WestEd
WestEd.org

VOL. 9

MATH IN COMMON®

Instructional Materials: Who Makes the Choice?

Findings from the Annual Survey on Implementing the Common Core State Standards in Mathematics

Rebecca Perry
Stacy Marple
Frances Reade

July 2017

Suggested citation: Perry, R., Marple, S., & Reade, F. (2017). *Instructional Materials: Who Makes the Choice? Findings from the Annual Survey on Implementing the Common Core State Standards in Mathematics.* San Francisco, CA: WestEd.

Table of Contents

Figures

Tables

WestEd's Evaluation of the Math in Common Initiative

Math in Common® is a five-year initiative, funded by the S.D. Bechtel, Jr. Foundation, that supports a formal network of 10 California school districts as they are implementing the Common Core State Standards in Mathematics (CCSS-M) across grades K–8. Math in Common grants have been awarded to the school districts of Dinuba, Elk Grove, Garden Grove, Long Beach, Oakland, Oceanside, Sacramento City, San Francisco, Sanger, and Santa Ana.

WestEd is providing developmental evaluation services over the course of the initiative. The evaluation plan is designed principally to provide relevant and timely information to help each of the Math in Common districts meet their implementation objectives. The overall evaluation centers around four central themes, which attempt to capture the major areas of work and focus in the districts as well as the primary indicators of change and growth. These themes are:

- Shifts in teachers' instructional approaches related to the CCSS-M in grades K–8.
- Changes in students' proficiency in mathematics, measured against the CCSS-M.
- Change management processes at the school district level, including district leadership, organizational design, and management systems that specifically support and/or maintain investments in CCSS-M implementation.
- The development and sustainability of the Math in Common Community of Practice.

Together, the Math in Common districts are part of a community of practice in which they share their progress and successes, as well as their challenges and lessons learned about supports needed for CCSS-M implementation. Learning for district representatives is supported by WestEd team members who provide technical assistance related to goal-setting and gathering evidence of implementation progress (e.g., by advising on data collection instruments, conducting independent data analyses, participating in team meetings to support leadership reflection). An additional organizational partner, California Education Partners, works with the community of practice by offering time, tools, and expertise for education leaders to work together to advance student success in mathematics. California Education Partners organizes Leadership Convenings three times per year, summer Principal Institutes, "opt-in" conferences on high-interest topics (e.g., formative assessment), and cross-district visitation opportunities.

Executive Summary

Curriculum matters, deeply, for student achievement and for districts to be able to achieve the Common Core State Standards (CCSS; Chingos & Whitehurst, 2012; O'Day & Smith, 2016). Curriculum is an essential element of successful mathematics instruction in any district; it is part of a system of instructional improvement, along with professional development and accountability assessment (National Research Council, 2001; Smith & O'Day, 1990).

In the Math in Common (MiC) districts and across the state, curriculum decisions are initially made at two levels: the state makes recommendations and district leaders then make choices. Still a third level of decision-making about curriculum involves individual teachers; in a national survey, four out of five math teachers reported changing more than half of their instructional materials in response to the CCSS (Kane, Owens, Marinell, Thal, & Staiger, 2016). Overall, enormous thought and effort across multiple levels of a district system go into identifying and curating instructional materials to guide instruction. These decisions are likely to have cumulative and widely varying implications for how instruction is organized within and across districts, schools, and classrooms to support student achievement.

Seven years into implementation of the CCSS-M, sourcing and using appropriate, high-quality instructional materials is still a central concern for districts and teachers — yet there is little information available about what decisions other districts have made and how these choices have played out for students. To understand how instructional materials support, and hinder, educators in their work, we looked at the qualitative and quantitative findings from WestEd's 2017 surveys of educators in the 10 MiC districts (which included over 2,000 teacher and 100 administrator respondents) as well as information gleaned from eight focus groups held with teachers and principals.

Below is a summary of selected findings from the report as well as key takeaways and ideas for action.

Selected report findings

We see wide variation across the 10 MiC districts in which curriculum materials are used. At the elementary level, the districts are using: GO Math!, EnVisionmath, a district-developed core curriculum, and Math Expressions. At the middle school level, districts are using GO Math!, Big Ideas Math, CPM Core Connections, a district-developed core curriculum, and the Carnegie Learning Middle School Math program. Even those districts that have adopted the same curriculum materials have taken broadly different tacks to implementation and "filling the gaps" they have identified in those materials. If we generalize from this small sample of 10 districts, we can surmise that across California, districts' choices about instructional materials would likely display similar variation. In some places, good choices about instructional materials are being made, while in others poor materials could compromise teacher instruction and student learning — but there are few formal structures for districts across the state to share information about what works and doesn't with their peers.

In the surveys, we found some discrepancy between teachers' and site administrators' perceptions of the curriculum materials currently in use, suggesting that teachers may be supplementing with non-commercially published materials more than administrators are aware. Many focus group respondents indicated that they are not limiting their curriculum sources to district-provided materials, but are also "internet scavenging." By selecting materials on their own, teachers may be needlessly recreating work that their colleagues are also doing for the same units, across schools and sites. And, if

principals are unaware of these decisions, it limits their ability to provide instructional support to their sites.

Our survey asked teachers to name the areas where they most need support in order to effectively implement the CCSS-M. Three of the five top reported requests for support related, at least partially, to instructional materials: *meeting the needs of all students*, *time to discuss and plan lessons with peers*, and *access to quality textbooks and instructional materials*. We surmise that teachers may feel they are faced with gaps between the materials available from their districts, and the demands of the CCSS-M and their classroom contexts.

Indeed, other data show that teachers draw from a wide variety of sources to supplement their district-adopted curriculum, including a high percentage of teachers that report using "teacher-developed" or online resources, such as the website Teachers Pay Teachers. Across the MiC districts, 79 percent of teachers reported that they used materials to supplement their teaching in "some" to "most" of their lessons each week. Additionally, in the absence of (or along with) guidance from the district office or centrally provided curriculum, almost half of teachers reported asking their peers for support to determine whether instructional materials are aligned to the standards.

