



Educators Collaborating to Improve Mathematics

Three Structures That Mattered
in Math in Common Districts



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Introduction

For school districts in California, just as one set of revolutionary new content standards is beginning to feel familiar, another deep change is brewing. Districts have now had more than five years to wrestle with how they implement the Common Core State Standards for Mathematics (CCSS-M) (NGA Center & CCSSO, 2010). Many have made large-scale changes in their systems. However, state math assessment scores have remained flat, suggesting that many districts may still be in the early stages of understanding and implementing changes that are necessary to support instruction.

This report describes how 10 districts participating in the Math in Common (MiC) initiative have approached implementation of the CCSS-M somewhat differently. To implement their district visions of the CCSS-M, each MiC district's MiC leadership team developed three critical collaborative structures. These structures enabled these districts' practitioners, administrators, and thought partners to meet to learn, interpret, and refine the ways they wanted to shift the dynamics of classroom instruction so that the new math standards could come to life in their classrooms.

This new way of operating may have contributed to the "bright spots" that a few of these districts are demonstrating in relation to improving student mathematics achievement (Perry & Huang, 2019). In this report, we share this information so that other districts across the state may benefit from some of the implementation design lessons learned by these 10 districts, as CCSS-M implementation continues and as districts shift to the Next Generation Science Standards, which demand similarly profound changes in teaching and learning.

Shifting paradigms for implementing standards

In the past, standards change often began as a suggestion from a national body such as the National Council of Teachers of Mathematics (NCTM) (e.g., NCTM, 2000) or as a state-level policy requirement (e.g., California Department of Education, 2008). The most common measure of the success of implementing the new standards was students' scores on supposedly aligned summative assessments. To help teachers support their students in passing the new assessments, districts usually looked to instructional materials. These instructional materials, along with related teacher training and aligned assessments, provided the foundation for districts' standards implementation: the instructional materials were the mechanism for teachers to put new ideas to work in their classrooms, the professional learning was the vehicle for teachers to learn how to use those standards-aligned materials with students, and the aligned assessments were the measure of success.

With implementation of the CCSS-M in California, however, educators in the state were unable to follow many of these previous paths for standards implementation. For instance, when the standards first appeared, there were no adequate standards-aligned instructional materials available, and even today there are few acceptable options for instructional materials (Kane, Owens, Marinell, Thal, & Staiger, 2016; Opfer, Kaufman, & Thompson, 2017; Polikoff, 2015) and no professional learning programs linked to the materials. Summative assessments also lagged, with the state's

new standards-aligned tests, the California Assessment of Student Performance and Progress (CAASPP, affiliated with the Smarter Balanced Assessment Consortium), not rolled out until several years into implementation of the CCSS-M.

In the early years of CCSS-M implementation, the MiC initiative was launched with 10 California school districts. As the leadership of these districts grappled with the upending of the previous approach to standards implementation, and dug more deeply into the standards to understand what sort of new approach would be needed, the magnitude of the necessary work to align instruction to the new standards became apparent. The most basic elements of teaching and learning — the very *dynamics of classroom instruction* — had to change. (The phrase “dynamics of classroom instruction,” a central organizing theme for this MiC report series, is defined in the sidebar *What is a Focus on the Dynamics of Classroom Instruction?*)

With both instructional materials and assessment off the table as the central vehicles of standards change, what path did districts pursue for implementation? When asked, “What were the key implementation approaches you took to support the adoption of the new standards?” in 2016, 66 percent of interviewed school leaders in California districts indicated that adopting new instructional practices was their primary implementation mechanism, rather than other mechanisms such as developing instructional units or changing organizational structures (Center for the Future of Teaching and Learning, 2017). That is, they started with making changes at the classroom level, rather than at the policy level. The 10 MiC districts also led implementation efforts by focusing on classroom instruction.

WHAT IS A FOCUS ON THE DYNAMICS OF CLASSROOM INSTRUCTION?

Unlike previous standards, the CCSS-M include standards for both mathematical content and mathematical practice, and they place greater emphasis on students’ conceptual understanding. To transition to the CCSS-M, districts’ approaches to teaching and learning will need to undergo a deep shift from procedural instruction (think worksheets and lectures) to classrooms where students own the intellectual work and can both understand and explain the mathematics.

In MiC districts, for students to be able to work, think, and communicate about mathematics at the level of the standards, district staff across the system had to consider shifting every interlocking element of what happens in classrooms — what we call the *dynamics of classroom instruction*. The dynamics of classroom instruction include 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.

