

Building Leadership Capacity to Improve Math Teaching and Learning

Lessons from the Math in Common Initiative

September 2020 | Rebecca Perry, Frances Reade, Stacy Marple

The COVID-19 pandemic has required educators to make a seismic shift to distance learning, first on an emergency basis early in the crisis, and now with some amount of pre-planning in fall 2020. Many educators are concerned that distance learning exacerbates students' inability to access and engage in high-quality math learning. Educators are particularly concerned about learning for the groups of students that, prior to the pandemic, were already performing less well than average on the state math achievement test: Black students, English learner students, and students with disabilities.¹

Before COVID-19, there was already a growing awareness that school site leaders' instructional leadership could be critical for raising student achievement. The pandemic further highlighted the potential for targeted leadership development to improve math teaching and learning in California schools at a moment when achievement gaps could be widening.

Findings from WestEd's evaluation of a seven-year initiative called Math in Common may offer some useful insights at this time. Math in Common was organized to support 10 California districts in effectively implementing the

Common Core State Standards for Mathematics (CCSS-M) across grades K-8. A key part of the effort to improve math teaching and learning in these districts involved providing leadership development opportunities for many types of district and school leaders — from teacher leaders and instructional coaches to principals and district administrators — to help them understand and support the math content and instruction that teachers are expected to use.

In this brief, we offer three recommendations for how educators in California and beyond should conceptualize new leadership development

¹ In October 2019, the California Department of Education (CDE) reported that only 39 percent of California's students had met or exceeded standard on the 2018/19 mathematics assessment. Disaggregated data for several student subgroups were even less positive. For example, approximately 13 percent of both designated English learner students and students with disabilities, and 21 percent of Black students met or exceeded the standard.

opportunities to support math improvement — during the COVID-19 crisis and beyond. We offer these recommendations to a broad audience of educators, administrators, and policymakers concerned with building leaders' capacity for school improvement, including representatives from county offices of education, district central offices, the California Subject Matter Projects, the newly formed California Leadership academies,² and leadership associations such as the Association for California School Administrators. To ground our recommendations, we begin with some brief background on the CCSS-M and the Math in Common initiative.

The Common Core State Standards and Math in Common Initiative

The CCSS-M were adopted by the California State Board in 2010. These new math standards required teachers to make significant instructional shifts, including moving from a narrow focus on developing students' procedural knowledge (e.g., memorizing steps to solve a math problem) to a broader focus on fostering both procedural *and* conceptual knowledge, enabling students to build their mathematical understanding. The Department of Education provided some

guidance³ to local education agencies creating implementation plans for these significant changes in teachers' math instruction. However, concrete implementation details were, as ever, dependent on individual teachers' decision-making and classroom instruction.

To support a cohort of California districts in addressing these new standards and developing local math improvement structures and strategies, the S.D. Bechtel, Jr. Foundation created the Math in Common initiative. Throughout the seven-year initiative (2013–2020), the 10 participating district leadership teams developed professional learning to support mathematics standards implementation and instructional change. These professional learning strategies and structures aimed at developing the capacity of a broad group of district leaders and educators to support math standards implementation. The 10 Math in Common districts also participated in a cross-district community of practice to learn with and from one another through regular gatherings of district leadership teams.

WestEd served as the evaluator of the initiative, producing a series of reports describing the work of the participating districts, including districts' math implementation strategies, ways district leaders worked together, and data from yearly surveys of teachers and administrators.⁴

2 One recent promising leadership development initiative is the collaboration between the California Department of Education and the California Collaborative for Educational Excellence to establish California School Leadership Academies. The 2019/20 California State Budget authorized \$13.8 million in federal funds to establish these academies for building the capacity of central office and site leaders to lead school improvement efforts. Seven regional academies were funded across the state, along with one statewide center designed to support and build coherence among the regional academies. They began their program work in June 2020.

3 California Department of Education (2019). *CCSS Systems Implementation Guide*. <https://www.cde.ca.gov/re/cc/ccssguide.asp>

4 Math in Common reports are available at <https://www.wested.org/mic-summative-evaluation-reports/> and <https://www.wested.org/resources/product-category/highlights/free-publications/math-in-common-evaluation-reports/>.

This brief draws on our findings over the course of the initiative to ground the recommendations described below.

Three recommendations for building leadership capacity to improve districts' math teaching and learning

Here we offer three recommendations for groups in a position to support teachers and district staff. In California, for example, these groups might include county offices of education and local education agencies, policymakers, and professional learning organizations, such as the California School Leadership Academies, California School Boards Association, the California Math Project, and the Association of California School Administrators. We believe the experience of Math in Common shows that investments that support these three recommendations can have outsized effects on improving mathematics teaching and learning. Below, we describe each recommendation and then briefly summarize the learning from Math in Common that supports it.