Key takeaways and ideas for action

MiC districts have, from the beginning of their CCSS-M adoption efforts, balanced a set of interrelated challenges around instructional materials: the quality of materials on the market and the availability of CCSS-M–aligned materials; variability in classroom implementation of selected materials; and attempts to build teachers' capacity to use materials for classroom instruction. Knowing what we know from previous standards-based reform efforts about inevitable variation in implementation (O'Day & Smith, 2016), district leaders must begin to think about how they will overcome these known implementation challenges of quality, variation, and differential capacity in the use of curriculum and instructional materials to support all students.

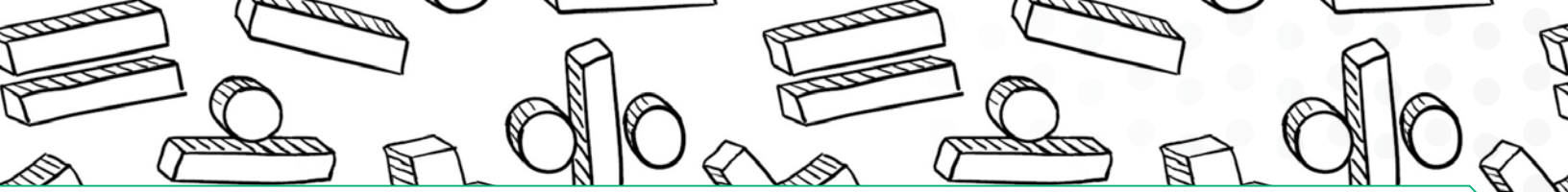
Drawing from our work on this study as well as the literature on standards implementation, we have outlined three key steps for educators — including teachers, coaches, and district staff — to consider as they move forward with their curriculum. Below we offer specific recommendations, based on work in the Math in Common districts, to help educators define and assess the quality of and move forward effectively with their CCSS-M–aligned curriculum materials.

1. Define the quality of the instructional materials

RECOMMENDATIONS

- *Consult existing research or ask other districts to determine the merits and shortcomings of math programs.*
- *Learn about the quality of instructional materials by gathering evidence at the district level about "what works, for whom, under what circumstances" (Bryk, Gomez, Grunow, & LeMahieu, 2015).*
- *Use professional learning communities (PLCs) to gather evidence about the quality of materials; encourage discussion of why certain materials are of high quality or where they fall short for students.*

Teachers use an array of materials of varying quality, some of which are better than others at producing the results district leaders are hoping for. Accordingly, it is important for teachers and administrators to effectively define the quality of instructional materials, and for teachers to confidently fill in any gaps in those materials in order to help their students succeed. We need to enable all educators across district systems — especially teachers — to understand how to identify and choose high-quality lesson resources that are content-rich and educative for the teachers who use them, and which ultimately provide access to vital mathematical opportunities for students (Ball, Thames, & Phelps, 2008; Davis & Krajcik, 2005).



2. Examine variation in what materials are being used and how they are being used

RECOMMENDATIONS

» *Create opportunities for classroom visits and tools for documenting materials-use to unpack the influence of the materials in relation to the "art" of teaching, and to inform school-level and district-level actions.*

» *Develop practical district systems to help teachers identify and use common materials and monitor how these are being accessed (and by whom) to understand if they are helping teachers.*

Districts cannot fully support and guide instructional practice toward the common goals of the CCSS-M or create equitable opportunities for students without understanding the variations in materials that individual teachers are using in their classrooms and how they are using them. In many cases, principals (and coaches) will be the best positioned to help district staff understand how teachers are taking up or leaving behind curriculum to enable all students to achieve the same standards.

3. Build capacity for educators to assess and use the instructional materials

RECOMMENDATIONS

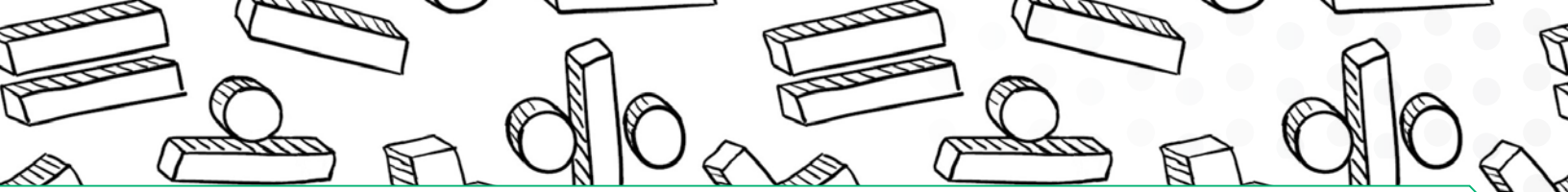
» *Use PLCs to build site staff capacity to identify and use instructional materials.*

Districts are always working to build teachers' capacity to provide high-quality mathematics instruction for their students. When the quality of teachers' instructional materials is in question or there is significant variation in how teachers are using (and supplementing) the materials, district leaders must also put supports in place to help teachers address these challenges. Principals may also benefit from more exposure to instructional materials to both improve their content knowledge and provide more useful support and feedback to teachers.

One benefit of the kind of localized, instruction-focused professional learning sessions and PLC discussions we see in some MiC districts is the opportunity for teachers to reflect with peers and math leaders on the materials as "inputs" to instruction, which influence teaching and learning. If planning for classroom instruction is a goal of PLC work, PLC discussions can engage a group of professional educators in all three areas we define here as critical to implementation: defining the quality of the materials, examining variation in what materials are used and how they are used, and building capacity to assess and use the materials.