To make progress on shifting these dynamics, the districts needed all educators and staff across the system to gain an understanding of how these various classroom features should look in practice, and then develop capacity to realize the vision in their practice. To achieve that vision across a district, no one can be left out of the learning agenda.

Three key collaborative structures for changing the dynamics of classroom instruction

Changing the dynamics of classroom instruction can’t happen with just a snap of the fingers. Through our observations of the MiC districts, we have found that one important strategy to guide this change comes from diverse groups of educators working together to create coherence and alignment of effort within a district system. In the MiC districts, we observed three particularly important



collaborative structures that enabled such coherence and alignment to develop:

- **Role-diverse sense-making teams** composed of a diverse mix of staff, from classroom-level teachers to district-level leaders. Together, these staff can interpret and make sense of standards, create visions for the standards implementation in the real contexts of the district and its classrooms, and then protect and promote these visions throughout the system.
- **Strategic partnerships with technical assistance providers** who can offer flexible, critical input on standards implementation within the bounds of each district's particular contexts and needs.
- **Empowered site-based leaders** who have the necessary training and skills to take an instructional leadership role in connecting the district's vision and theory of action for CCSS-M implementation to the day-to-day realities of classroom instruction.

These three structures have three primary functions in common: (1) they support iterative work toward shared understanding of classroom instruction and what is needed to improve that instruction; (2) they support collaboration and communication across groups of educators that generally work within their own siloed district and school departments; and (3) they support best practices on adult learning (National Academies of Sciences, Engineering, and Medicine, 2018), which align with how the CCSS-M is expecting students to learn together in classrooms. Accordingly, they reduce fragmentation within district

systems by involving everyone in the change effort to implement the standards, rather than leaving the implementation task solely to teachers working alone in their classrooms.

When these three structures were functioning well in the MiC districts, their participants became “boundary crossers” who shared information laterally (across groups of educators with similar roles) and horizontally (among educators with different roles, including teachers, site leaders, district staff, and technical assistance providers). Organizational theorists have given significant attention to the role of individuals as boundary crossers within and across organizations. Such individuals can provide a connective mechanism between culturally different groups, “import[ing] energy” from one environment to another (Scott, 1992). In this report, we argue that district systems as a whole, and the teachers and students within them, benefit from structures that enable — or even require — individuals from different areas of the district to work together toward common goals and understandings about mathematics instruction.

Although there is no roadmap for putting the CCSS-M standards in place across California's diverse districts and classrooms, we assert that the communication, learning, and resultant systems change enabled by these three key collaborative structures show how thoughtful collaborations can accelerate learning and implementation. In this report, we discuss each of these three structures, describing how each can be organized to support a focus on the dynamics of classroom instruction. In *The View from the Field* text boxes, we offer illustrative examples from the MiC districts, depicting how these structures were leveraged for systems change.

Structure 1: Role-Diverse Sense-Making Teams

Summary: To understand and interpret the standards and to drive implementation actions, district staff from many different departments came together to work and learn together. These staff members developed common understandings and messaging about what the new standards should look like in classrooms, enabling many different stakeholders to promote a consistent message in their communications with others.

Due to the complexity of the new standards and their differences from how most adults learned mathematics, staff across each MiC district needed space, structure, and the expertise of colleagues in order to develop shared understandings of what the standards meant and what they should look like in practice in classrooms. To help district leaders in this learning process, every MiC district created learning and decision-making structures that brought together diverse leaders and educators from all levels of the district's system, including teachers, coaches, principals, math department staff, and district administrators. These role-diverse team learning structures may have been inspired in part by the success of the MiC leadership teams, which included staff from several different district departments (Perry, Marple, & Reade, 2019a).

Sometimes, these district teams functioned like professional learning communities (PLCs), meeting throughout a year, or over a longer period, to puzzle over particular issues and

solve problems. At other times, teams were focused on specific tasks related to the dynamics of classroom instruction, such as identifying appropriate instructional materials, considering how to monitor student learning without readily available unit tests (which could formerly be found in textbooks) and without summative assessments, or helping parents and the community understand the methods and rationales behind the CCSS-M via parent education nights.

Other examples of the work carried out through MiC districts' role-diverse teams include developing classroom observation tools and rubrics to understand CCSS-M implementation progress; working together to create an entire K–8 curriculum in the absence of an adequate commercial solution; and thinking through ways to realign the district's current system to achieve better outcomes for African American students. The text box *The View from the Field: Dinuba's Classroom Observation System* provides an example of how one MiC district used diverse sense-making teams of educators to develop a classroom observation system, and of how the system development process supported the development of staff understandings, competencies, and relationships across the district.

