical growth in their model. Investing substantial resources and efforts on teacher pedagogy has begun a move away from the prevalent practice of rote learning in the classroom. However, the existing practices can be improved further to include opportunities for skills development, reflection and case-based learning to help teachers understand the continuous and evolving vision for twenty-first century skills and receive the day-to-day support and coaching that can improve their instruction toward holistic student learning outcomes.

## 5.8 Program Description: Integrated Curriculum

In the National Research Council's report "Education for Life and Work: Developing Transferable Knowledge and Skills in the 21st Century" James W. Pellegrino and Margaret L. Hilton categorize twenty-first century competencies into three major groups: cognitive competencies, intrapersonal competencies and interpersonal competencies, as described in the first chapter of this book. Some of the cognitive competencies include critical thinking, creativity, oral and written communication. Intrapersonal skills include cultural awareness and competence, initiative, citizenship and career orientation among others. Interpersonal skills include teamwork, negotiation, social influence and so on.

The Telangana State Curriculum Framework (TSCF) is similar to the Andhra Pradesh State Curriculum Framework (APSCF) created in 2011, which is based on suggestions from the National Curriculum Framework created in 2005. The state curriculum envisions that education will produce rational and responsible citizens who can appreciate their heritage and become agents of social change. Subjects taught include English, Mathematics, Science and Social Studies, Work Education, Art and Culture, Value Education and Life Skills, Information and Communications

Technology, and Physical Education. These subjects identify learning goals as academic standards. Some of the academic standards are problem-solving, reasoning-proof, appreciation and sensitivity, reading comprehension, information skills, citizenship, creativity, community service and interpersonal communication. Comparing the skills included in the Hilton-Pellegrino framework with those included in the TSCF, we observed that the TSCF covers 75 percent of the skills in the cognitive domain but only 50–60 percent of the competencies in the interpersonal and intrapersonal domains. The curriculum has a stronger focus on traditional academics and a thin emphasis on twenty-first century skills, such as taking initiative, meta-cognition and self-regulation.

Although the TSCF does not include many of the skills required for living and working in the twenty-first century, TSWREIS conducts activities beyond regular school hours and over the summer vacation to ensure that students do have opportunities to develop these skills. For instance, the development of strong language and communication skills is promoted through English-Plus and Writing-Plus clubs that provide an exploratory space for the students to independently familiarize themselves with the English language. Their early foundation program for classes fifth and sixth is developed in collaboration with an external partner, *Karadi Path*, to help new students gain English language skills through songs, stories and other audio-visual resources. These have helped to improve academic performance within the school. There are also extracurricular activities that ensure that students develop different life skills. Some of these programs include the Ignite initiative and the annual Science Fair, which gives the students a chance to showcase their learning in widely attended student conference. The schools also have initiatives such as the Green Gurus program and the S. R. Sankaran super lectures, which encourage students to collaborate, refine their communication skills and earn extra money by teaching their peers. They have partnered with external organizations, such as Design for Change, an online platform that promotes practical application of learning and civic engagement by giving the students a chance to create innovative solutions for immediate problems faced in the world (Telangana Social Welfare Residential Educational Institutions Society Calendar of Events, 2018).

Additionally, an annual summer camp project was conceived in 2011 with the objective of giving the students a chance to engage with a range of academic, non-academic and athletic opportunities in order to identify their areas of interest. Between 2011 and 2018, the camp grew in size and quality, from ten camps and eight thousand students to reaching over forty thousand (G. Varkey, email communication, November 30, 2018).

Although preliminary analysis suggests that the TSCF and the additional activities conducted by TSWREIS cover most of the skills in the Hilton-Pellegrino framework, the efforts to inculcate twenty-first century skills are dispersed and in silos. In order to support students in developing a strong foundation of twenty-first century skills, targeted efforts need to be directed toward infusing opportunities to develop these skills in everyday teaching practice inside the classroom and in the extended learning hours.

## 5.9 Key Enablers

As a chairman of TSWREIS, the Minister of the Scheduled Caste Development heads the society and has the authority to sanction funding for new ideas within the project. The in-built supportive structure helps by reducing the number of stakeholders involved in decision-making and supporting the implementation of new ideas and projects. Most bureaucrats in India are given fixed term appointments to positions at the secretary level, sometimes switching departments after just two years. The long-term appointment of Dr. Kumar as the Secretary of TSWREIS has enabled the project to have stable leadership and a sharp focus on their vision and goals, rather than the instability that changes in leadership can cause.

Another factor that has supported the reform is the staff structure. TSWREIS staff can be categorized into two levels: leadership and school staff. Their leadership team includes regional coordinators, school principals, and senior and junior vice-principals. The teachers in the school, based on their experience and the grades they teach, can be categorized as senior teachers and junior teachers. The school structure enables junior teachers to be mentored by senior teachers through master lessons, classroom observations and feedback. Teachers' welfare is also taken care of by the teacher union. The teacher union under TSWREIS is a democratically elected body that consists of senior teachers and is registered with the government. According to Mr. George Varkey, a TSWREIS official involved in teacher training and development, like most teacher unions, they resisted the innovative practices and changes in teacher training when TSWREIS started to make changes to their program. However, they soon realized that the changes were beneficial to the students and helped achieve TSWREIS' vision. They now function as a cooperative body that works together with the management toward the common goal of improving student outcomes.

Another key strength of the TSWREIS model is having spaces for the different stakeholders to collaborate, both within the school system and outside. We examine these partnerships on two levels: internal capacity partnerships and external capacity partnerships. Within the school system, a collaboration between the school leadership and the teachers is promoted through weekly T-plus meetings, which ensure that the teachers are given the chance to discuss success any challenges faced through the week with the principals. This ensures that the school administration and the school staff are on the same page with regards to issues related to school improvement and key decisions within the school. Collaboration between the teachers is promoted through strategy meetings, held at the beginning of every week. During these meetings, experienced teachers demonstrate model lessons across several topics for the newer teachers on the payroll. After a week, the roles are flipped as the newer teachers apply the planning and execution strategies observed previously into a sample lesson. There is a constant feedback chain maintained throughout the process, which helps to identify the need for remedial training (G. Varkey, personal communication, September 28, 2018).

Another important component within the internal capacity partnerships is the interaction between parents and teachers. Since the schools also operate as residential institutions, great emphasis is placed on ensuring that the teachers understand the context of the students in order to provide the required personal and emotional support. To achieve this, collaboration between teachers and parents is promoted through home visits that the teachers have to undertake after the end of each term, in order to understand the challenges that the students might be facing at home. These meetings also work to improve the levels of trust between the parents and the teachers (Telangana Social Welfare Residential Educational Institutions Society Calendar of Events, 2018). Their internal feedback mechanisms, which include video conferences between principals and the secretary and student councils and the secretary, enable regular evaluation of school-level programs and give students a chance to share some school-level feedback with the Secretary.

In terms of external partnerships, the TSWREIS schools collaborate with several organizations working in areas such as teacher training, school leadership development and curriculum design to leverage specialized support to supplement the state's efforts. For instance, two key partnerships developed to support teacher training include those with Russell's Spoken English and *Aavishkaar*. The former initiative is undertaken to equip the teachers with strong English language and communication skills, which is reflective of the core emphasis placed on English communication component for the students. The second partnership with *Aavishkaar*, a non-governmental organization that develops interactive methods to impart science and math education, has been initiated since the summer of 2018 to equip the teachers with varied skills to teach science and math for grades six and above (Telangana Social Welfare Residential Educational Institutions Society Calendar of Events, 2018). Parallel to the partnerships developed for teacher training, the TSWREIS schools also collaborate with ISLI. This is a stepping-stone to expand the role of the school leaders within the TSWREIS system beyond the traditional role of school principals and vice-principals focusing exclusively on administration.

## 5.10 School Evaluations

School evaluations are the key in assessing whether the school is functioning up to the standards mentioned in the reform. The Central Board of Secondary Education, India (CBSE) conducted an evaluation of the schools managed by TSWREIS. The CBSE rating has three levels: emergent, satisfactory and good. While there is merit in having a multileveled evaluation model, the CBSE has not generated a robust rubric that indicates what makes a school emergent, satisfactory or good. The CBSE has seven performance standards that are used to assess the rating of a school, which are outlined below and were used for evaluating the schools.

The CBSE uses seven performance standards in their evaluation. These performance standards include: PS1—academic outcomes, PS2—personal and social outcomes, PS3—teaching, learning and assessments, PS4—academic, co-academic

and extracurricular inputs, PS5—health, safety, protection and guidance, PS6—infrastructure and PS7—leadership. This evaluation was conducted for all schools, according to their districts.

We notice that most of these schools performed between the range of emergent to good, with an external evaluation rating as "emergent" and self-evaluation rating as "satisfactory". The four school reports reviewed by us indicate that those TSWREIS score the best on "personal and social outcomes of students" and were satisfactory in providing academic, co-academic and extracurricular inputs to students. The difference in the ratings leads us to question the process of evaluation. We notice that the assessment used by CBSE is not a standardized assessment and does not norm on specific criteria. For example, schools with tenth-grade passing rates of 96 and 60 percent are both given the same accreditation under academic outcomes. Similarly, in many sections of the report, it is unclear what weight is given to various factors in assigning a ranking. Thus, even though evaluations have been conducted, there is no standardized assessment with clear guidance on areas of excellence and areas of growth for the schools (Assessment and Accreditation Report, 2016–17).

Since there is no assessment of the reform yet, we can look at other results as indicators of success of the reform. According to Dr. Kumar, six schools which are part of TSWREIS won national-level awards in the national Design for Change competition. Several students have successfully secured admissions in prestigious institutes in India and internationally, in the fields of law, engineering, humanities and science (Telangana Social Welfare Residential Educational Institutions Society Calendar of Events, 2018). TSWREIS students have also performed well in sports, securing medals in national and international level championships for karate, chess, handball and regatta and scaling Mt. Renock as a group (Scaling Mount Renock, 2016). Therefore, we see some evidence of success of the reform in ways that are not captured entirely through the external evaluation produced by the CBSE.