We think districts across the state can learn from the kind of localized reflections — in PLCs and other formats — that are happening within the MiC districts on quality, variation, and capacity. For example, many California districts use the same curriculum materials, yet to our knowledge there is insufficient sharing and statewide knowledge development about how well these materials are working in the classroom, and what parts of these materials matter most for students. Districts, schools, and teachers should not have to learn these lessons about materials independently, recreating the wheel, but should aim to share knowledge and evidence communally and learn together about what materials work for students.

Math in Common districts have benefitted tremendously from their formal and informal opportunities to discuss common problems of practice, such as curriculum selection. We encourage districts to form PLCs for teachers and administrators and to monitor their implementation efforts. We also encourage county offices of education and state-level policymakers to think about ways they can support districts to learn together. We hope the learnings from our network can serve as an example of how to build a stronger understanding across the state about instructional materials and teachers' implementation of the CCSS-M.



Introduction

During the period between California's adoption of the Common Core State Standards for Mathematics (CCSS-M) in 2010 and the release of the state's list of adopted math programs in 2014, California districts were operating with little guidance about how best to identify and choose materials aligned to the CCSS-M. This delay was largely due to the fact that the California State Board of Education (SBE) was under a moratorium — beginning in 2009 and lasting through July 1, 2013 — on developing curriculum frameworks and adopting instructional materials. Legislative processes and other factors delayed the release of a list of adopted mathematics programs by the SBE until January 2014, long after some Math in Common (MiC) districts had begun or completed their curriculum adoption processes.

District leaders know that curriculum matters for student achievement and for their districts to be able to achieve the new standards (Chingos & Whitehurst, 2012; O'Day & Smith, 2016). Curriculum is an essential element of successful mathematics instruction in any district; it is part of a system of instructional improvement, along with professional development and accountability assessment (National Research Council, 2001; Smith & O'Day, 1990). In fact, the development of the CCSS-M were guided in part by research that found that the top-performing school systems in the world use a conceptually focused, as opposed to a skills-based, curriculum.[1] Yet research to guide districts' selection of instructional materials was not available when districts needed it in the run-up to their curriculum adoption (Monahan, 2015). District math leaders also knew — and their knowledge has since been validated in the research literature (e.g., Polikoff, 2015) — that many math programs available in the early years of the CCSS-M purporting to be CCSS-M–aligned fell short in critical ways, particularly through a systematic overemphasis on procedures and memorization.

In the MiC districts and across the state, curriculum decisions are initially made at two levels: the state makes recommendations and district leaders then make choices. In response to the CCSS-M, the MiC districts made different choices about their standards–aligned curriculum — choices that are likely to have cumulative and widely varying implications for student achievement. Still a third level of decision-making about curriculum involves individual teachers. Thus, the impact of districts' curricular choices on student achievement and equitable opportunities is magnified when we factor in teachers' experience and implementation. Harvard University's Center for Education Policy Research (Kane, Owens, Marinell, Thal, & Staiger, 2016) found that approximately four out of five math teachers (82 percent) reported changing more than half of their instructional materials in response to the CCSS (see also Bugler, Marple, Burr, Chen-Gaddini, & Finkelstein, 2017); using such a variety of new materials likely has an impact on teachers' instruction and, by extension, student achievement. A 2016 national survey of teachers further confirmed that 40 percent of teachers felt that their math materials were not aligned to the CCSS-M (Bay-Williams, Duffett, & Griffith, 2016), which presumably influences how they choose to supplement the materials they perceive as not being standards-aligned and likely impacts how their instruction is set up to support students to learn the new standards.

In some districts, central offices take primary responsibility for providing most of the curricular materials to teachers. In others the responsibility is shared with teachers, who make choices based on professional judgment or, in some cases, structured input from coaches or their site-based professional learning communities (PLCs). In

1 The term "curriculum" can be used in many ways, but in this paper we use "curriculum" to refer to instructional materials linked to teaching practices, sequenced across the primary and secondary levels.

all cases, enormous thought and effort across multiple levels of a district system goes into identifying and curating the instructional materials to guide instruction.

With 82 percent of teachers nationally (based on a national teacher survey; Kane et al., 2016) adapting their curriculum materials in response to the CCSS-M, U.S. education is essentially a system without a defined curriculum. Hiebert and Stigler (2017, p. 172), citing Dewey (1929), argue that positioning individual teachers as the sole repository of all the good ideas they develop over time is "the saddest thing about American education." Furthermore, we know that teaching is a lonely profession, with the majority of teachers having few opportunities to understand what and how their colleagues are teaching in their classrooms, or to share their own findings about what works with peers.

In order to reform education, we cannot accept teachers' professional isolation as a given — the work of educational improvement must be systemic and socially mediated. If teachers are not supported with opportunities to share their findings with peers and to test and debrief selected materials together, the value of each teachers' work and learning is potentially being squandered instead of benefiting the entire team, site, or district. As MiC districts experiment with ways to support teachers working together on the problem of identifying and implementing high-quality materials, they can create the conditions for systemic learning that can benefit everyone in a district.

This report

Seven years into implementation of the CCSS-M, sourcing and using appropriate, high-quality instructional materials is still a central concern for districts and teachers — and there is little information available about what decisions other districts have made and how these choices have played out. This report draws on data from WestEd's annual survey of teachers and administrators in the 10 MiC districts to provide a snapshot of the instructional materials and resources that districts and teachers are using. While the survey itself covers many different topics related to the CCSS-M — from professional learning to curriculum and instruction to preparedness to implement the standards — we chose to focus this report primarily on instructional materials (i.e., curriculum).[2] We honed in on this particular area because the materials teachers use to guide their instruction define the concepts and content that students have access to, thus creating the conditions for what students can learn in math.