Conditions for successful sense-making teams. The MiC district teams seemed to gain the most traction for CCSS-M implementation when two conditions were in place:

- The sense-making teams were a diverse and complementary mix of system leaders and educators, representing varying roles, perspectives, and expertise, from across the district, including assistant superintendents,



The View from the Field

Dinuba's Classroom Observation System: A Powerful Driver for Improving Instructional Leadership and Strengthening Relationships

A few years into their math implementation efforts, Dinuba Unified School District administrators realized that while staff across their system were putting in incredible effort to implement the CCSS-M, district and site leaders (including both principals and district math staff) had no way to understand whether teachers were helping their students make real progress in math.

In accordance with improvement science principles, the Dinuba MiC leadership team started small. The team members developed a classroom observation rubric to help them learn how teachers in two grade levels were enacting three of the math practice standards. But as soon as they went into schools to use the rubric, they realized that they didn't have a common understanding about what the standards meant or of what the standards should look like in classrooms, and that they didn't have a well-calibrated way of using the classroom observation rubric.

This led the team to develop a more complete classroom observation system, which included both an observation rubric and a protocol for its use. Both the rubric and the protocol were used to train more educators districtwide to calibrate their ideas around classroom instruction; these written guidelines provided clarity and specificity about how classrooms were to be observed. What Dinuba leaders didn't expect was that the very process of creating this classroom observation system would be one of the most valuable mathematics professional learning experiences they had access to.

Dinuba's role-diverse team. The team developing this classroom observation system initially included only leaders from the central office. Once the members of the initial group came to a calibrated understanding of what they were looking for from the system, they brought in principals and then coaches. Each time new staff were brought in, the whole group was recalibrated, so that all team members were using the tool the same way and were working together to clarify what they were seeing in classroom instruction in relation to the rubric that they were using and the standards. This calibration process allowed data gathered throughout the district (using a Google form) to be clearly interpreted and used to make data-based conclusions.

Dinuba administrators reported that involving their principals in this calibration process was "the best professional development we could have provided," because it enabled principals to talk about the CCSS-M, understand clearly what the standards look like in practice in real classrooms, and see the challenges that teachers were facing.

Principals used their experience with the observation system to strengthen relationships with teachers and improve their instructional leadership. Coaches used the system with individual teachers and with grade-level PLCs to discuss the alignment between observed classroom instruction and the standards. District-level staff used the system, and the data that it generated, to continue to think about their overall support for teacher professional development and to understand the district's implementation progress across years in relation to how they were allocating resources.



district math office staff, curriculum and instruction staff, district- and site-level math coaches, principals, and teachers.

- Collaboration and idea sharing were intentionally centered on shifting a particular facet of the dynamics of classroom instruction (such as mathematical discourse) or a specific structure that the district used to understand or monitor the dynamics of classroom instruction (such as learning walks or an observation tool).

With varied perspectives and a common focus to fuel the role-diverse collaboration, team members were able to unpack the complexity of the standards, gain new insights from their colleagues in different roles, and either validate their current thinking or be pushed to rethink their understanding about improving mathematics in the district. Collaboration within diverse groups engendered individual and shared reflection about how to effectively implement the standards, and supported district leaders in communicating consistent districtwide messaging about the district's expectations and vision for CCSS-M

implementation and standards-aligned instruction.

MiC districts have experienced repeated leadership turnover and other organizational turmoil, as have other districts across the state. For example, over the five-year span of the MiC initiative, the 10 districts were led by a total of 19 district superintendents. Several MiC districts also experienced cuts or changes to their staffing or to other elements of their programs to support mathematics improvement. In the midst of such changes, a variety of district staff members who had participated in the kinds of shared sense-making activities described in this section could serve as "keepers of the flame." These staff could maintain the vision of math improvement for their district; communicate a strong, consistent message about it to colleagues at their respective levels of the system; and otherwise work toward a common vision across the district.

The text box *The View from the Field: A Role-Diverse Sense-Making Team in Oakland* provides an example of how Oakland Unified School District educators relied on other educators from different parts of their district system to think collaboratively and work together to develop a plan to improve mathematics instruction.