Recommendation 1: Build broader capacity for math instructional leadership.

Even before the COVID-19 pandemic, many teachers felt under-prepared to teach CCSS-M-aligned math. They called for more professional development, better curriculum, clearer guidance on instructional routines, and help understanding what high-quality math

teaching was supposed to look like. At the same time, principals were overwhelmed with a growing set of responsibilities and priorities. They also sometimes struggled to understand what instructional shifts were needed for the CCSS-M and how to support teachers in making those shifts in the classroom.

Now, during the COVID-19 crisis, districts, counties, and the state are shifting funding priorities to address new challenges. The Math in Common evaluation team members have heard reports of many districts cutting instructional specialist positions and sending teachers “back to the classroom” to address teacher shortages rather than retaining those instructional specialists and hiring new educators. This means that as challenges for math teaching and learning grow exponentially, there will be even fewer staff with math expertise positioned to support teachers and principals.

Offer differentiated learning opportunities for school and district leaders. Put simply, both before COVID-19 and now, districts need more math expertise and leadership. But this need cannot be fulfilled by math coaches alone. Across the state, there is a need to build math leadership capacity for school and district leaders, including district curriculum and instruction (C & I) staff, teacher leaders, and principals. Organizations such as county offices of education, local education agencies, and others that are providing leadership development should seek to offer differentiated learning opportunities for building math knowledge and skill for C & I staff, teacher leaders, and principals so they can offer coherent, knowledgeable support to teachers.

Address math content more deeply in professional learning. Additionally, to build math teachers' leadership skills, or to equip them to become site or district math coaches who can support their colleagues, professional development will need to address math content more deeply. Teacher leaders and coaches need more support to understand the way the CCSS-M math content builds across grade levels. They also need access to useful instructional routines for achieving different mathematical goals and to strategies for using standards-based content and pedagogy alongside curriculum to plan rigorous, differentiated instruction. To be able to share their math knowledge effectively with others, teacher leaders and coaches also need to have or develop knowledge about the practice of coaching and theories of adult learning.⁵

Provide principals with relevant math knowledge. Principals do not necessarily need to develop the same level of math content expertise as teacher leaders and coaches in order to provide instructional leadership. They should, however, have professional learning experiences that develop new relevant math knowledge and lead them to *prioritize* math at their schools as much as they might prioritize English language arts. To support high-quality math teaching and learning, principals' professional development should focus on developing knowledge of the math standards, the curriculum materials, and the instructional shifts teachers should prioritize at different grade levels; fostering confidence to visit classrooms and offer feedback on and support for math instruction; and supporting the ability to organize their schedules so they can observe math instruction and monitor progress at their site.

5 See, for example, the 2013 Supporting High-Quality Common Core Mathematics Instruction chapter of the Mathematics Framework for California Public Schools: Kindergarten Through Grade Twelve: <https://www.cde.ca.gov/ci/ma/cf/documents/mathfwsupportingh-q.pdf>.

Building coaches' and principals' math instructional leadership in Math in Common

Each Math in Common district used grant funding to increase their district math coaching pool, bringing in more people with specific math knowledge, expertise, and training to guide their standards implementation strategies. Math in Common district team members frequently reported that their math coaches were one of the factors that made the greatest difference in their ability to implement the standards and change teachers' math instruction.

For example, Math in Common math coaches worked with teachers, site instructional coaches, and teacher leaders individually and collectively to demonstrate instruction, co-teach lessons, engage individuals and teams in inquiry cycles, and facilitate lesson- and unit-planning discussions for teacher professional learning communities. Coaches also helped principals deepen their conceptual knowledge of mathematics and understand what high-quality math teaching should look like in the classroom, often by facilitating regular math-focused principal meetings.

Several Math in Common district teams also supported principal instructional leadership by having principals observe classroom math instruction alongside coaches and others (e.g., teachers, other central office staff). Because the classroom observers often had different levels of math knowledge, their time together would typically begin with some initial study and discussion (e.g., of the math in the lesson plan, curriculum materials, and observation rubric) before the lesson to develop shared understandings. After the lesson, observers would reflect together on the math instruction they saw, share evidence they had gathered of how the lesson supported the mathematical goals, and consider how the lesson might be adapted to better support lesson goals.

Through activities like these, math coaches helped school and district leaders directly see and understand what the WestEd evaluation team described in our prior Math in Common reports as the “dynamics of classroom (math) instruction.”⁶ Through this engagement with actual classroom instruction, different groups of leaders built their own math knowledge, developed a deeper understanding of what teachers needed to do and understand to implement high-quality standards-aligned math instruction, and gained new ideas about how to help teachers improve their math teaching.