Lastly, a way to identify if the intended outcomes are being achieved is to analyze results against the theory of change of the reform. It is clear that due to the opportunities provided by TSWREIS, several students from marginalized communities have been academically successful. However, the success of TSWREIS should not depend on a single structure or leader and should be sustainable in the way that these sections of the society can create this change for themselves.

## 5.11 Lessons Learned

The TSWREIS schools have significantly improved student outcomes in comparison to the public schools which exist across the rest of the state. However, there are several areas where the school system can be further refined and strengthened. These are discussed in four broad areas below.

### 5.11.1 Teachers

While the TSWREIS model has established a functional base for teacher training, there is room for improvement with respect to creating a strong vision for teacher professional development. In the current system, teachers have access to pre-service training and in-service training, but there is a lack of a cohesive developmental path for the teachers. There is also a lack of differentiation in training based on teachers' existing level of experience, interests and needs. A possible way of addressing this challenge is to have the school leaders create professional learning opportunities that align with the goals that teachers are working on every quarter. These goals should be assessed on a quarterly basis, so that school leaders can adjust the learning path based on progress made. Additionally, the training should differentiate between the specialized needs of teachers so that teachers of all levels of experience are trained in areas that allow them to grow as facilitators and leaders.

Another element in the current model that shows room for further growth is preparing the teachers to integrate twenty-first century skills into classroom instruction independently.

Throughout the school year, teachers do not have learning opportunities to develop the necessary skills for them to strategize closely based on the needs of their classrooms. For this, explicit training on how to integrate twenty-first century skills into the current curriculum is needed as part of the in-service or pre-service component, so that teachers are equipped to incorporate these skills into their teaching. This can ensure that inter and intrapersonal competencies are developed during class hours and afterwards in the activities that students participate in.

### 5.11.2 School Leaders

In terms of school leader preparation and support, due to the complex structure of the management team and the multiplicity of voices involved, principals and other higher officials make decisions. However, there is less autonomy for them to focus on certain aspects that align to their schools' needs and vision. Furthermore, school leaders are burdened with administrative responsibilities and hence cannot devote enough time to teacher growth and development or student outcomes. This leaves room for capacity building for the principals to prepare them to execute all aspects of their roles effectively and to build a strong school team culture that focuses on outcomes for all children. The administrative pressure on the principals can also be relieved by looking at hiring and training additional staff or temporary workers to manage operations.

### *5.11.3 Curriculum*

Even though the curriculum and the activities implemented by TSWREIS include most of the skills included in the Hilton-Pellegrino framework, the activities leading to these skills are not adding up to the goals of the reform. The inputs toward building twenty-first century skills can be streamlined through a curriculum sequence that describes the vision for mastery of the skills mentioned in the reform goals. Instead of the schools trying to focus on all skills at once, the skills can be sequenced in different grades. This would allow students to gain a wide range of skills with greater depth as they progress through school. This could also enable the teachers to implement twenty-first century skills more effectively in their lessons.

### *5.11.4 System Level*

The TSWREIS model has scope to strengthen two of the four areas of system-wide alignment outlined in the World Development Report, 2018. These are unclear objectives and blurred responsibilities; lack of information and metrics and actor incentives. This could be addressed by promoting strategic planning that examines Strengths-Weakness-Opportunities-Threat for each school (including analysis of student assessment data). It could be supported further by aligning classroom and school-level activities to the school vision, defining clearer job roles with greater autonomy and professional development to decentralize some school-level decisions related to student learning, and providing non-monetary incentives to improve student outcomes in twenty-first century skills for teachers and students alike.

## 5.12 Conclusion

Overall, TSWREIS has gone against the grain in its efforts to provide quality education to students from marginalized communities in Telangana. The model has managed to increase the efficiency of the actors involved in the school system, such as the teaching staff and the school leaders, by reducing information asymmetry and promoting collaboration at several levels. This has resulted in notable improvements in student outcomes, which have allowed graduates from the TSWREIS system to access premier education institutions in the country. At the same time, the model can be refined further by ensuring that their curriculum framework and teacher training framework more intentionally adopt a twenty-first century and deeper learning approach.

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# Chapter 6
# Cambodia's New Generation Schools Reform


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**Abstract** The New Generation Schools (NGS) reform in Cambodia was launched in 2015 with the aim of improving the quality and relevance of education to better prepare Cambodian youth for the twenty-first-century workforce. The reform aims to develop students' cognitive competencies, with a particular focus on STEM, ICT, and critical thinking skills, as well as inter- and intrapersonal competencies. As of 2018, the reform operated in 10 designed "New Generation Schools" across the country which combinedly served over 4,000 students. New Generation Schools are unique in that they operate similar to charter schools in the United States, where school-based administrators and staff have a high degree of autonomy over school operations, resources, curriculum, and instruction. This is coupled with high professional standards that hold schools accountable for improving the quality of teaching and learning in their schools. To support teachers in using their autonomy to deliver innovative, twenty-first century instruction, the reform includes a robust teacher professional development program based on a reflective teaching model. The professional development program employs a variety of modalities, including pre-service training, professional learning communities, career path planning, individual feedback, classroom observations, visits to other schools, and ongoing in-service training. Ultimately, as the reform scales, it aims to create a larger cultural shift in the education system by professionalizing the role of the Cambodian teacher. The NGS reform provides valuable insights for practitioners, researchers, policymakers, and funders looking to enhance teacher capabilities to deliver twenty-first century instruction through a combination of high professional standards and robust professional development.

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## 6.1 Introduction

In 2015, the Cambodian national government launched the New Generation Schools (NGS) reform. In support of the broader national goal of enhancing the quality and relevance of education, the program provides greater autonomy and funding to designated "New Generation Schools" with the aim of spurring innovation in curriculum, instructional practices and use of resources to ultimately improve learning outcomes, and prepare students for the twenty-first century workforce. Now in its third full year of implementation, NGS currently operates at 10 school sites (6 secondary and 4 primary) and serves approximately 4,000 students. Since 2015, the Ministry has invested $4.65 million USD in NGS, with plans for further investment and expansion to 100 schools by 2022.

This chapter analyzes the theory of change and implementation of the NGS reform, with a specific focus on how the reform prepares teachers to deliver innovative, twenty-first century instruction. First, we consider the context of the reform within the broader Cambodian economy and education system. Second, we describe the design and planning of the reform. Next, we describe the reform's theory of action, which is as follows: If the reform creates a system and culture of high teacher professionalism and provides high-quality professional development to teachers, then teachers will utilize innovative teaching and learning practices and help students develop twenty-first century skills. We also present preliminary process and outcome results of the NGS reform. Finally, we identify lessons learned from the NGS reform which can be leveraged in other contexts, aiming to support teachers in delivering innovative twenty-first century instruction.

## 6.2 Methods

Our analysis was conducted based on a review of reports provided by the Ministry of Education, Youth and Sports and KAPE, as well as information publicly available on the internet. We received an email response to our questions from H.E. CharVann Lor, the Deputy Director General of Education at the Ministry of Education, Youth and Sports. We also conducted a phone interview with KAPE Senior Technical Advisor, Kurt Bredenberg, with subsequent follow-up via email. We would like to thank Kurt Bredenberg and the Ministry of Education in Cambodia for their support of our study. Given our limited data sources and the scope of the project, we were unable to conduct additional fieldwork or other stakeholder interviews.

## 6.3 Context of the New Generation Schools Reform

Cambodia's recent history and current economic state are important driving factors underlying the national education goals. In the 1970s, the Khmer Rouge regime decimated Cambodia's formal education system and eradicated a generation of education professionals. Since then, the government has made great progress in rebuilding education institutions, with a primary focus on improving access to and quality of primary education. With funding from the World Bank in 2005, the government increased its investment in secondary education to meet the demand for a more skilled workforce. However, Cambodia continues to face several challenges to its economic growth and development, including economic competition in the ASEAN region and globally, increased urbanization, and a population with a large, unskilled youth workforce (Bredenberg, 2018). For Cambodia to achieve "upper-middle income" status by 2030, the national government has committed to improving education.

The NGS reform is one of 15 initiatives in the Cambodian National Education Strategic Plan (2014–2018), which aims to prepare students for the twenty-first century workforce. The Education Strategic Plan targets the Ministry of Education, Youth, and Sport's vision that "graduates from all its institutions will meet regional and international standards and will be competitive in the job markets worldwide and act as engines for social and economic development in Cambodia" (Ministry of Education, 2014). The Ministry's three-core policy priorities are equity, quality and relevance of learning, and effective school leadership and management. The plan includes goals for improving language, math, science and technology instruction, as well as skills in communication, research, problem-solving and decision-making. It also includes a goal to ensure students have an "understanding of human rights as responsible citizens as an individual and a member of a family, community, society, region and the world" (Ministry of Education, 2014). These national goals guided the development of the NGS program.

Low teacher quality in Cambodia poses a major challenge to reform. In 2011, the World Bank's Systems Approach for Better Education Results (SABER) analysis of Cambodia indicated teacher training programs did not include sufficient practical professional experience to help teachers transition from learning to teaching. In addition, few incentive structures were in place to motivate teacher performance and systemic professional development was absent for all primary and secondary teachers (World Bank, 2011). As of 2015, Cambodian teachers are more highly educated than in the past, but significant gaps remain in qualifications across levels and between urban and rural areas. Two-thirds of Cambodian teachers held a Bachelor's degree, with a greater proportion at the secondary than primary level. For example, primary teachers in rural schools may have only completed grade 9, whereas in urban areas primary teachers have typically completed at least grade 12 (Tandon & Fukao, 2015). Teacher development takes place through District Training and Monitoring Teams (DTMTs) and through workshops arranged by the Ministry and development partners. The current model, however, has also drawn criticism for not providing broader ongoing capacity development and follow-up for teachers (King, 2017).