The View from the Field

A Role-Diverse Sense-Making Team in Oakland: A Site-Based Grant Program to Support CCSS-M Implementation

For several years during the MiC initiative, Oakland's math department used part of the district's MiC funding to offer mini-grants (called Enhanced Math Collaboration grants) to individual schools to focus school-level attention on mathematics and to support CCSS-M implementation. The Oakland MiC leadership team wanted the grant application process to incentivize the creation of a role-diverse sense-making team whose members would come together to create a detailed vision and implementation plan for each site that applied for a grant. Principals and instructional coaches from each site worked closely with their network superintendent and district-level math office staff to develop a plan describing how the site would use the money to improve math instruction (e.g., coaching, substitute teachers, professional learning days designed by the district math department, instructional materials). This

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grant opportunity gave site leaders a chance to think deeply and with specificity about improving their sites' math programs, with targeted support from district leaders.

Timeline for the team's work

- The Oakland MiC leadership team conceptualized the grant program and designed the applications in 2015–16. Interest in the program was very high across the district.
- In fall 2016, school site teams began meeting to write their sites' applications. The applications required a thorough articulation of a standards-implementation plan for the year, including calendaring professional learning, creating a theory of action, committing to participating in one of the district's improvement networks, bringing curriculum and content up to grade level at the site, and collecting and using data to understand progress.
- The Oakland MiC leadership team began approving plans and distributing funds in late 2016. Some schools with clear plans were approved immediately. When plans needed work, the MiC leadership team collaborated with the team that wrote the proposal to improve the plan, giving the MiC leadership team greater influence over the direction of math implementation at school sites and further supporting the learning of the site-based educators who wrote the applications.
- In 2016–17, the Oakland MiC leadership team adapted an existing classroom observation tool, for both the site team and district staff to use at grantees' schools to assess school-site capacities in several areas of interest discussed in the schools' applications.
- In 2017–18, although the grant amount was reduced, site teams were still eager to apply. Under the reduced grant amount, the program focused more on funding to support site-based collaboration to improve each school's CCSS-M implementation activities (e.g., funding substitute teachers and paying stipends for teachers to meet on Saturdays and evenings).
- In 2018–19, funds were reallocated from Saturday professional development sessions, which were joined by individual teachers, to continue the grants to support collaboration at school sites in a more ongoing way. The grants have especially emphasized teachers' collaborative unit (rather than lesson) planning, based on the theory that planning at the unit level enables teachers to emphasize content over pacing. Central office math staff offer direct support to all sites with approved grants.

Structure 2: Strategic Partnerships with Technical Assistance Providers

Summary: Like most districts in the state, MiC districts have worked with a range of technical assistance providers to support their learning and improvement, funded both by the initiative and by the district. They had the most success using these external sources of expertise and assistance when all parties adopted an approach of collaborative inquiry, learning together about how to shift and strengthen the dynamics of classroom instruction.

While most districts in California contract with technical assistance (TA) providers in ways that support mathematics teaching and learning, the character and depth of districts' relationships with external TA providers can vary greatly. In some cases, external providers offer districts somewhat generic services designed to be broadly applicable to a broad range of recipients — for example, a specific half-day training, following a pre-defined protocol that may not change from district to district. Other times, providers and districts enter into partnerships that are more targeted and responsive to specific local contexts. In these latter instances, district staff take a more active role in defining what the support will look and feel like, and they work with the provider to align the services to the district's vision for instruction.

Supporting the district vision. When MiC districts looked for external providers for support, they often asked the providers to

design their services to work in coherence with the district's vision and goals. Especially in the early years of their responses to the CCSS-M, MiC districts engaged TA providers around three main areas of need for internal capacity building:

1. Professional learning about the standards and aligned instructional shifts for teachers, coaches, and administrators
2. Careful review of instructional materials and/or the development of district materials or scope and sequence guidelines
3. Districtwide adult learning strategies and systems

Some of the ways in which TA providers worked with MiC leadership teams to help the teams address these three areas of need included:

- Helping district staff understand differences between old and new standards, and what needed to change, or remain the same, about the district's approach (this work also often included helping districts understand the reasons *why* an approach might be useful in a given situation)
- Listening to district staff about their starting points for and progress around standards implementation, and customizing support accordingly
- Examining and using data (e.g., student assessments, teachers' reflections) to inform ongoing standards-implementation efforts



The View from the Field

Garden Grove and UC Irvine's Partnership

Garden Grove Unified School District leaders pride themselves on low administrative spending and on developing their own knowledge in-house, so they hadn't considered bringing in a third-party provider to support their math standards implementation until this idea was recommended by their MiC program officer from the S. D. Bechtel, Jr. Foundation. The resulting partnership with the California Math Project at the University of California at Irvine (also known as the Irvine Math Project, or IMP) became a key resource for the district's math implementation, and this partnership is intended to continue beyond the five-year MiC funding period.