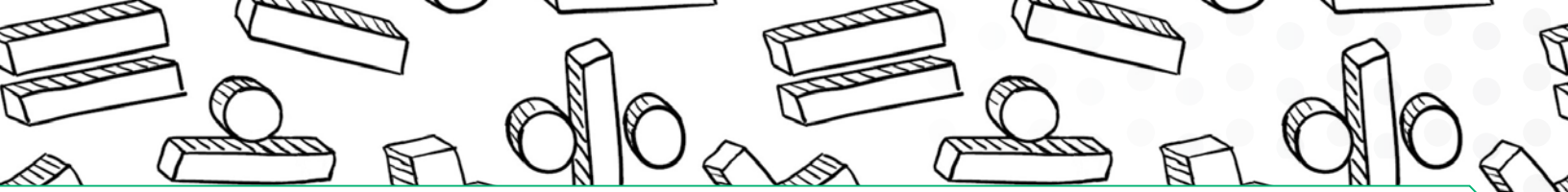
To understand how instructional materials support, and hinder, educators in their work, we looked at the qualitative and quantitative findings from WestEd's 2017 surveys (which included over 2,000 teacher and 100 administrator respondents) as well as information gleaned from eight focus groups that we held with teachers and principals.[3] The report begins with a look at the instructional materials currently in use in the MiC districts, followed by an examination of the support offered to, or requested by, teachers around instructional materials. We then examine the different sources of instructional materials that teachers report using and how they determine whether their materials are aligned to the CCSS-M. Finally, the report concludes with key takeaways and ideas for action.

Key considerations on sourcing and using instructional materials

MiC districts have been, from the beginning of their CCSS-M adoption efforts, balancing a set of interrelated

2 In this report, we move back and forth between uses of the words *instructional materials* and *curriculum* because of the different levels of decision-making we referenced previously. The state and districts typically define curriculum, which teachers may add to (i.e., supplement) with ideas from elsewhere to create a set of materials they use in their instruction (i.e., instructional materials). We also found that teachers sometimes thought of the term instructional materials more broadly, to include manipulatives like rekenreks or blocks.

3 Appendix A has more information about the survey methodology and Appendix D has more information about the focus group methodology.



challenges around instructional materials: the quality of materials on the market and the availability of CCSS-M–aligned materials; variability in classroom implementation of selected materials; and attempts to build teachers' capacity to use materials for classroom instruction. Knowing what we know from previous standards-based reform efforts about inevitable variation in implementation (O'Day & Smith, 2016), district leaders must begin to think about how they will overcome these known implementation challenges of quality, variation, and differential capacity in the use of curriculum and instructional materials to support all students.

Based on the survey and focus group findings on districts' sourcing and use of instructional materials — along with research on effective standards implementation — we have identified three key considerations for educators at all levels of a district system:

- **Define the quality** of the instructional materials
- **Examine variation** in what materials are being used and how they are being used
- **Build capacity** for educators to assess and use the instructional materials

These considerations are woven throughout the paper, and we attend to each with specific recommendations in the conclusion.

Instructional Materials Used in Math in Common Districts

In the past, when selecting curriculum materials, districts and teachers confronted three primary levels of decisions: whether to purchase commercial materials (those produced by a few big publishing houses) or use non-commercial materials; which materials should be the primary district-adopted texts; and which supplemental materials might be added to that mix to best support schools and students. No one set of curriculum materials is necessarily the "best" or most effective for all districts. Context — including local historical factors and the needs of the particular student population — is a key factor in curriculum decisions. When choosing among mathematics programs, districts balance several factors, including quality and applicability for their students, ease of use for teachers, inclusion of material that supports teachers' content and pedagogical knowledge, cost of the materials, and alignment with the district vision of math instruction. This vision must now also be guided by the CCSS-M, which are quite different from the previous standards guiding mathematics instruction (National Governors Association Center for Best Practices & Council of Chief State School Officers, 2010).

With these competing factors in mind, every district faces a dizzying array of decisions and actions with respect to choosing, adopting, supplementing, and aligning materials.

District-adopted instructional materials

To begin to understand how these decisions are playing out in each MiC district,[4] we gathered information from district leaders about their adopted materials, as shown in Table 1 below. At the elementary level, the MiC districts are using a variety of curricula: GO Math!, EnVisionmath, a district-developed core curriculum, and Math Expressions. At the middle school level, districts are using GO Math!, Big Ideas Math, CPM Core Connections, a district-developed core curriculum, and the Carnegie Learning Middle School Math program. At both levels, some districts are just recently adopting new curriculum materials, having waited to adopt until they felt the materials were of higher quality with respect to standards-alignment (for more on these district responses, see Monahan [2015]) or are in the process of pilot-testing new materials in hopes of updating their current materials with ones that are better aligned with the CCSS-M.

We wondered if anything could be said about the relative quality of these materials chosen by the MiC districts. Of these listed programs, not all meet expectations for alignment to the CCSS-M across all K–8 grade levels, although GO Math! and Eureka Math (also known as EngageNY) are two programs with strong alignment across grade levels and and which scored high on three evaluation criteria (focus and coherence, rigor and mathematical practices, and usability; see EdReports staff, 2017a, 2017b). We found no additional research[5] that provides conclusive information about the quality of the other materials listed in Table 1, highlighting the information vacuum that districts and teachers were and are operating in as they make their choices about materials.

4 To preserve the anonymity of the survey respondents and the districts, we have assigned each of the 10 MiC districts with a letter name — District A through District J.