## 6.4 Design and Planning of New Generation Schools Reform

### *6.4.1 Reform Goals*

The first step in the design of the NGS reform was to define specific goals for student learning aligned to twenty-first century workforce needs. Given the burgeoning global technology sector, the NGS reform aims to develop students' cognitive competencies in STEM (Science, Technology, Engineering, and Mathematics), ICT (Information and Communications Technology) and critical thinking.

### *6.4.2 Reform Design and Planning*

The NGS reform was strongly influenced by the international school-based management (SBM) movement. This includes both the charter school movement in the United States as well as innovative schools in South-East Asia, which provide a high level of autonomy to school-based staff. Recent research has shown school-based management can be effective in improving student outcomes, but effective implementation requires school leaders have expertise in both instruction and management, as well as the true autonomy to implement changes in their schools (Demas & Arcia, 2015).

New Generation Schools originated in 2011 with the Beacon School Initiative (BSI) pilot project funded by an Australian development agency and implemented by the Cambodian education non-profit Kampuchean Action for Primary Education (KAPE) (Bredenberg, 2018). In 2013, the new Cambodian Minister of Education, Dr. Hang Chuon Naron, mandated to improve the current education system and was empowered by the Prime Minister to exercise his political leadership. In 2015, the Ministry of Education approached KAPE to replicate the original BSI pilot on a larger scale, which became the NGS reform (Bredenberg, 2018). NGS is no longer a time-bounded project, but instead a comprehensive education reform within the national education strategic plan facilitated by a public–private partnership between the Ministry of Education and KAPE. After the development of the NGS policy framework and accreditation guidelines in 2015, the NGS reform has expanded from 2016 to 2018 (Bredenberg, 2018). In 2017, NGS began to operate in primary schools in addition to operating in secondary schools.

The NGS reform is implemented by KAPE with strong support from the Ministry of Education, Youth and Sports, the Ministry of Economy and Finance, and the Ministry of Public Works (CharVann, 2018). NGS schools operate in four provinces (Kandal, Kampong Cham, Svay Rieng, Kg Speu) and the capital city Phnom Penh. By 2017, ten NGS schools were established with six secondary schools and four primary schools. By 2017, NGS student enrollment reached 4,039 students in 117 classes. There are three NGS school models. Seven schools follow the "Whole School"

model, where the entire school is a NGS school, as opposed to the "School in a School Model", currently only operating at Sisovath High School, which refers to a "distinct and independent institutional environment that is created within an existing school where a majority of school stakeholders are opposed to educational reforms because they challenge certain vested interests" (Ministry of Education, 2018a, b). The remaining two schools operate under the "New School" Model, which refers to a newly established school where principals and teachers are newly hired (Ministry of Education, 2018a, b).

### *6.4.3 Reform Funding*

From 2015 to 2018, $4.65 million USD was invested in the NGS reform from a combination of public and private sources. NGSs are funded by the government, development partners and school-generated income, such as from student and family contributions (CharVann, 2018). Approximately 80% of the investment in NGS has been funded by the Ministry of Education. The remaining 20% has come from three major foundations since 2015: Franks Family Foundation Child Fund Australia and Oaktree Foundation. In 2017, the Ministry invested approximately $550 USD per secondary student in New Generation Schools (Ministry of Education, 2018a, b). Some NGS schools also generate their own additional income, and two of the NGS primary schools are entirely self-funded (Ministry of Education, 2018a, b).

### *6.4.4 Future Planning and Implementation*

The Ministry plans to scale up the NGS reform by expanding the number of NGS schools in the coming years (CharVann, 2018). Funding from the World Bank will enable NGS to operate in 25 provinces and 100 schools by 2022. In addition to scaling up within Cambodia, there is also a possibility for the NGS model to be adopted within South-East Asia, as in 2018 the Ministry of Education of Laos PDR visited Cambodia to learn more about the NGS model (Bredenberg, 2018).

## 6.5 Theory of Change of New Generation Schools

The New Generation Schools reform's theory of change for teachers is: If the reform (1) creates a system and culture of high teacher professionalism and (2) provides high-quality professional development to teachers, then teachers will utilize innovative teaching and learning practices and develop students' twenty-first century skills.

### 6.5.1 System and Culture of Teacher Professionalism

New Generation Schools create a system and culture of teacher professionalism through the governance framework. There are four core principles of the NGS governance framework: operational autonomy, high professional standards for principals and teachers, a rationalized resource allocation framework and strict accountability requirements with a required annual accreditation process (Ministry of Education, 2018a, b).

**High Professional Standards**: First, NGS establish high professional standards for principals and teachers. The NGS reform is based on the notion that one of the core barriers to improving learning outcomes is rampant corruption at the school level. The reform targets this corruption by establishing an expectation of teacher professionalism, where school accreditation is based on adherence to the following criteria: "(1) private tutoring abolished and (2) practice of mandatory student purchases of teacher goods (e.g., study papers, cake, etc.) abolished." An even higher expectation has been applied to principals, as "the role of the principal as a school leader is to set an example of high professionalism for teachers" (Ministry of Education, 2016a, b).

Both teachers and principals are compensated for adherence to high professional standards. There are two types of pay incentives. The first are fixed payments linked to the agreement among NGS teachers to abolish private tutoring, which are set at a minimum of $100/month for teachers and $250/month for principals (Ministry of Education, 2016a, b). Teachers can also receive task-based payments for responsibilities such as leading clubs or organizing field trips, which vary depending on school needs and availability of resources (Ministry of Education, 2016a, b). The Ministry posits rewarding teachers and principals for maintaining a high standard of professionalism will reduce corruption (Ministry of Education, 2018a, b).

NGS teachers are selected primarily based on their alignment to the NGS vision and expectation of high professional standards. As Bredenberg (2018) noted, given the high accountability standards which differ starkly from the traditional Cambodian education system, NGS staff must be intrinsically motivated and dedicated to serving students well. They also should be willing to innovate and continually improve their instructional practices. For example, NGS teachers should be willing to incorporate ICT and constructivist pedagogy into their classroom.

**Operational Autonomy**: Next, NGS school-based staff, including principals and teachers, have nearly complete autonomy over their schools, provided they can justify how they will "promote innovation and increase educational quality" (Ministry of Education, 2018a, b). This includes autonomy over teacher recruitment, curriculum modifications, student–teacher ratios and use of education technology. NGS principals have a special allocation budget to fund innovative practices in teaching and learning, which specifically target STEM, ICT and critical thinking skills (Ministry of Education, 2018a, b).

**Rationalized Resource Allocation**: Third, NGS must demonstrate a rationalized resource allocation framework. NGS receive additional discretionary funding

to achieve their learning goals. However, the rationalized resource allocation framework requires schools abolish all informal fees and demonstrate funds are being used effectively in support of the NGS goals, such as for "the delivery of high quality student services, teacher incentives that are linked to performance, and investment in school facilities"(Ministry of Education, 2016a, b). Overall, the governance framework is designed to provide autonomy to highly efficient and effective principals and teachers to innovate at the school level to improve the quality of instruction and student outcomes.

**Accountability and Accreditation**: Finally, the school-level autonomy and high professional standards are accompanied by strict accountability requirements for NGS accreditation. The *NGS Policy Guidelines* include 24 criteria that NGS must meet to maintain status and funding. To monitor NGS compliance with the accreditation criteria, the Ministry has created a national NGS Oversight Board. The Board is comprised of both representatives from the Ministry and non-state actors from the private sector. The Board is responsible for approving and monitoring the use of funds to ensure the additional investment in NGS is producing higher quality learning. The Board also oversees NGS accreditation visits and based on these evaluations makes recommendations for whether or not a NGS should maintain accreditation. If a NGS school loses its funding, it will no longer have access to Ministry resources and funds (Ministry of Education, 2018a, b). The strict accountability requirements and robust annual accreditation process are designed to ensure NGS use their operational autonomy and additional resources to improve the quality of education in their schools.

### *6.5.2 High-Quality Professional Development*

The NGS reform utilizes several modalities to provide comprehensive support and training to teachers to encourage innovations for twenty-first century teaching and learning.

**Initial Training**: The Ministry and KAPE are developing a specialized training institution for NGS teachers: the New Generation School Training Center (NGSTC). The institute will be affiliated with the national recruiting system and will directly recruit and train teachers for the NGS program. The NGSTC will provide an 8-month, 34-credit master's degree for young teachers. The curriculum at NGSTC will focus on academic leadership, professional ethics, mentoring and twenty-first century professional skills (Ministry of Education, 2018a, b). The program will use innovative advertising to recruit teachers and employ a selection process, which includes not only written examinations but also multiple rounds of interviews and evidence of community service (Ministry of Education, 2018a, b). This holistic application process will allow NGSTC to select candidates not only on their content and pedagogical expertise but also their intra- and interpersonal skills. Moreover, to ensure teachers have continued support when they leave the institute and enter the classroom, NGSTC is developing a software platform to enable virtual mentoring and provide access to

success story podcasts. It will also use interactive voice response to track students' progress via real-time data (Ministry of Education, 2018a, b). Overall, the proposed teacher recruitment and training process at NGSTC is well structured to prepare teachers to work in New Generation Schools.