The district was emerging from a long period of focusing on procedural ways of teaching math, so its staff knew that the district's teachers would need meaningful support to make the switch to CCSS-M-aligned teaching. IMP was initially brought in to provide support for adopting new curricula, designing a new unit-pacing plan, and providing support for teachers during lessons (e.g., modeling and providing feedback on instruction), and similar activities continued over several years (e.g., helping to guide the yearly revisions of the scope and sequence of curricula, and to identify resources such as formative and summative assessments). Knowing that the district had historically taught math in a very different way than what was called for in the CCSS-M, district leaders especially wanted to convey to teachers the new instructional shifts related to pursuing conceptual understanding, procedural skills and fluency, and application simultaneously, as described in the CCSS-M.

Building internal capacity to sustain the work. Knowing that there was a limited period of funding from the MiC initiative, IMP was brought in to help the district "ramp up" and build broad internal capacity. To build the district's internal capacity to continue the work after the funding ran out, IMP worked with administrators and with the entire teacher on special assignment (TOSA) team four times per year, particularly helping them think about how conceptual lessons were different from procedural and application lessons, and how the TOSAs could convey those differences to teachers.

IMP staff also collaborated with TOSAs to facilitate the district's summer institute for teacher professional development. In this process, TOSAs were able to learn from IMP colleagues about ways to clearly communicate the district's central mathematical ideas to teachers in different formats. To conserve resources as the work progressed, district staff leaned less on IMP for support for the summer institutes once they felt they had built the capacity of the district's TOSAs to lead the work.

- Collaborating informally, revising ideas and decisions over time, and building capacity for self-reflection within the district

Keys to successful partnerships. Successful partnerships between MiC districts and TA providers frequently started with both parties

seeking clarity about the goals of their collaborative work together, and with willingness to engage in an ongoing relationship built on honest communication, inquiry, vulnerability, and trust. Additionally, these relationships often began with heavier initial district investment in time and resources to lay the necessary foundation for the collaboration, which

Table 1. Types of Technical Assistance Providers Supporting MiC Districts

Technical Assistance Provider	Technical Assistance Provider Activities	District(s)
County offices of education	Provided math specialists to lead teacher professional development for district grade-level teams and school sites, build capacity of administrative teams, and (for Dinuba) serve on a district Math Leadership Team	Dinuba and Sanger
	Worked with district math staff to develop math curriculum content for grade bands; provided school-based coaching support for teacher leaders (e.g., number talks)	Elk Grove
Generation Ready	Worked with district staff, principals, and teachers to help them understand, implement, and support the instructional shifts required by the CCSS-M	Sacramento City
Local universities (often affiliates of the California Math Project)	Provided professional learning in mathematics content and instructional strategies	Elk Grove
	Worked with district math staff to create conceptual lessons to supplement the district’s adopted mathematics curriculum; trained teachers and administrators on the lessons alongside their curriculum (also see the text box <i>The View from the Field: Garden Grove and UC Irvine’s Partnership</i>)	Garden Grove
	Provided supplemental lessons to accompany the district’s existing curriculum; advised on adoption of new materials; trained teachers on math content and lessons	Santa Ana
Silicon Valley Mathematics Initiative	Supported district math staff with formative assessment, and with increasing student agency, ownership, and communication in math instruction	Oceanside and San Francisco
Solution Tree	Worked with district leaders to think through how to make site-based PLCs into drivers of prioritized instructional shifts; trained teachers, coaches, and principals to lead successful PLCs	Elk Grove
WestEd	Collaborated with district math staff to strengthen programs for and approaches to supporting English learners	San Francisco and Oakland
	Worked with district staff to gather and interpret relevant data to illustrate the impact of district teaching specialists’ work at school sites on teaching and learning	Sacramento City
	Worked with district math staff to use improvement science methods to test and improve principal feedback to teachers	Oceanside

could be moderated as district capacity grew. All of the most successful partnerships that we observed in the MiC districts focused on strengthening the district’s vision for CCSS-M implementation, building internal capacity to implement the standards across the system, and shifting the dynamics of classroom instruction accordingly.