5 An external evaluation of one MiC district's self-developed curriculum is currently underway.

Table 1. 2016–2017 Curriculum and Supplemental Resource Material, by Math in Common District

DISTRICT	ELEMENTARY (GRADES K–6)	MIDDLE (GRADES 7–8)
District A	EnVisionmath CA2015	Big Ideas Math
District B	District-developed curriculum with Math Expressions; ST Math	District-developed curriculum. Currently in process of reviewing new materials for adoption — examining EngageNY.
	Math Instructional Toolkit	
	Supplemental Curriculum Guide (for special educators)	
District C	District-developed curriculum (including a Math Teaching Toolkit)	
District D	GO Math!	GO Math!
District E	Math Expressions	College Preparatory Mathematics Core Connections
District F	EnVisionmath CA2015	GO Math!
	Supplemental resources from Irvine Math Project	
District G	GO Math!	EngageNY, with supplemental material from Utah Middle School Math Project
District H	GO Math!; piloting new curricula — Glencoe Math Accelerated[a]	Carnegie Learning Middle School Math; exploring for future use Illustrative Mathematics, CPM Core Connections, and Glencoe
District I	GO Math!	GO Math!
District J	GO Math!	Big Ideas Math (Math 6–Algebra II)

Note: Information for this table was gathered from district central office representatives and district websites. Highlighted cells indicate programs included in the California State Board of Education's 2014 list of adopted mathematics programs. Math Expressions, used in District B, is on the state adoption list; the district-developed curriculum is not.

[a] A district representative clarified that while they are using GO Math!, they allow and encourage the use of supplemental tasks that align to the rigor of item specs and the CCSS-M.

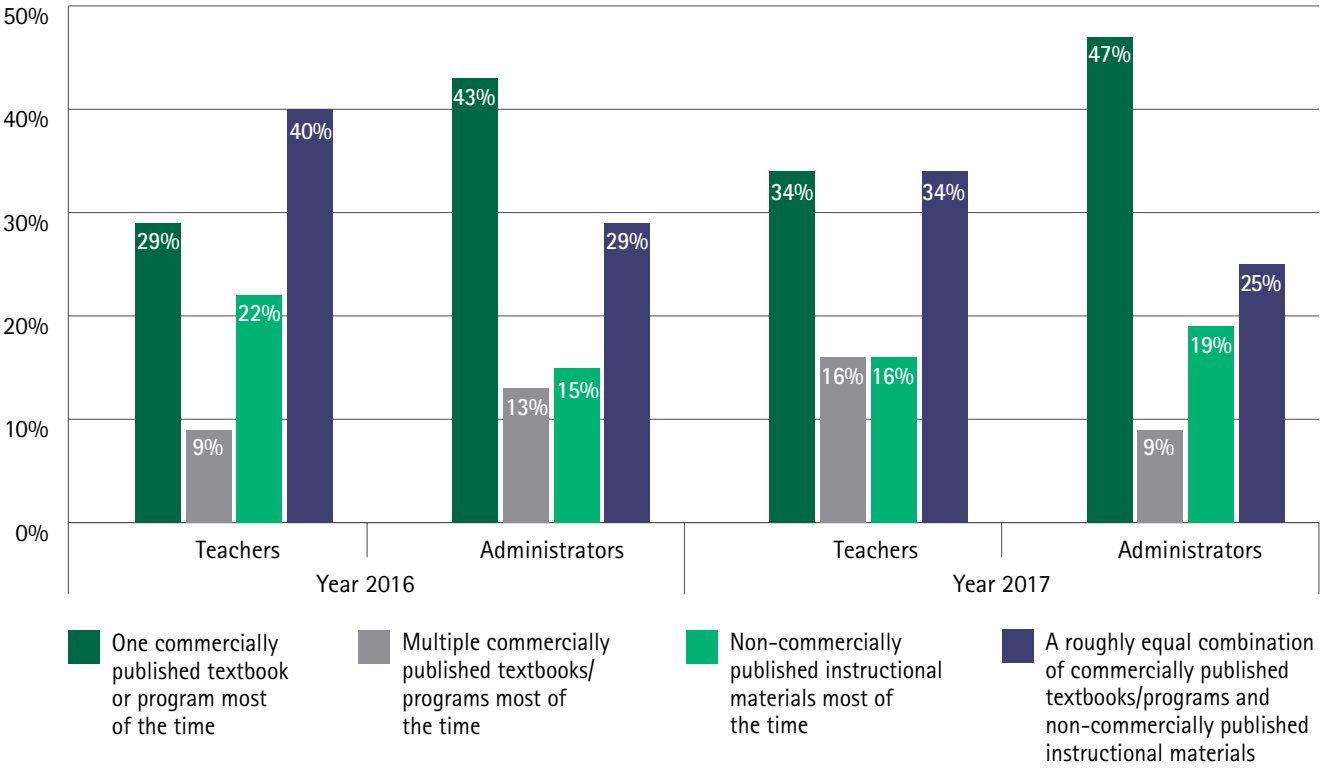
Teacher and principal perceptions of instructional materials in use

In the table and text above we describe the materials that districts make available to guide teachers' instruction, as reported to us by district leaders and culled from official district websites. Yet we know from research on curriculum implementation that there is often a gap between the materials provided for teachers and the materials they use in their classrooms (Cohen, 1990; Remillard, 2005; Remillard & Bryans, 2004; Remillard & Heck, 2014). To better understand this discrepancy, our surveys asked teachers and site administrators (i.e., principals and vice principals) to describe the mathematics materials students most frequently use.

In 2016, our survey data showed that 29 percent of teachers said they were using a commercially published textbook or program most of the time. This is a far lower percentage than available estimates prior to the CCSS-M indicating that 70 to 98 percent of teachers nationally were using commercial textbooks (Chingos & Whitehurst, 2012). Interestingly, our data also showed a mismatch between teachers' and site administrators' perceptions of materials used most often in classrooms: 43 percent of site administrators reported that teachers were using primarily commercially produced materials. We were interested in exploring this mismatch of

Figure 1. Teacher and Site Administrator Perceptions of Curriculum Materials Currently in Use

On their respective surveys, teachers and site administrators were asked to select one answer to the following question: "Which best describes the mathematics instructional materials students most frequently use in your class [teachers] / at this school [administrators]?"



teachers' and administrators' perceptions from the 2016 data further with the 2017 survey, to see if the discrepancy between their perceptions would be smaller after several districts had an additional year of using their newly adopted materials.