**Career Planning**: Once teachers are in their schools, all New Generation Schools provide ongoing instructional support to teachers via the Formative Teacher Support System. The system is centered on the practice of reflective teaching, which asks teachers to continually reflect both individually and in collaboration with colleagues and mentors on their practice (Ministry of Education, 2016a, b). There are seven key elements of the Formative Teacher Support System in a New Generation School: teacher profiles, study trips to other schools, professional learning communities, career path planning, individual conferencing, classroom observations and on-going in-service training opportunities. Teachers track their own professional growth and development by maintaining a professional profile, which includes documentation of their professional goals and accomplishments, including a CV, career path plan, special certificates or awards, and observation and evaluation forms.

**Mentoring**: All NGS schools have designated teacher mentors, who may be a vice-principal or KAPE staff member, to provide instructional support and feedback to teachers (Ministry of Education, 2016a, b). Mentors partner with teachers to develop, progress and monitor their career path plan, conduct individual conferences at least twice annually to provide feedback on classroom observations or a team-taught lesson, and arrange study trips to other innovative schools so teachers can observe different pedagogy and practices (Ministry of Education, 2016a, b). Mentors partner with teachers to develop a career path plan, with specific and measurable professional goals for the next 5 years. Teachers keep a weekly logbook of successes and challenges in progressing toward their goals.

**In-service Training**: All NGS teachers participate in-service training to learn about effective methodologies for developing critical and creative thinking skills. Some topics of NGS in-service teacher training include constructivist learning, problem-based learning, cooperative learning, differentiated instruction, teaching to promote critical thinking and using ICT in education (Ministry of Education, 2016a, b).

**Professional Learning Communities:** All NGS teachers participate in Professional Learning Communities (PLCs), where they not only collaborate and reflect on instructional practices but also reinforce the positive behavioral norms of teacher professionalism which are central to the NGS model. It is suggested that PLCs meet at least 2–3 times per month based on subject area or grade level to "share information, plan lessons and examinations together, and provide assistance to one another for special projects that are common to all teachers such as using educational software" (Ministry of Education, 2016a, b).

**International Study Trips**: New Generation School teachers also have the opportunity to visit and learn about other twenty-first century schools. For example, the Ministry organized a trip to Thailand in June 2018 for a group of NGS teachers, principals and board members to visit three innovative schools. The experience of international comparative education allows teachers to identify ways they can enhance

their own school to better achieve their goals for developing students' twenty-first century competencies.

**Principal Support**: NGS principals are ultimately accountable for ensuring high-quality instruction, although they typically do not support teachers directly in an instructional capacity. NGS principals are aware of their role in monitoring the quality of instruction in their schools, as one NGS principal stated, "I have to make sure teachers [are] ready to transform all young learners with the knowledge and skills needed to function in a rapidly changing world by integrat[ing] modern and interactive methods into their teaching" (Vicheaka, 2016). Principals may collaborate with teachers to define professional development goals, such as the use of ICT or constructivist pedagogy in their classrooms (Ministry of Education, 2016a, b). Some principals also conduct classroom observations, provide written and oral feedback, monitor teacher reflection journals and support professional learning communities (PLCs) (Vicheaka, 2016, Ministry of Education, 2016a, b). However, given their other management responsibilities, principals do not have time to build the instructional capacity of all teachers in their schools (Bredenberg, 2018).

Given the inputs above, NGS teachers are expected to achieve the following outcomes: (1) innovative teaching and learning practices and (2) support their students in developing twenty-first century skills.

1. Innovative Teaching and Learning Practices

The high level of operational autonomy and support provided to NGS is one of the key factors which distinguishes them from traditional Cambodian public schools. NGS are expected to use this autonomy and support to innovate to best serve the needs and interests of students and the community. For example, NGS can adopt new curricula, increase hours of instruction in a particular subject, extend teaching hours and reduce class sizes. They also receive additional resources which can be used to purchase new technology or curriculum. Overall, this approach is aligned with the theory of school-based management that those closest to students know best how to allocate resources to meet their needs. The two focus areas for innovation at NGS are curriculum and instruction and technology and facilities.

**Curriculum and Instruction**: The NGS reform anticipates principals and teachers will use the autonomy and support they receive to deliver high-quality, innovative twenty-first century curriculum and instruction. First, NGS teachers are able to adopt new curricula outside the national framework which is aligned to twenty-first century learning standards. Some of the possible instructional innovations articulated in the NGS Policy Guidelines include "enhanced curricula (e.g., intensive learning in the STEM subjects) … and (iv) differentiated learning channels to accommodate students' strengths and interests" (Ministry of Education, 2018a, b). One example of an instructional innovation took place in 2018, when several NGS senior English teachers began implementing the *Extensive Reading Program,* which is designed to supplement classroom English instruction, improve English fluency, and prepare students for standardized English tests. The NGS secondary schools are the first in Cambodia to adopt this innovative instructional technique (Ministry of Education, 2018a, b). NGS also have the option to reduce class sizes to increase individualized

learning. The increased student instructional hours (36 hours for primary, 40 hours for secondary) can be used for special subject themes such as STEM or foreign language (Ministry of Education, 2018a, b). This autonomy to innovate with curriculum and instruction is designed to develop students' twenty-first century skills.

**Technology and Facilities**: NGS schools are also encouraged to innovate with technology and facilities to develop a modern, efficient learning environment. This means ensuring access to a twenty-first century library, science and ICT labs, and sports and playground facilities. As the Ministry expressed: "the use of technology will be a key element in New Generation Schools that includes not only access to hardware but also the introduction of new educational software that will enhance teaching, learning, and assessment (e.g., Literatu, 3D Classroom, etc.)" (Ministry of Education, 2018a, b).

2. Twenty-First Century Skills

The New Generation Schools reform aims to support students in developing twenty-first century competencies, in order to prepare them to contribute productively to the workforce. NGS's specific emphasis on STEM and ICT skills is a response to these growing industries in Cambodia and across South-East Asia. As Minister of Education Dr. Hang Chuon Naron explained, "Because we are in the 21st century, technology develops very fast. I think, to make Cambodia advance to the status of a developed country with an increased income, we need to create new industry, we must focus our students' training in STEM" (Sacker, 2017). The Ministry also emphasizes the importance of critical thinking in preparing students for future employment, as a recent survey in Cambodia identified analytical thinking and decision-making as the skills most desired by employers for skilled and semi-skilled work (Bredenberg, 2018). It is this combination of cognitive processes and explicit content knowledge in STEM and ICT that the Ministry believes will prepare students for future success in the workforce.

The NGS place a strong emphasis on cognitive competencies, with a particular focus on content knowledge of STEM and ICT and critical thinking skills. While the NGS reform aims to improve the overall quality of education, the Ministry has expressed an explicit goal for NGS is to improve STEM instruction, given historically more than half of students have not passed the national 12th grade Bac II examination in Mathematics, Chemistry and Biology (Bredenberg, 2018). This priority is also reflected in the NGS Operating Guidelines for accreditation, which require all schools to have a twenty-first century library, ICT lab services and science lab services (Ministry of Education, 2018a, b). The importance of having a "modern and efficient learning environment" to facilitate the development of STEM and ICT cognitive competencies is an important aspect of the NGS model, with special funding allocated for upgrades of libraries, computer labs and other common spaces in NGS (Ministry of Education, 2016a, b).

The goals for NGSs also emphasize ICT literacy for both students and teachers. Teachers are expected to have a high degree of ICT literacy and are evaluated based on their ability to integrate ICT into their classrooms. Students are expected to utilize their school's abundant ICT resources, both as a means to learn

and also to develop technical ICT skills useful for future employment (Ministry of Education, 2018a, b). For example, in the upcoming school year, NGS will partner with *Code.org* to offer two hours per week of coding instructions to students (Ministry of Education, 2018a, b).

Besides the emphasis on STEM and ICT, the Ministry also requires students to develop other cognitive competencies such as critical thinking and problem-solving abilities. One of the key target outcome indicators defined by the Ministry for NGS is "critical thinking scores among students show a statistically significant improvement from baseline scores by the end of year 3" (Ministry of Education, 2018a, b). In order to achieve this goal, NGS utilizes problem-based learning and constructivist teaching methods. Problem-based learning is an inquiry-based, student-driven approach where students learn through discussion of open-ended, real-world problems. Similarly, constructive learning is as an active process of contextualizing information and constructing meaning based on one's own life experiences (Ministry of Education, 2016a, b). Both approaches require students to utilize critical thinking skills to analyze relevant real-world problems. The Ministry emphasizes the importance of critical thinking in preparing students for future employment, as a recent survey in Cambodia identified analytical thinking and decision-making as the skills most desired by employers for skilled and semi-skilled work (Bredenberg, 2018).

While goals for inter- and intrapersonal competencies are not explicit in the program design, the NGS reform provides opportunities for students to develop these twenty-first century competencies. For example, the use of problem-based pedagogy allows students to develop collaboration and leadership skills. Students also have additional opportunities for interpersonal development outside the classroom through participation in sports and student organizations. Education Minister Dr. Naron also includes global citizenship as one of the goals of the reform in stating, "They [students] should also have a good attitude…to help them become good national citizens, but also good global citizens. [Students need] to know about global warming and terrorism, and how to address these issues" (Sacker, 2017). NGS also utilizes inquiry-based pedagogy to foster intellectual curiosity and self-directed learning. Ariel Rozenblum, ICT in Education Advisor at KAPE, described the power of this self-directed learning, "We realize that we only need to open doors, we don't have to do more than that. Once we open the doors, the students have a lot of ideas, a lot of drive by themselves" (Cheyenne, 2017). Thus, the development of students' inter- and intrapersonal competencies is embedded in NGS pedagogy; however, these competencies are not explicitly defined, monitored and assessed in the NGS accreditation criteria.