It is unlikely that teams of observers will have the ability to observe classes together in person given the shift to online or hybrid learning during the COVID-19 pandemic. But the online instruction that many teachers are planning for may actually create new and easier opportunities for these kinds of shared learning experiences to occur if these are presented as a learning opportunity for all.

6 In our report *Educators Collaborating to Improve Mathematics: Three Structures that Mattered in Math in Common Districts* (Reade, Perry, & Marple, 2018), we described dynamics of classroom instruction as including the following: instructional materials; instructional routines; teacher and student roles, identities, and beliefs about learning and “productive struggle”; the number and difficulty of tasks within a lesson; lesson structure; the use of technology and manipulatives; participation, group work, and discourse structures; and the ways in which lessons can be differentiated for different types of learners.

Recommendation 2: Create regular opportunities for leaders in different district roles to reflect together on math instruction and needed supports for improvement.

Even before the pandemic, we found that there was significant variation in how math was taught from classroom to classroom and school to school. What happens regularly in a fourth-grade math class at one elementary school, for instance, might look quite different from what happens regularly in a different fourth-grade class at a school across town. These differences in the classroom instruction that students experience often impact their math learning and achievement.

Convene professional learning communities of leaders to develop shared understanding of math teaching and learning. To best understand what to focus on in districtwide math improvement efforts, leaders need to develop shared understanding about what math teaching and learning actually looks like in a variety of classrooms across the district. With this information, leaders can then collaborate to develop a plan to reduce variation and create similar high-quality learning experiences for all students.

Leaders' understandings about students' experiences in math class can best be built when staff from different layers of the district system have the chance to talk about what they are seeing in their daily work at the classroom, site, and district levels — and what is “working” or not. Especially now, when district and site leaders may have even fewer opportunities to talk about math instruction formally or informally and teachers

are likely using an even wider variety of different resources and strategies to support math instruction, it will be critical for many leaders across the district to contribute to the discussion about students' math experiences.

To optimize future leadership development opportunities and to ground them in the realities of actual classrooms, we imagine teams of educators representing diverse roles (e.g., principals, teacher leaders, coaches, C & I staff) working together closely as professional learning communities. Not only should district leadership teams attend differentiated learning opportunities, they should also convene regularly to build common understandings about what teaching and learning looks like on the ground, and how investments in supports like teacher professional learning and curriculum materials are playing out for students. For example, in a distance learning environment, it could be possible for district professional learning community members to collaboratively observe a series of fourth grade math classes taught by teachers at a given school to understand how they are implementing school improvement ideas.

Gather and reflect on data about math teaching and learning. To inform the efforts of the professional learning communities, teachers, coaches, and principals could be asked to visit classrooms or schools (in person or online) and gather data about math teaching and learning (e.g., classroom observation data, teacher or student interview/survey responses, student work). The team could use these data to inform decisions on how the district could improve math teaching and learning for each student, classroom, and school site.

For example, in a district focused on strengthening student mathematical discourse, coaches could use a simple rubric to observe classrooms and evaluate the discourse that they see taking place. The coaches could then meet to share findings, identify the variations in teaching and learning they observed, and discuss why those variations may be occurring. Does a strong math-focused professional learning community at one site, a new curriculum in use at another, or a recent training on math talks at a third seem to be having a positive effect? If so, how can those supports be scaled to more sites?

Role-diverse team learning in Math in Common

One of the most valuable, yet simple, scaffolds Math in Common offered to participants was requiring each district to organize a leadership team of people who attend Math in Common convenings together and meet regularly outside of convenings to carry out the district's math improvement efforts.

These leadership teams typically consisted of about eight people representing a mix of C & I office staff, math coaches, principals, and other district administrators, such as the district's technology lead. In each district, these teams of people with diverse district roles met regularly, gathered and reviewed evidence of what was happening in math class relative to their indicators of interest (e.g., student discourse) from across the district, and used this information to inform targeted district efforts to support and improve math teaching and learning based on what they were seeing in classrooms. Each team member brought information to the team from their own spheres of influence about what was happening in math instruction in different schools and classrooms. The team then reflected on this together and collaboratively decided what improvements to make. In several of the Math in Common districts, the leadership team remains an important legacy of the initiative to carry on math improvement efforts within the district.

Recommendation 3: Build a cross-district information exchange to identify math education “pain points” and strategies to address them.

There are many interventions that schools and districts use to improve mathematics. Some schools and districts have identified successful strategies from which others could learn, and others have tried strategies that did not work and should be avoided. Unfortunately, this important knowledge tends to stay local. Across the state, this information is not easily shared so that effective improvement strategies in one district could support similar improvement in neighboring districts or other parts of the state. And outside of summative assessments, educators have very little access to information about why, across the state and within their districts, students perform better in certain classrooms than in others, making it difficult to know what needs to change.