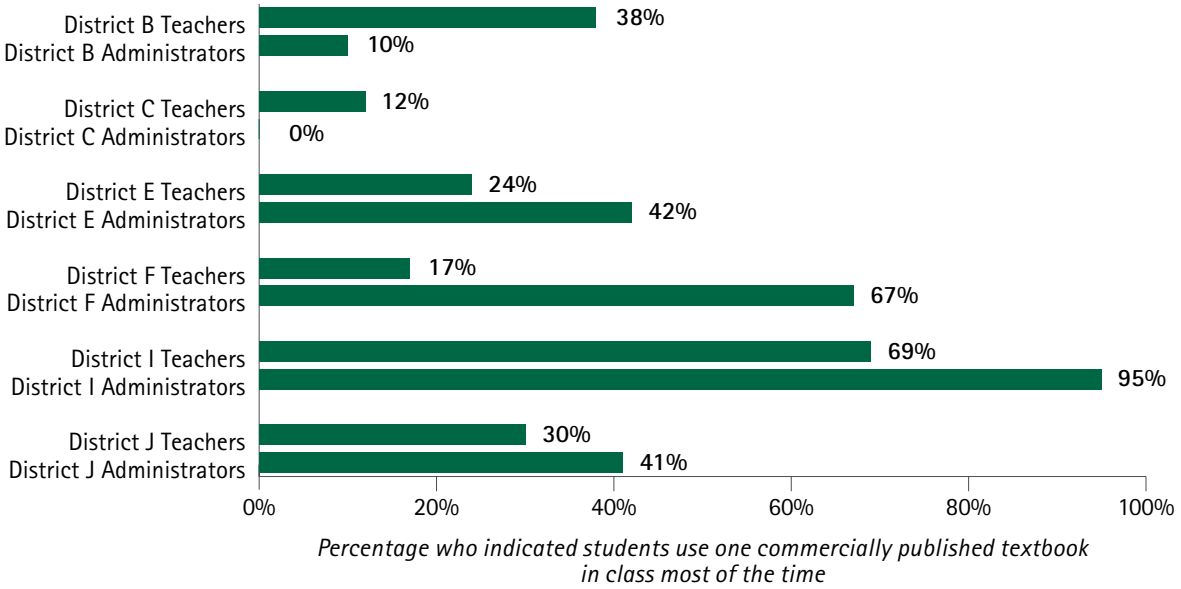
While we know that at the time of our 2017 survey administration, 8 of the 10 MiC districts were using, in part or in full, a commercial program, those numbers do not match the perceptions of teachers and site administrators. As in 2016, there continues to be some discrepancy between teachers' and site administrators' perceptions of the curriculum materials currently in use: about a third of teachers reported using one commercially published textbook or program, while 47 percent of site administrators reported using one commercially published textbook or program, as shown in Figure 1. Additionally, teachers (34 percent) were more likely than site administrators (25 percent) to report that they were using a roughly equal combination of commercially published and non-commercially published materials. These data suggest that teachers may be supplementing their materials with non-commercially published materials more than administrators are aware.

The discrepancies between teacher and principal perceptions remained when we looked at the answers by district. For example, Figure 2[6] shows that even

6 To uncover the variation across districts, we examined these data by MiC district. Figure 2 shows results, by district, just for the response option related to one commercially published textbook or program. The results confirm differences across districts in the

Figure 2. Teachers and Site Administrators Who Indicated That Students Use One Commercially Published Textbook in Class Most of the Time (2017), by Math in Common District

This figures shows the percentage of teachers and administrators from each district who selected the answer, "One commercially published textbook or program most of the time" when asked the following question: "Which best describes the mathematics instructional materials students most frequently use in your class [teachers] / at this school [administrators]?"



Note: Only the six districts that had a sufficient site administrator sample were included.

in District F, which has a relatively centralized curriculum (as reported by the district), 67 percent of site administrators and 17 percent of teachers reported that the primary resource for classroom instruction is one commercially published textbook or program. For site administrators to be able to provide strong support for their teachers, it may be useful for them to build a more fine-grained understanding about classroom instruction, including what materials are being used. Our data suggest that site administrators may recognize a need to learn more about classroom materials: when asked to report on their greatest areas of need to support CCSS-M, 40 percent of administrators indicated wanting more time to observe teachers in their classroom.

teacher and administrator perceptions about this material source. Only the six districts that had a sufficient site administrator sample were included.

Summary

We see wide variation in the MiC districts even at this first level of decision-making about which curriculum materials to select.[7] Additionally, we know through our work with the 10 districts over the past several years that even those that have adopted the same curriculum

7 The prominence of MiC districts' use of GO Math! and EnvisonMath at the elementary level mirrors information from a national sample (Bay-Williams, Duffett, & Griffith, 2016). Researchers found that approximately 16 percent of K–5 teachers reported using either GO Math! or Envisionmath. The materials selected by the MiC districts for the middle school grades also show a good deal of variability, consistent with the national sample. The national study showed that only 28 percent of grade 6–8 teachers reported using three commercial curricula: Math Connects (11 percent), Big Ideas Math (9 percent), and Holt McDougal Math (8 percent); otherwise the remaining 72 percent of middle grade teachers were using a variety of other supplemental or online materials.

Reflections from an elementary school principal on adapting instructional materials

Elementary school principal: "Well, none of the materials are all that great, but I'm sure everyone probably feels that with their program. [Our district] uses GO Math! at the elementary level. There are definitely some holes and it's all in the delivery. You can pick out the one really great question and make that last the whole period if you know what you're doing, or you can just go numbers one through 27, odd … Honestly, my teachers that understand where we're supposed to get [i.e., the teachers that understand the instructional goals] and they don't use the book have the best [assessment] results, as opposed to those that are just the page-turners because they either don't have the capacity, don't have the belief that kids can do something outside of the book, or just feel like, 'This is what I'm supposed to do, I'm supposed to follow the book.'"