### *6.5.3 Risks and Assumptions*

There are a few major risks and assumptions with the NGS reform theory of change. The first assumption is principals and teachers have the expertise required to make decisions with resources which will positively impact teaching and learning. This

assumption is a current risk because, while there is a robust system for teacher professional development, there is no standardized process for principal selection and training. This has not yet been a significant challenge, given the small scale of the reform and close involvement of KAPE staff, but it will become a critical risk as the program expands.

Beyond having the knowledge and skill, school-based staff must also be highly motivated to maintain support for the NGS vision and adhere to the accountability framework in the context of a larger system that is highly corrupt. As KAPE describes, "A key assumption…is that teachers are truly dedicated to being a good teacher and are not distracted by unprofessional activities that seek to exploit students. If this assumption does not hold at a New Generation School, it is likely that the present system will not function effectively" (Ministry of Education, 2016a, b). For example, teachers must be willing to take risks with their instruction and deliver lessons that are engaging, relevant and personalized to the needs of all learners. Similarly, principals must effectively manage resources in their schools to ensure the environment is conducive to twenty-first century learning.

Finally, there are two critical assumptions about the link between twenty-first century skill development and workforce readiness. First, graduates of NGS must have employment options that match the twenty-first century skill set acquired in NGS. The STEM-focused curriculum assumes there are more jobs available in the STEM field. Second, there is an assumption that NGS graduates will utilize the skills they learn in NGS to contribute to the Cambodian workforce and economic growth.

## 6.6 Results of New Generation Schools Reform

With three full years of implementation, current evidence suggests that the New Generation School reform has been successful in achieving its desired outputs and outcomes, however, ongoing monitoring and evaluation is needed.

### *6.6.1 Accreditation Results*

Available evidence suggests the NGS governance framework and school-level professional support are in place and being implemented with fidelity. In 2017, Sisovath High School and Hun Sen Kampong High School were evaluated to receive full NGS accreditation status and were found to be highly compliant with NGS accreditation criteria. Both schools achieved 100% of the required criteria, while Hun Sen Kampong achieved 90% of preferred criteria and Sisovath achieved 70% (Ministry of Education, 2017). Hun Sen Kampong fully achieved criteria for teacher career path planning and teacher support, while Sisovath fully achieved criteria for library, ICT and science lab services. The Ministry was satisfied with these results, noting: "The successful piloting of NGS Accreditation Criteria marks an important milestone for

NGS educational reform because it shows the willingness of the educational system to rigorously apply standards and the motivation of schools to comply" (Ministry of Education, 2017).

Since 2017, the Ministry has added four additional accreditation requirements for New Generation Schools and plans to conduct 12 accreditation visits in 2018 and 2019. Given the high level of autonomy and investment in teacher development within the NGS framework, additional data should be collected to assess changes in teacher practice, such as from mentor coaching logs or classroom observations. The results of these evaluations will provide further insight into the fidelity of implementation of the NGS model.

### *6.6.2 Teacher Perspectives*

NGS teachers report that the use of ICT has modernized the curriculum and enabled them to be more creative and interdisciplinary. Keo Chanith, a physics teacher at NGS, expressed the use of classroom multimedia as a great method for developing students' cognitive skills: "the administration here focuses on teaching students critical thinking. We want them to expand on their ideas and create new things" (Sacker, 2017). Puthy, a mathematics teacher, also reflected on the benefits of cross-disciplinary practices at NGS, where she has learned to incorporate English and ICT into her mathematics lessons (Sacker, 2017).

### *6.6.3 Outcome Results*

Students in two NGS with grade 12 cohorts outperformed the national average and non-NGS schools in the same vicinity on the 2018 Bac II Examination. While the national passing rate for the 2018 Bac II examination was 67%, 89% of Sisovath High NGS students and 75% of Hun Sen Kampong passed the Bac II exam. Both schools also significantly outperformed non-NGS schools in their vicinity (KAPE, 2018). However, when reviewing these results, it is critical to note that no baseline test data was collected and student admission to NGS is partially based on merit. Therefore, the outperformance could result from selection bias instead of the positive impact of the NGS program. Nevertheless, KAPE Advisor Kurt Bredenberg noted when NGS began in 2014 it did not have a student entrance exam requirement, and thus students tended to come from poorer and less advantaged backgrounds than later cohorts. Further demographic subgroup analysis of Bac II results indicates poorer students and students with longer exposure to NGS tended to perform better than poorer students who did not attend NGS (Ministry of Education, 2017). Beyond test scores, there is also evidence of a change in the culture and attitude of student learning, as Education Minister Dr. Naron shared, "After one year of visiting Sisovath, I could see that the students had changed as a result of the altered teaching method. I think

they have curiosity, they want to learn, and they want to explore, to have dreams" (Sacker, 2017).

## 6.7 Lessons Learned from NGS Reform

The NGS reform provides valuable insights for practitioners, researchers, policymakers and funders looking to enhance teacher capabilities to deliver twenty-first century instruction through a combination of high professional standards and robust professional development. We have identified a few key lessons from NGS based on the key themes for supporting teacher and leader development identified by Reimers and Chung (2018) in *Preparing Teachers to Education Whole Students*.

**Lesson #1: Professional development is socially situated, responds to current needs of teachers and uses multiple modalities to provide sustained, extensive opportunities for teachers to build capacities.**
The NGS teacher formative support system is well aligned with best practices for teacher professional development. First, it is grounded in a model of reflective teaching and continuous improvement, where teachers plan and direct their own professional learning and development over multiple years with the support of mentors. The NGS model also utilizes a variety of modalities for teacher professional development, including an initial pre-service training, in-service mentoring and targeted training sessions, PLCs and international study trips.

The NGS approach to teacher development is also socially situated in its attempt to counteract the broader context of systemic corruption by promoting a culture of high standards for professionalism. The NGS governance framework requires teachers adhere to strict accountability requirements by abolishing the common practice of private tutoring. This can be especially challenging in the "school in a school" model, such as at Sisovath High School, where NGS teachers work in the same building as teachers without the same strict professional standards. Given this broader social context, NGS leaders carefully select the most highly motivated teachers and provide them with robust professional development. While initial evidence suggests NGS teachers are aligned with the goals of the reform and compliant with anti-corruption requirements, this will be an important area for future monitoring as the reform scales.

**Lesson #2: The teacher development programs cover a blend of capabilities, from a broad focus on helping students develop capabilities to a highly granular identification of specific pedagogies and instructional practices that can help students gain skills and competencies.**
As Reimers and Chung (2018) note, effective teacher development programs "aim to develop the autonomy and agency of teachers as professionals, their capacity for

independent learning, their desire for continuous learning, and increased effectiveness, and their intrinsic motivation to strive for excellent teaching" (Reimers and Chung, 2018, p. 31).

The NGS teacher mentoring program is built on the philosophy of reflective teaching and includes feedback cycles which embed the practice of continuous professional learning. Contrary to traditional "check and control" approaches, teachers are provided with opportunities to reflect on their own teaching. While teachers are the ones who are directly engaged in their own growth and assessments, mentors can also provide external feedback. Teachers are supported in setting professional goals which represent a shift from the traditional role of the Cambodian teacher, such as the utilization of ICT-based instruction. For example, through the country's first *Extensive Reading Program,* English teachers at NGS are not only expected to develop instructional expertise, but also the ability to monitor a digital technology platform.

The NGS teacher development model also supports teachers to be more creative and interdisciplinary through student-centered pedagogy and instruction. NGS teachers are able to incorporate cross-disciplinary practices into their own classrooms and develop competencies beyond subject-matter knowledge. The feedback from current NGS teachers reaffirms the need to modernize the curriculum to more intentionally focus on twenty-first century competencies, as it is a learning process not only for students but also teachers.

Although NGS allows teachers to develop and educate a broad set of capabilities, NGS teachers still face a dilemma on whether to "teach to think" or "teach to test". To prepare students for the Bac II, NGS teachers may have to compromise some of their innovative instructional time for exam preparation. To find the middle ground, NGS provides a special budget to assist students with Bac II preparation from grades 7 to 11 (Ministry of Education, 2017). This includes funding for organizing mock exams and incentives for teachers to help prepare students for the exam.

**Lesson #3: All New Generation Schools model a learning orientation.**
The NGS model represents a significant departure from the traditional Cambodian education system in both the goals and approach to teaching and learning. As the reform has scaled, the Ministry and KAPE have demonstrated a learning orientation, collecting detailed information on school-level implementation, such as through the accreditation visits, to inform the future direction of the reform. This has allowed the reform to evolve and continuously improve, for example, with the recent updates to the accreditation criteria and expansion to include primary schools. The learning orientation that underlies the teacher formative support framework is also embodied by the leaders at all levels of the reform.

The NGS reform also offers a few unique insights into effective twenty-first century schools and teacher development.

**Lesson #4: The NGS governance framework includes a thoughtful balance of autonomy, accountability and support for school-based staff.**
The combination of high autonomy, accountability and teacher support is the core strength of the NGS reform. First, operational autonomy allows school-based staff to take direct action to improve their school. This autonomy without excessive bureaucracy allows schools to respond quickly to needs in their schools to have a more immediate impact on students. This autonomy is coupled with the strong NGS accountability system which directly targets corruption—one of the systematic causes of low school performance in Cambodia. Finally, school-based staff receives robust and ongoing support to make the most effective use of their autonomy.

**Lesson #5: The success of the reform is in large part based on strong political support and public–private partnerships.**
A strong public–private partnership and political support have been indispensable for ensuring the vision and plan for the reform are implemented. NGS maintains strong backing from the Prime Minister and Minister of Education, Youth, and Sports, which has been critical for consistency in funding and political support. The strong public–private partnership between KAPE and the Ministry has ensured coherence in the design and implementation of the reform. Further, as an implementing organization, KAPE brings significant technical expertise in school-based management to provide direct support to principals and teachers. This public–private partnership has proven to be a great asset for the NGS reform.