The types of partner organizations that districts relied on were as unique and specific as the relationships built through the partnerships. In fact, some MiC districts engaged the same providers in different ways. Some of these partnerships, and examples of their work, are shown in Table 1.



Much of this technical assistance was partially or fully funded by MiC grant funds, which were finite, ending with the initiative. However, districts that found this external support useful plan to try to continue partnerships that were begun with MiC funding, by using Local Control Accountability Plan funds or federal funds (e.g., Title II). Although ongoing funding is often important — if not required — to sustain these types of improvement efforts, the sustainability of the MiC districts' work

with TA providers also depended on how individuals and groups within the district systems built their own capacity to maximize their work with TA providers.

All of the MiC districts' work with external providers was ultimately geared toward the goal of building internal capacity. This goal has implications for districts across the state, most of which do not have MiC-level funding but do have some work contracted with external TA providers.



Structure 3: Empowering Site-Based Leadership to Interpret and Implement the Standards

Summary: To convey their mathematics visions to the teachers who were responsible for implementing the standards in their classrooms, districts needed messengers, interpreters, and instructional leaders. Most frequently, coaches and principals played those roles and were connectors, bridging the divide between the district office and school sites, and synthesizing and communicating the experiences and learnings of staff at both levels.

After some centralized district professional development efforts to try to support teachers in changing the dynamics of classroom instruction, district teams realized that their professional development support needed to do a better job of helping teachers translate learning into practice (Perry, Marple, & Reade, 2019a). To enable more teacher learning and experimentation in the contexts of teachers' own classrooms and alongside school colleagues, many districts shifted the locus of adult learning from the central office to the school sites. District systems had to be realigned to build and leverage instructional leadership skills at the large number of school sites, through district math specialists, site coaches, principals, and (in some cases) teacher leaders. The following sections focus on shifts in the roles of coaches and principals as a result of this work.

Coaches

Most districts in California have a tier of educators whose role can be understood as instructional coaching, even if the name of this staff position varies (e.g., training specialist, math specialist, teacher on special assignment, instructional coach, math coach). In this report, these individuals are referred to as "coaches," with the acknowledgment that they may perform various types of support for changing the dynamics of classroom instruction, from providing teacher professional learning to developing curriculum.

Defining the role of the coach. In their grant applications, each MiC district proposed to use MiC funds to hire additional staff dedicated to coaching. However, exactly how coaches would be used was loosely described. Most districts described a kind of "kitchen-sink" role for the coaches that they would bring in to support standards implementation. For example, one district outlined this role as follows: "Each training specialist or partner will render targeted on-site support to approximately six schools in the form of coaching, observing, modeling, co-teaching, reflective practice and feedback, and collaborative planning, with the aim of increasing the probability of teachers transferring the knowledge gleaned during professional learning successfully to the classroom."

Other districts mentioned different coaching strategies and targets in their grant applications, including some of the following ideas:

- Engaging external technical assistance partners for coaching



- Providing coaching for site administrators
- Using coaches to co-plan and co-teach lessons
- Transitioning from face-to-face and one-on-one coaching toward technology-based coaching and coaching of teams or small groups
- Moving away from a train-the-trainers model

These proposed ideas for engaging coaches, which describe traditional uses of coaches (predating the new standards), were somewhat vague compared to these districts' later ways of describing their coaches' roles in standards implementation. The earlier descriptions rarely positioned coaches as interpreters of the standards at sites, as instructional leaders, or as synthesizers of the experience of implementation across the system. It's likely that, given the new ideas and practices embedded in the standards, districts may have wanted to understand their systems' specific needs for instructional support before identifying where and how coaches might be most effective. Additionally, as the initiative came to focus on shifting the dynamics of classroom instruction, districts thought differently about the new roles that coaches could play and how these roles could be critical for implementation.

At the end of the MiC initiative, after years of standards implementation efforts, coaches in MiC districts had roles that were more clearly specified in relation to communicating their districts' math visions to site-based staff, working with groups of teachers to carry out the district vision in classrooms, and communicating back to district staff about progress and roadblocks. This shift in coaches' roles was intertwined with movement toward offering more site-based learning for teachers and with the need to support principals to become instructional leaders.

THE ROLE OF COACHES

At the beginning of the MiC initiative, coaches in some districts were still being asked to serve as lunch monitors and spelling-bee organizers. By the end of the initiative, coaches' roles had evolved, and they were more pivotal to helping the districts understand improvement efforts, based on how those efforts were playing out at schools, as evidenced below.