Interviewer: "When you say, 'If you know where we're supposed to get,' is it important for teachers to know the Framework or the Progressions or what …?"

Principal: "Knowing progressions, knowing the rigor, knowing that you've got to know that backward and forward and inside out and — getting to that high-quality instruction…. You have to have a really good understanding of math and when you don't, then you are bound to the book."

materials have taken broadly different tacks to implementation and "filling the gaps" they have identified in those materials (see sidebar). If we generalize from this small sample of 10 districts, we can surmise that the variation in their choices about instructional materials may be reflected in a similar variation among districts across the state. In some places, good choices about instructional materials are being made, while in others poor materials could compromise teacher instruction and student learning.

Support for Teachers' Use of Instructional Materials

Our survey asked teachers to name the areas where they most need support in order to effectively implement the CCSS-M. Overall, when comparing the responses between 2016 and 2017 we saw a consistent pattern: In 2017, a smaller percentage of teachers reported needing support in all areas we asked about than in 2016, suggesting that over time teachers may be better equipped to tackle CCSS-M implementation. In both 2016 and 2017, three of the five top reported requests for support related, at least partially, to instructional materials: meeting the needs of all students, time to discuss and plan lessons with peers, and access to quality textbooks and instructional materials. We surmise that teachers may feel they are faced with gaps between the materials available from their districts and the demands of the CCSS-M and their classroom contexts.

Teachers' requested supports around instructional materials

When teachers were asked to name specific supports needed, "meeting the needs of all students" was the most frequently indicated response in both the 2016 and 2017 surveys (58 percent and 53 percent, respectively) as shown in Figure 3 below. We know from interviews and qualitative survey data that teachers see appropriately differentiated curricular materials plus relevant pedagogical strategies as critical for guiding diverse learning populations to succeed in math. For example, a teacher told us:

> *"A lot of the students that I have are below grade level. I didn't find anything [in the district-provided materials] for ELLs…That's why we create a lot of tasks around the standard and the tasks help them solve a problem that's an application in the real world. We use a lot of manipulatives from the GO Math! series and manipulatives are really great, but we use them in different ways [than GO Math! intended]."*

Teachers' second most requested support was "time to discuss and plan lessons with peers," which held steady with 48 percent of respondents in 2016 and 47 percent in 2017. This suggests that many teachers feel they are spending too much time planning lessons in isolation (including sourcing materials), when they would prefer to identify and share lesson ideas with, for instance, grade-level colleagues. The statements below from two teachers reflect how teachers can benefit from the opportunity to collaborate regularly with a team of other educators to create efficiencies year over year.

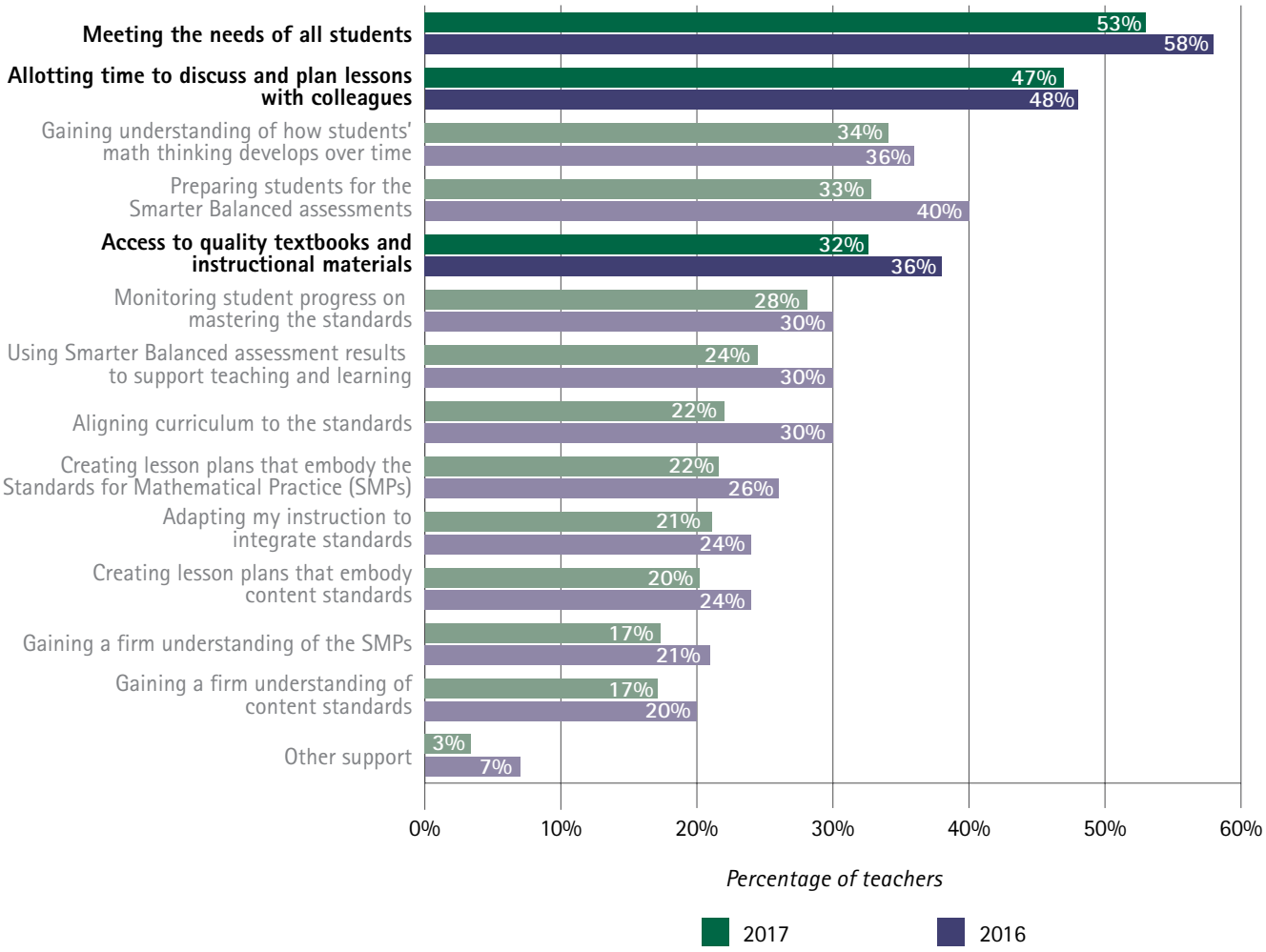
> *"Last year I felt like we were spending hours gathering materials, even just going through the teacher guide and understanding how to carry it out, how to support our students. I would say last year it was probably a couple of hours a week as a team overall that we were spending each week. I noticed this year it's less time, things are quicker, and now we have become more comfortable."*