## 6.8 Conclusion

Cambodia's New Generation Schools reform is a promising model combining high professional standards and comprehensive professional development to prepare teachers to strengthen students' twenty-first century skills in STEM, ICT and critical thinking. The reform is unique in that it provides significant autonomy and support to school-based staff in exchange for high accountability for results. Current evidence suggests the reform is well-aligned to its established goals. Continued study of the NGS reform will undoubtedly yield valuable insights for policymakers and educators aiming to improve twenty-first century teaching and learning around the world.

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# Chapter 7
# Twenty-First Century Learning in Burlington Public Schools


**Karishma Mhapadi, Brittany Moniz, Franco Mosso and Rose Sagun**

**Abstract** The world is advancing toward a new paradigm of education, one in which students are no longer required to excel only at standardized testing, but to foster competencies, such as empathy, citizenship, and creative thinking, which will equip them to solve the complex problems that lie ahead of humanity. In Massachusetts, a state in the United States which underwent a long-standing standard-based reform in 1993, the Burlington Public School district provides an example of an education system that can challenge the status quo. With a culture of distributed leadership, collaboration, and innovation, which greatly empowers teachers and principals, the district of Burlington Public Schools implements its policy "Planning for Success", a three-year strategy with the explicit aim of helping students develop twenty-first century competencies. Based on a combination of observation and in-depth interviews at all levels, this study shows how this education system empowers teachers by focusing on strategic priorities and by achieving coherence, collaboration and trust among the many stakeholders involved in the school system.

In an increasingly connected world, schools are tasked with not only educating students to be citizens but also preparing them to be active and engaged participants in today's global economy. With technological advancements and rapidly changing economic opportunities, students must develop skills relevant to the current workforce they will join and the future they will build. Likewise, teachers are also compelled to upskill, train and develop in their profession to keep up with the demands of their students, schools and industry practices. In this chapter we study how the Burlington Public School (BPS) district in Burlington, Massachusetts sustains a culture in the schools that supports twenty-first century education. To provide opportunities for students to prepare for life as global citizens, the Burlington Public School system

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attracts, develops and maintains a staff of highly engaged educators to carry out this important work. As a public school district in the United States, BPS serves as an example of the possibilities that systematic alignment and the ensuing coherence can bring when investments in human capital focus on collaboration, bounded autonomy and continuous learning for all.

Approaches like the one implemented by BPS, which places great importance on culture, coherence and relationships, are supported by the academic literature of educational change. Bryk highlighted the importance of strong ties, a climate conducive to learning, and great leadership in a study of Chicago schools that had a history of success (Bryk, Bender, Allensworth, Easton & Lupescu, 2010). Fullan and Quinn, in their Coherence framework, highlight four distinct aspects to achieve educational success: focusing orientation, cultivating collaborative cultures, securing accountability and deepening learning (Fullan & Quinn, 2015). Chung highlighted how the Expeditionary Learning Network, a successful professional development non-profit in the US, based part of their intervention in schools on creating a great working climate and helping develop a clear strategy (Reimers & Chung, 2018).

In the wake of economic growth in the town of Burlington and the arrival of new technology companies, there is a deliberate focus by BPS to prepare students for life and work in the twenty-first century while balancing the demands of societal pressures and national Common Core curriculum standards. Given the increasingly diverse student population, of which 11% of students are classified as economically disadvantaged (2018–19 Selected Populations Report), BPS supports students in developing global citizenship and engaging in community building, in addition to developing cognitive competencies, which are the principal focus of state standards and assessments. Serving over 3,500 students in pre-kindergarten through twelfth grade, the BPS district includes six schools, many of which explicitly identify twenty-first century learning expectations in their communications. Based on a review of district documents, field observations, primary interviews with BPS leaders and focused discussion groups with teachers, in this chapter we examine how Burlington addresses cognitive, intrapersonal and interpersonal competencies in theory and practice.

Cognitive and socio-emotional competencies are given sufficient focus in the district. Grade-level personalization is facilitated through engaged learning. Student engagement in computational thinking skills, such as robotics and coding, are strongly supported by the district's investments in technology and encouraged through the student-led IT help desk, robotics, drone and e-sports programs (Villano, 2018). To develop interpersonal competencies, BPS encourages participation in makerspaces such as the TED Clubs and conferences, Northeastern University's drive competitions, and the IT help desk modeled on Apple Genius Bar (Villano, 2018). The BPS peer mentorship program is another vehicle for teaching empathy and collaboration. Responding to the growing opioid crisis affecting families in America as well as to increasing stress and anxiety-related problems in students, BPS promotes socio-emotional learning (SEL) to develop students' resilience and self-management. According to the conceptual framework of skills for life and work developed by Pellegrino and Hilton and discussed in the first chapter of this book, this focus on socio-emotional learning is aligned to Positive Core Self-Evaluation

(Reimers and Chung, 2016). At the elementary level, this focus is reflected in an emphasis on mindfulness, and by high school, it includes self-regulation and mental health awareness. In Burlington High School, there is an effort toward self-regulation for students to build their character and make smart decisions.

As a way to foster innovation, the leadership of the BPS district decided to participate in the *Planning for Success* process initiated by the Massachusetts Department of Elementary and Secondary Education. Beginning in 2013, BPS first used the Planning for Success (PFS) model to establish their three-year District Plan, the *Planning for Success: 2016–2019* document. The PFS model was designed for Massachusetts public school districts as a flexible planning process aimed at building capacity and coherence. The process lays out an annual implementation plan, which every school is mandated to produce, as well as a voluntary multiyear improvement plan (Conti, 2018). The hands-on planning process invites the participation of stakeholders—students, parents, teachers, staff, administrators and school board members—in crafting district goals. This participatory process aims to yield shared community understanding and support of district initiatives.

## 7.1 Intended Outcomes

BPS has systems in place that focus on well-rounded learning outcomes for its students, not only in academic areas but also in areas such as college readiness, twenty-first century learning and socio-emotional skills. In 2017, BPS had a graduation rate of 95.5%, which falls well above the 75th percentile across the state of Massachusetts. In 2018, when compared to the state, Burlington exceeded expectations on all strands across grades except for English Language Arts for grades 7 and 8 (Massachusetts Department of Elementary and Secondary Education, 2016). BPS performance on the Massachusetts Comprehensive Assessment System (MCAS) reflects merely one aspect of the intended student learning outcomes that BPS aspires and works toward. Given the standardized nature of MCAS, BPS has invested in assessments that are timely and that provide continuous data and feedback for them to actively reiterate their approach to schooling. BPS conducts a math assessment thrice a year, and socio-emotional skills are assessed twice a year. Compliance with state-mandated assessments coupled with their autonomy over testing internally gives BPS a comparative edge in terms of comprehending student learning. This in turn helps BPS to feed the resulting data back into the system and align the stakeholder actions—especially teachers'—with the district's vision.

## 7.2 Theory of Change

The district articulates its formal theory of change to mold students for the future in the PFS document. The theory emphasizes the belief that, in order to prepare students for the future, three conditions must happen in concert: (1) Targeted and engaged

learning in cognitive and non-cognitive skills, (2) a supportive environment and community, and (3) investment in human and financial capital to achieve such means. Supporting these three conditions are four strategic objectives: Engaged Learning, Relationships, Communication, and Facilities and Operations. We use the Ecological Model (Priestley et al., 2015; Eteläpelto, Vähäsantanen, Hökkä, & Paloniemi, 2013; Emirbayer & Mische, 1998), to assess whether each of these four strategic objectives have been actualized from policy all the way down to learning. The Ecological Model is a conceptual framework that posits an interconnected understanding of various factors that affect student learning. The model's aim is to relate policy to student learning. From policy, there are layers to permeate (influence) before reaching learning: improvement program, school culture, teacher capacity, instruction and then finally, learning. In other words, through this ecological approach, we can determine if the theory in concept is indeed the theory in action.

**Engaged Learning**. This strategic objective of BPS's theory of change proposes that, if students receive a rigorous and well-balanced program of studies, then they will succeed upon graduation and will be ready to succeed in college, in their career, as well as in their role as global citizens (Conti, 2016). The district uses the term "balanced" to describe a program that meets the academic, social and emotional needs of students. In PFS, developing the student and teacher capacity for SEL is a primary goal contributing to Engaged Learning. This goal is seen in action from policy through learning in the classrooms. There is an improvement program in place where student activities align to the improvement of skills as self-regulation and mindfulness. There is a monitoring system in place for these SEL competencies. In addition, school leaders, through regular staff meetings and SEL-specific teacher training, foster the collective culture and instructional capacity needed for continued impact.

**Relationships**. The second strategic objective pertains to cultural competency by building "the capacity of the school community to work effectively and sensitively across cultural contexts" as well as encouraging teacher leadership (Conti, 2018). The theory of change posits that, with improved cultural competency of teachers and administrators, in particular, more relevant teaching can occur, which then makes students feel welcomed and engaged in the learning process, thereby leading to better learning outcomes. In light of the Ecological Model, cultural competency is not fully supported throughout the system, wherein a well-meaning policy does not have the aligned elements conducive for its effect. Cultural competence, to date, does not appear to have a clearly articulated capacity-building plan in place nor are there incentives or measures to monitor the progress or quantify the impact. By all accounts, efforts on cultural competence appear to be at their nascent stage. This strategic objective may need more attention in future strategic plans.

**Communication**. One of the key strategic objectives is communication. They break it down into smaller, actionable goals: (1) Expanding collaboration, (2) Cultivating partnerships, (3) District communications, and (4) Planning for Success process. The theory of action prioritizes communication, leading to more dynamic collaboration, knowledge-sharing, best practices and collective leadership. By all accounts, the Communication pillar appears to be coherently aligned so that Policy

reaches Learning. The advanced use of technology allows real-time, accurate information to be disseminated across the ecosystem. Furthermore, partnerships with the private sector foster learning from industry practitioners through internships and company visits.