In Elk Grove, some of the coaching work involved:

- Leading and supporting site-based teacher leaders and grade-specific math professional learning communities to implement instructional strategies such as number talks or "read two ways"
- Working with site principals and teacher leaders to connect site-based professional development to the site plan for math instruction
- Partnering with coaches from other district offices (e.g., English learner coaches) to support a specific math improvement focus (e.g., discourse)

In Santa Ana, some of the coaching work involved:

- Engaging groups of principals to do mathematics together to facilitate their shared understanding of mathematical rigor and of the importance of student discourse
- Creating a slide deck for principals to share these same ideas with department heads and teachers
- Supporting principals and teachers to strategically use online professional development course materials
- Helping site teams consider appropriate instructional strategies for upcoming units of instruction (e.g., "just in time" lesson planning)
- Discussing observations prompted by principals' use of the classroom reflection tool

Principals

Over the course of the initiative, MiC participants came to understand that principals can be crucial levers for standards implementation within district systems (Reade, Perry, & Marple, 2019). Accordingly, all 10 MiC districts shifted resources in order to support



The View from the Field

Coaching to Move Beyond “Gap Gazing”: Long Beach’s Work Toward Equity

Throughout California and across the country, district staff members realize that inequities in their systems contribute to significant variations in student achievement across and within school sites. Although they know there are achievement gaps, they sometimes don’t know what to do about them and thus don’t take action to address them. Gutiérrez (2008) calls such a situation — where there is concern but not attendant action — “gap gazing.” In Long Beach Unified School District, however, over time, district staff have chosen to treat inequities within their own system as an emergency to be remediated.

Long Beach had been using mathematics coaches to design and lead professional development and to work with grade-level teacher teams, school-level instructional leadership teams, and individual teachers and principals. But, like many large urban districts, Long Beach did not have enough coaches to work deeply with every teacher, or even at every site. Additionally, the district faced the common problem that coaching wasn’t always fully understood by other staff throughout the system. For example, district math specialists reported that some principals didn’t know how to make the most effective use of coaches working with teacher groups at their sites.

In 2016–17, Long Beach began assigning district math coaches to work in targeted ways at the 27 lowest-performing elementary and K–8 sites in the district, and in the following year, the district expanded its coaching support to include 10 middle schools. Coaches worked with grade-level or course-alike teacher teams before a unit of instruction, to unpack the standards, study the assessment, and choose classroom tasks with high levels of cognitive demand. During the unit, the coach worked with the site principal and with teams of teachers in a lesson study to consider the dynamics of classroom instruction (Perry & Reade, 2018). In addition, the coach worked closely with site leaders to consider and redesign math department meetings to enable teams to maintain collaborative momentum to understand and problem-solve around student mathematics work.

While it is not possible to definitively tie student achievement outcomes to any one district effort or intervention, it is notable that CAASPP scores rose markedly and disproportionately in district schools where coaches were assigned. Math achievement growth was strong enough that the district assigned every curriculum staff member to sites in the 2017–18 school year, to increase the number of sites with coaches (including staff in math, science, English, history, special education, and GATE).

principals in more fully understanding the instructional and logistical changes necessary for successful implementation of the CCSS-M. This support was useful to principals, many of whom had been out of the classroom for some time, and who, prior

to the CCSS-M, may not have considered leading mathematics instructional change as a defining part of their administrative role.

As school sites in the MiC districts increasingly became the locus of teacher professional development in support of the new



The View from the Field

Building Relationships Between Math Coaches and Principals: Santa Ana and Elk Grove

MiC districts have taken a variety of approaches to building relationships between math coaches and principals, depending on the resources that they have available and the structures already in place in the districts. Two examples follow:

- In Santa Ana, math coaches work with sites when possible, but there are too few coaches to regularly reach the district's thousands of teachers in person. In 2016, the district's coaches shifted to focus more of their time on working with principals, who became more accessible to them once the coaches were able to join the principals' monthly meetings. In this way, the district's coaches have leveraged their very limited time in order to not only hear from principals about their particular needs, but support principals in talking about math instruction with their teachers. Principals, in turn, can share their deepened understanding of the standards and of the district's math vision with teachers, with greater clarity and confidence.
- In Elk Grove, each principal has access to an instructional coach. The principal, the coach, and teacher leaders develop a site-specific plan and work together to support the site in carrying out the plan. The principal and coach meet regularly throughout the year to monitor progress.

standards, principals were central to the ways in which schools and teachers took up the instructional shifts required by the CCSS-M. MiC districts came to understand that principals who were actively engaged in prioritizing math at their sites were more likely to prioritize finding time and resources to get teachers together to learn from one another, and more likely to involve coaches in supporting changes in mathematics instruction. At sites where the principals' attention was focused elsewhere, coaching and other supports for teachers' mathematics instruction were likely to receive less attention.