Building from the kinds of intra-district data collection and learning that we described in recommendation 2, we think that inter-district information sharing could be an important strategy for leadership development and statewide math improvement.

Collaborate across districts to investigate pressing issues. For example, in classrooms where students are successfully persevering to solve challenging math tasks, what kinds of professional development or coaching have teachers received? Or, in schools where English

learners are under-performing, what instructional routines may be limiting the ability of these students to adequately access and engage with the content?

Questions like these could be investigated by cross-district leadership teams. Some California county offices of education have already organized local professional communities of educators from multiple districts.⁷ This model could be expanded to create other new opportunities for cross-district discussions of math instruction and math improvement strategies that work. The newly organized California School Leadership academies could also provide forums for teams of district leaders to work with and learn from each other about math improvement.

Build a cross-district body of knowledge. In cross-district learning environments, leaders could build common understandings about math classroom instruction and its relationship to student math achievement, consider system supports for standards implementation, and study situations in which math implementation is, or is not, progressing. By sharing local data about math instruction more broadly and reflecting together, leaders from different districts could create a body of knowledge about “what works, for whom, under what circumstances” that could inform both their own local improvement plans and broader state math improvement approaches. This approach could be particularly useful now, given the need for information on the effectiveness of various online and hybrid instructional models that are being used in response to COVID-19.

⁷ For example, The California Partnership for Math and Science Education (CAPMSE) has provided micro-grants to County Offices of Education to support such local professional community development. More information about CAPMSE, these grants, and other resources provided by CAPMSE is available at <https://capmse.org/home>.

Together, district leadership teams could start to understand math achievement challenges deeply and respond appropriately to improve math teaching and learning across the state. For example, in the current distance learning environment, educators everywhere need to

develop a better sense of what is happening during effective online math instruction, and how those effective instructional elements might be applied more broadly to other math content or face-to-face learning experiences.

Sharing implementation information and strategies in Math in Common

As described in our 2019 summative report *What Accelerates a Community of Practice? Inflection Points That Changed the Course of the Math in Common Initiative* (Perry, Marple, & Reade, 2019), Math in Common provided an opportunity for cross-district leadership teams to meet together, in person, three times each year to share their math implementation strategies, successes, and challenges. This collaborative structure accelerated the progress of the community as a whole.

To inform the work of these cross-district teams, in early 2016, WestEd developed customized analyses of achievement on the new state summative math assessment for each district. WestEd supported the community in discussing the relationships between the summative assessment results and each district's allocation of resources and supports for schoolwide math improvement. These data-based discussions engaged the entire community in examining the challenges and solutions related to each other's math improvement efforts. Teams were able to learn what was working to shift math instruction in districts and school sites with similar student populations. They were also able to compare their own progress to that of other districts to understand if similar improvement strategies were resulting in similar student outcomes.

It was through these cross-district data-based discussions that teams built common understanding of the demands of math standards implementation, trust needed to talk about their own challenges, and knowledge about strategies that different district teams were using that were either working well or were not. Sharing details about how the improvement strategies worked in practice and where they were leading to successes gave some district teams the information and inspiration they needed to be able to adopt and adapt similar strategies in their own districts.

For example, one district team described how they organized regular reflection opportunities for PLC participants from different schools to learn from each other about the math improvement approaches their respective schools were taking. This idea of organizing cross-site "PLC huddles" was subsequently adopted by another district team, who saw the cross-site sharing as a way to reduce instructional variation and to spread effective ideas. The second district's Chief Academic Officer told us that the PLC huddles helped "[Teams] to have the model of [others] who are a little farther ahead, so they cross-pollinate a little bit." Through the initiative, Math in Common teams were able to cross-pollinate as well, capitalizing on the work that other districts had already done instead of starting from zero themselves.

Final Thoughts

Distance learning is likely to exacerbate existing systemic inequalities for students, which will have serious effects on learning and achievement for our most vulnerable students. While the COVID-19 situation is stretching resources and attention thinly across a host of new and old challenges faced by teachers and school districts, based on our observations of the Math in Common initiative, we believe

agencies across California, and in other states, could intervene by offering more, not fewer, opportunities to develop math leadership capacity for educators. With targeted learning opportunities that build broader understanding of in-class math implementation, leaders across the state will develop the knowledge they need to ensure students' access and ability to engage in the high-quality mathematics instruction they need and deserve.

Suggested citation: Perry, R., Reade, F., & Marple, S. (2020). *Building leadership capacity to improve math teaching and learning: Lessons from the Math in Common Initiative*. WestEd.



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