**Facilities and operations**. The fourth strategic objective directly supports the theory of action by providing human and financial resources to address safety, capital improvements and school programming. Safety of students and staff is paramount to the facilities and operations objective. Simple tasks, such as posting room numbers inside and outside of classrooms and re-recording notification system messages with new protocols, serve as the foundation for schools to address an emergency event (Conti, 2016). Installing both the physical and financial resources to supply and train staff, BPS used the PFS process to outline all the preliminary steps necessary for all students and staff to operate within a safe and secure learning environment. From an ecological perspective, the facilities and operations initiative relates to the idea of building system capacity within BPS in order to reach their teaching and learning goals; this includes dedicated staff and budget allocations that sustain programs and infrastructure.

It is particularly important to elaborate on the underlying mechanism through which these priorities would create educational success for students. First, it is salient and unique that two of the four strategic pillars just described address what some would call the human component of the work of education (i.e. Relationships and Communication). BPS focuses on creating great relationships between people at all levels and depends on creating a district-wide culture where all stakeholders are aligned, well informed, adequately heard, readily supported and learning all the time. The assumption would be that such an environment would be responsive to develop new educational practices for twenty-first century education, because every reform effort could count on the commitment of teachers as well as the political support of other key stakeholders.

This theory of change and culture is especially important to rally the commitment from teachers. Interviews and focus groups revealed that relationships, communication and constant learning were present at the school level. Teachers had a voice in school planning, professional development and educational innovation. Furthermore, the fourth priority of BPS (Facilities and Operations) also helped develop teachers using technology. For example, in terms of student learning outcomes, the MCAS acts as a rudimentary tool that is in place as a part of the state mandate. BPS, however, has its own internal assessments, such as i-Ready, Kahoot, Socrative, Symphony and Quizlet, that provide exit-ready data. Teachers appreciate that the district invests in tools that will help them process data faster and find solutions for their students. As attested by School Superintendent Dr. Eric Conti, "We screen kids for particular skills. For example, literacy, numeracy and socio-emotional skills are tested three times a year across the district. We also have progress monitoring that caters to individual needs of the learner" (Conti, 2018). These measures of screening are adopted across elementary schools but the same are missing from the middle schools and high schools, mainly because the district is learning how to implement such systems in a

gradual way. According to Dr. Conti, this data is further used as a primary method to increase pedagogical effectiveness and as a measure of accountability.

## 7.3 Developing Human Capacity Through a Culture of Bounded Autonomy

School culture is oftentimes difficult to articulate, much less create and develop. It is a loosely defined concept that can be elusive to pinpoint. However, in the case of Burlington, their school culture, as we have come to know it, is visible, well-defined and well-strengthened. What strengthens school culture, first of all? According to Ebony Bridwell Mitchell, an expert in education leadership and professor at the Harvard Graduate School of Education, culture is shaped and measured by the degree of connections:

> Culture will be strong or weak depending on the interactions between the people in the organization…. In a strong culture, there are many, overlapping, and cohesive interactions among all members of the organization. As a result, knowledge about the organization's distinctive character—and what it takes to thrive in it—is widely spread and reinforced. In a weak culture, sparse interactions make it difficult for people to learn the organization's culture, so its character is barely noticeable and the commitment to it is scarce or sporadic (Shafer, 2018).

**Collaboration**. Burlington's district culture is precisely strengthened and made distinct by the density and frequency of connections and interactions among key stakeholders. Each major stakeholder in the district—student, teacher, school leader, parent, industry—has a voice, through formal and informal means, and there are many opportunities for these groups to collaborate. Parent–teacher committees are actively engaged, and industry leaders participate via company visits and possible placements. Meanwhile, the high school, for example, develops global and community citizenship through an array of student clubs where students create and execute ideas for community service (Sullivan, Sheehan, & Deacon, 2018). Teachers and school leaders see this as an opportunity for collaboration. Another example is the IT help desk led by students. In the one-to-one implementation process, leaders saw an opportunity to empower students with the task of solving technological problems for teachers and other students. Initiatives like these give students a real sense of responsibility over an important aspect of school improvement, and school and district leaders are confident in the value of collective leadership (Villano, 2018). Furthermore, district leaders foster opportunities to collaborate—even in decisions of resource allocation—and use design thinking principles when crafting policy. A district leader shared the impact of including student voices:

> When we were going through the one-to-one implementation in the high school…we asked what kind of cases should we get for the iPads, and one kid said, "Don't buy cases.…People are going to toss them and buy one anyway." That would have been frustrating to find on the floor these cases we paid for (Larkin, 2018).

School principals are also highly collaborative. They involve the whole community in planning and implementation processes and regularly contribute to teaching. For example, an elementary school principal goes into all the classrooms every day to ensure that he and the teachers have a close and trusting relationship (Lyons & Larkin, 2018). Again, there was no evidence of specific training in this area, other than their studies in educational leadership (Villano, 2018), but rather that the district fosters a culture of broad collaboration.

**Autonomy**. The BPS district places a strong emphasis on having an empowered, well-supported staff of teachers and principals. Two main characteristics define the BPS human capital strategy. First, the district allows for a high level of autonomy for teachers and principals. In all schools, teachers felt empowered to bring new and innovative ideas to their principal and district leaders and felt supported in pursuing those ideas. A teacher-librarian shared: "I had this crazy idea to turn the library into a learning commons, and so I brought [it] to Eric (Superintendent) and Patrick (Deputy Superintendent) and to John (Principal)… and not only did they said yes, but they provided me with help" (teacher-librarian, December 5, 2018). The second characteristic is focused guidelines that serve to align the efforts across the district as well as to provide clear boundaries within which the autonomy could be exercised. The *Planning for Success* document and its four objective pillars serve as an orienting document that created alignment throughout the district. Relatedly, a principal shared how the superintendent had asked all principals to comply with a set of research-based "non-negotiables", such as holding English language classes early in the morning, because research showed that students incorporate language better at this time of day. The Superintendent emphasized that it was important to have clear direction with narrowed focus and ample autonomy (Conti, 2018).

**Bounded Autonomy**. In sum, the balance between collaboration and autonomy has given rise to what we define as a culture of bounded autonomy. This set of moderate rules and focused priorities drives a consistent effort throughout the district without stifling the motivation of teachers or principals. This system culture seems to resonate with the principles of distributed leadership in which actors are entrusted with greater responsibility and accountability, and in turn feel empowered to execute policy with excellence (*TALIS 2013 results*, 2014). This culture of bounded autonomy where good relationships are valued contributes to high motivation among teachers, extending therefore to the classroom level. Noting the role of the Superintendent and Deputy Superintendent, a teacher shared, "They are pretty open with what they are communicating to us.…They are present, they are here, they substitute once a month.…They show up in our ceremonies, that is meaningful, that the superintendent cares enough about my kid as a student" (elementary teacher, December 5, 2018).

## 7.4 Teacher Professional Development

The theme of collaboration runs steadily throughout a teacher's experience in BPS and is explicitly defined in Burlington's District Plan. The Plan outlines two specific strategic initiatives related to teacher training and collaboration. The first initiative

aims to build teacher capacity through professional development opportunities as well as planning for use of "evolving instructional technologies"; another calls to "expand collaboration" through efforts to "increase formal and informal collaboration amongst staff" (Conti, 2016). The focus on teamwork, collaboration and leadership among teachers aligns with the interpersonal skills in the Pellegrino framework for twenty-first century skills (Reimers & Chung, 2016). The dedication to collaborative approaches signals an understanding of the importance of the interpersonal skill-building not only for students but also for educators.

Interviews with BPS leaders reveal that fostering teacher capacity is one focus areas for professional development (Villano, 2018). Reviews of the literature of professional development indicate that professional development can encompass both formal and informal experiences, which Burlington balances in the opportunities it provides and allows (Villegas-Reimers, 2003). With limited days allotted for teacher trainings, it is notable that the professional development opportunities at BPS span both internal and external environments, meaning there are trainings available during and outside of the school day. External opportunities may include serving as a mentor to new teachers or attending an offsite conference or workshop. Examples of internal opportunities are informal knowledge-sharing at department meetings and observing lessons in classrooms. More formally, elementary teachers review assessment data every six weeks to modify lesson plans and adjust for individualized instruction (Villano, 2018). Further, teachers have access to subject coaches who assist in creating lessons or refreshing existing lessons to incorporate technology (Villano, 2018). Working with colleagues and students to maximize learning potential, teachers in Burlington have the support, resources and access to enhance their own careers and skill sets.

Notably, Burlington does not face the same hiring challenges that other school systems may struggle with in attracting well-qualified educators. Most teachers in Burlington have attended teaching colleges in the region and secured their teacher licensure from the Commonwealth of Massachusetts, which must be renewed after five years. Massachusetts also mandates that all teachers seeking their professional licensure undergo a one-year induction program followed by an additional 50 hours of mentoring with an experienced educator (Massachusetts Department of Elementary). Administrators have designed a "feeder" structure wherein support staff, such as Response to Intervention tutors and substitute teachers, who regularly work in the schools and already know the organization and their colleagues, so it is easy for them to be absorbed by the district when vacancies arise. Due to the reputation BPS has built for itself, it becomes very easy for Burlington schools to fill vacant teacher positions with highly qualified candidates, according to one school administrator. The culture of autonomy, innovation and continuous learning supports a robust pipeline of professional staff at all levels.

## 7.5 District Leadership

Among the factors that enable and empower teachers is the leadership that the Superintendent of BPS, Dr. Conti, provides. Here we analyze certain aspects of his behavior that are especially relevant.