Principals' collaboration with math coaches.

Instructional leadership to support any improvement in subject-area teaching at a school site is demanding work. Because principals are ultimately accountable for teaching and learning in all subject areas, it is useful for them to draw on other sources of instructional leadership at their school. This might include working closely with district-assigned

mathematics coaches to create and realize a math vision at the site, as well as developing the leadership and content skills of site-based teaching staff in support of this vision.

As MiC districts determined the best roles for their coaches, given each district's goals and resources, some districts took special care to communicate an understanding of the importance of coaches to staff at all levels of the system — especially to principals and other site leaders who might otherwise have not known how to work in partnership with their math coaches most fruitfully. Coaches cannot do effective work at sites in isolation from site leadership, and principals may need clear directives from their own supervisors about what coaches should and should not be doing. Through successful partnerships between principals and coaches, principals and teachers learn about the district's vision for math from their coaches — which, in turn, raises all of their capacities to enact mathematics standards in a powerful way.

Conclusion and Recommendations

With new standards as dramatically different from prior standards as the CCSS-M and the Next Generation Science Standards are, relying on traditional improvement levers such as instructional materials and summative student assessments is not enough to guide and realize standards implementation. This is borne out by our findings from the MiC districts, which have had to forge new paths in implementation. In order to ensure that everyone in the district is walking these paths toward a common destination, MiC participants chose to ground their work in shifting the dynamics of classroom instruction.

Our observations of MiC districts demonstrate that shifting the dynamics of classroom instruction requires meaningful collaboration that draws on the diverse expertise of educators within, across, and outside of a given district system. Through these collaborations, specific and concrete visions for successful implementation can be nurtured and shared across the system, helping to keep everyone working toward the same goal, regardless of their role.

This report describes the collaborations that MiC districts developed over the past five years. This section offers recommendations for other districts considering how to build coherence and collaboration across their own

systems for implementing new standards — in math, science, or other content areas.

Role-diverse sense-making teams

- **Since complex new standards don't come with a roadmap, provide educators and administrators across the system with opportunities to meet, study, interpret, plan, and take ownership for implementation together.** MiC districts set up a range of structures that enabled staff with diverse roles — teachers, principals, coaches, district math staff, and superintendents — to meet together and advance understandings or plans about math standards implementation. These collaborative structures, including PLCs, monthly meetings, and teams convened for specific projects, allowed each district to develop a common message about how math instruction should look and feel in classrooms, and ensured that this message was communicated throughout the system as everyone continued in their daily work. Such collaborative structures will need to be maintained and nurtured to vigorously support CCSS-M implementation as other standards are also rolled out.
- **Ground teams' work in a common facet of implementation.** MiC districts chose to focus most of their role-diverse teams' work on either shifting or measuring shifts in an element of the dynamics of classroom instruction. (Often, the element of



focus was student discourse.) This focus kept the realities of teaching and learning at the center of the work, and offered rich learning opportunities to staff outside the classroom.

Strategic partnerships with technical assistance providers

- **To maximize investments in outside expertise, districts and technical assistance providers should enter into partnerships in a spirit of collaboration.** Enormous sums of money are spent across California on technical assistance (TA) to school districts. The most successful district TA partnerships in MiC were those in which there was significant give and take, with TA providers offering services that were responsive to districts' specific visions and goals for mathematics.
- **TA providers should plan to "work themselves out of a job," by building districts' internal capacity to continue the work beyond their contract together.** MiC districts' partnerships with outside experts were most

successful when one explicit goal of the work was building districts' internal capacity to implement the standards. These partnerships were often designed with a heavy initial collaboration, followed by progressively less support, as district staff took the reins on whichever element of implementation (e.g., professional development, designing PLCs) they had explored together.

Empowering site-based leadership to interpret and implement the standards

- **Clearly define the role of the coach.** Staff who are known as coaches can do many types of work in a district. In order to help coaches do effective work in service of implementing the CCSS-M, district staff should communicate across the district system a clear message about the roles that coaches are expected to play, and offer principals support in working with and learning from math coaches at their sites.

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