Taking Fullan and Quinn's framework of coherence, the mindset of growth in a leader can be very beneficial to generate a culture of learning throughout the district (Fullan & Quinn, 2015). It increases the quality of plans because it involves more stakeholders, and it increases the capacity of the organization to approach future issues. Furthermore, great leaders act as "Lead Learners", and they impact the organization through modeling learning, through shaping the culture through relationships, trust and engagement, and through maximizing the impact on learning (Fullan & Quinn, 2015).

Dr. Conti fits the description of a leader that creates trust, relationships and empowerment among teachers and principals. Not only does he make sure that the district has established a few well-understood priorities, which helps to execute the theory of change, but he also gives a fair amount of autonomy to the school principals, while making sure to generate a collaborative culture across the district. For example, he substitute-teaches once a month, attends events that are important for teachers and visits regularly the schools to share time with staff. If a teacher has a new idea, he willingly listens and supports that teacher in their innovation journey. However, he also provides a minimal amount of structure for principals to work. A school principal, for example, said that Dr. Conti asked all principals to comply only with a list of research-based "non-negotiables" (i.e., that math should be taught in the morning for better outcomes), and beyond that they had autonomy to run their schools, knowing that the superintendent trusts their work. Importantly, Dr. Conti also pointed out that he always tries to elevate and recognize the leadership of his team (whether principals or teachers) when something is successful, as opposed to self-attributing the success. He is not concerned with being congratulated, but for his team to feel successful and recognized. In difficult times though, he perseveres to lead and absorb the difficulties, so that the teachers can continue to work ahead in favor of the students.

Leadership is clearly important to establish a culture that supports teacher professional development. In this case, we found a collaborative leader that has had a ripple effect on all stakeholders, thus contributing to enable the whole district to live into a culture of adaptation, learning and trusting relationships.

## 7.6 Investment in Infrastructure

Another reason for a thriving culture in BPS that aids teacher empowerment is their investment in infrastructure, especially in the area of technology. When we first met Mr. Villano, Director of Technology at BPS, he emphasized a three-step strategy to roll out a technological reform: (1) Infrastructure, (2) Devices, and (3) People.

Villano mentioned how most reforms that do invest in technology, almost always put the people first, thus risking the sustainability of the intervention. In BPS, they first set up the infrastructure, including high-speed wireless internet and routers. Next, they invested in the one-to-one device program (i.e., an iPad for every child). Once the infrastructure was in place, they started investing in resources for both teachers and students. This level of preparedness helped BPS gain trust among teachers who were the key implementer stakeholders. BPS made sure that the necessary support, both in terms of lesson planning and diagnostic tools, was present for the teachers. The teachers make use of technology to collect data from assessments or end-of-day learning checks through apps, such as i-Ready. The teachers can even rely on the student help desk, which is an effort to diagnose everyday technical issues in terms of technology use, both for teachers and students. It is this nature of codependency and collaboration among the stakeholders and the existing structure that promotes learning in BPS.

The Burlington teacher preparation experience is a hybrid between structures and habits that combines top-to-bottom and bottom-up professional development. In this system, agency, collaboration and leadership are crucial. There is alignment between teacher preparation and student learning goals, particularly regarding socio-emotional learning, collaboration, and creativity and innovation. Moreover, citizenship seems to be loosely aligned to a culture of teacher agency embedded in the system; though there is weak evidence of cultural competency training, a learning goal that was mentioned regarding student learning goals. Furthermore, digital learning is highly driven by leadership and formal training from the district.

## 7.7 Key Takeaways for Educators and Future Research

While Burlington is an example of a high-performing district at work, we are cognizant of the possibility that there are enabling factors present in Burlington that may elude other school systems in the United States and around the world.

**Long tenure of collaborative leaders**. While the average tenure of a district superintendent in the United States is of about 3–4 years (Conti, 2018), the BPS superintendent is on his eleventh year. Long tenure of leaders and staff provides a nuanced understanding of how to navigate key relationships in the district and how priorities should evolve to serve BPS students. A relatively long tenure, we believe, can play an essential role in building social capital and therefore in developing a cohesive school culture over time. Developing a culture of collaboration, for instance, requires focused, intentional effort over a sufficiently long period of time as teams don't learn to collaborate overnight.

**Hiring policies**. Unlike other districts in the world, it should be noted that the Superintendent can hire the principals, and indeed has hired each of them, and he can also remove them. This is favorable for the alignment required in a coalition and leads to the belief that school leaders' autonomy is mediated by the trust generated in the selection process.

**Financial resources**. Especially in developing countries, the choices that BPS made should be understood within the context of the resources at their disposal. For example, the total per pupil expenditure in BPS amounts to $20,678 USD annually (Massachusetts Department of Education 2018), but it is approximately $1,500 USD in Peru, $167 USD in the Philippines (World Education News + Reviews, 2018) and as low as $127 USD in some areas in India (Jain, 2017). This is especially relevant since many of the main factors of BPS involve purchasing goods and services, such as evaluations and professional development. While cost structures vary across countries, it is clear that schools need adequate resources, in their respective settings, to be able to acquire the kind of inputs that can support efforts of instructional improvement such as those examined in this chapter.

Given these enabling factors, BPS nevertheless proves to be an example for other school systems. We draw the following lessons from this case, which we hope are useful to education leaders interested in supporting the development of teacher capacity to empower students with the full breath of competencies necessary.

**Alignment around few priorities is key**. The strategic planning had few priorities, which were clearly understood by all actors. The priorities describe what to do (engaged learning) and how to do it (collaboration). Focused alignment can be reinforced by strong leadership.

**The importance of formative assessments**. In many systems, standardized assessments fail to help educators to improve curriculum, either because the data arrives late, or because they do not provide a comprehensive range of data about students. Districts might consider crafting or buying a different set of evaluations that are commonly agreed upon by all actors, with the specific objective of promoting frequent collaboration among teachers aimed at improving instruction.

**Investment in technology processes**. Implementation should follow a three-step process: (1) Investing in infrastructure (points of access, broadband internet); (2) Investment in devices (iPads, computers, readers); and (3) Training people (professional development) (Villano, 2018). School leaders shared that many districts fail to implement technology-driven instruction because they start by purchasing devices without proper investment in infrastructure. After implementation, it is also important to include maintenance budget lines to continue to update equipment, though these expenses are considerably less than the initial investments.

**A culture of bounded autonomy**. Policymakers may benefit from coalescing actors around elements of structure and direction such as the main goals of the strategic plan, standards, or minimal agreements of execution (such as the "non-negotiable list of execution" that Dr. Conti shared with principals). However, it is also key to provide autonomy. Teachers are empowered when they see opportunities to create products, contribute knowledge and choose their learning; examples include sharing professional development with peers, building curriculum or selecting BPS Conference professional development sessions. Teachers should also be asked for feedback on initiatives.

As we look to the next generations to solve tomorrow's problems, it is imperative that education systems are designed and implemented in ways that support the multifaceted student and maximize their abilities and capacity for development. The

following ideas illustrate the complexities of supporting twenty-first century skills in various educational systems in relation to the goals set forth by the Burlington Public School district.

**Digital citizenship enabled by ICT**. Through intentional implementation of the one-to-one device program, Burlington Public Schools is leading the way in its application of information and computer technology (ICT). The integration of iPads and laptops in the classroom has created more dynamic learning experiences and given teachers and students more flexibility in their communications and interactions. The one-to-one program supports the cognitive competencies of adaptive learning and ICT literacy. By virtue of the connectivity and ease of sharing information, learners in the district are equipped to further develop interpersonal competencies such as collaboration, teamwork, assertive communication and social influence with others. The importance of ICT literacy cannot be underestimated, as students prepare to be active and engaged citizens.

**Building to higher-order thinking skills**. The ethos of Higher-Order Thinking Skills (HOTS) is to enable students to lead their learning process—a major aim of the district. From creating digital portfolios to learning about mindfulness, the students in Burlington are creators of their own experience and have ample opportunity to cultivate HOTS. Further, David Villano, Director of Technology Integration at BPS, talks proudly about incorporating the SAMR model (Substitution, Augmentation, Modification and Redefinition) in their curriculum. Burlington uses relatively simple technology tools like Scratch and Sphero to enhance problem-solving skills.

**Widespread support of socio-emotional learning**. In Burlington, social-emotional learning is included in the guiding principles of curriculum frameworks and in the district's strategic objectives. Burlington also runs empathy walks, meditation schedules and peer mentorship programs that help kids collaborate and work through real-life problems or simply cultivate a culture of acceptance (Villano, 2018).

**Collaboration and diversity**. Relationship management is included in Burlington as a guiding principle for curriculum frameworks. Burlington leaders, curriculum frameworks and strategic plans explain empathy and cultural competence as understanding the perspective of others.

We conclude this analysis with three questions that we cannot answer at this time. The first concerns whether the collaborative culture would suffer if the Superintendent changed. It would be important to examine the degree to which district habits and investments have sufficient legitimacy to continue regardless of changes of leadership at the top. A limitation of this study is that we conducted a small number of teacher interviews. Further studies may include a broader sample or surveying teachers to inquire into the robustness of the collaborative culture. The second question relates to the tension between one-to-one learning and collaboration. Classroom visits showed all students conducting individual work on their iPads, which leads to the question of how BPS can balance personalized learning and teamwork. The third question asks how BPS will evaluate other competencies in the future. Current evaluation systems for math, literacy and socio-emotional learning exist in elementary school, and it remains to be seen whether and how these policies translate to middle school and high school.

This analysis serves to draw lessons from Burlington Public Schools as an ecosystem and to help policymakers reflect on their own ecosystems, taking into consideration the complex interplays that must be managed to achieve coherence between the different actors' priorities, focus in the district's efforts, and ultimately, student progress towards twenty-first century competencies.

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