> *"I have a very collaborative team and we work together on a weekly basis to develop lessons and standards. We'll make tasks that the student has to do; we'll create those based on whatever the standard is. We use the standards to create our own materials, to create tasks — or I do a lot of internet scavenging or looking for things other teachers have used that I find effective for my students."*

In 2017, a third of all teachers (33 percent) reported needing support to access quality textbooks and instructional materials and about a quarter of teachers (22 percent) reported needing support to align curriculum to the standards. (Teachers surveyed in 2016 were

Figure 3. Teachers' Most Needed Areas of Support Relative to CCSS-M

Teachers were asked to check all answers that apply to the following statement: "To effectively implement the CCSS in mathematics, I need support mostly in:___."



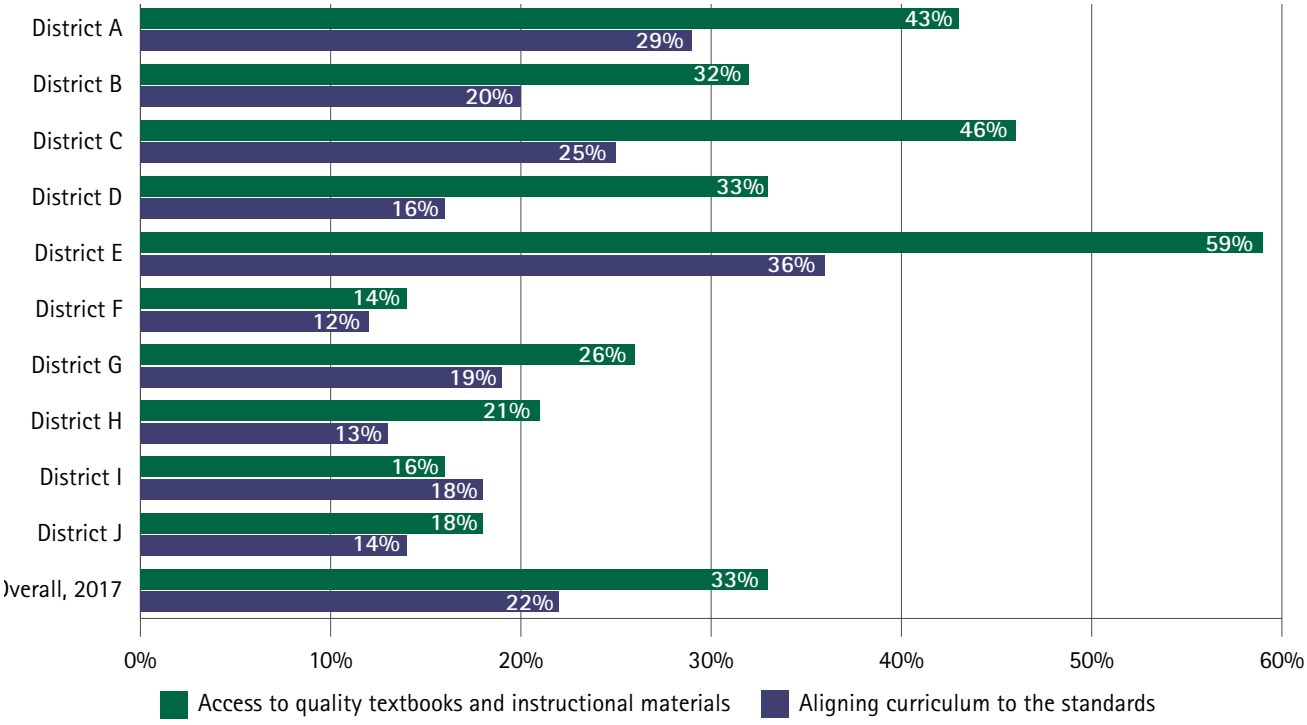
Note: The items in bold are those that relate most closely to instructional materials.

slightly more likely to indicate a need for support in both areas.) That the percentage of teachers requesting support in these two areas is one-third of the sample or lower suggests that many teachers are satisfied with work they may be doing on their own and are not looking for further support. We see an opportunity for districts to help the more satisfied respondents provide materials support to their less satisfied colleagues to improve the system as a whole.

When we took a closer look at these data by MiC district, we realized that the full-sample statistics hide cross-district variation on these support items. As shown below in Figure 4, there were differences in the percentage of teachers needing support in two of these areas in districts where there is less guidance on materials from the district office (District E; no adopted curriculum at the time of survey administration) and where there is significantly more (District F; centralized curriculum

Figure 4. Teachers' Reported Needs for Support Relative to Instructional Materials, by Math in Common District

This figure shows the percentage of teachers who selected "Access to quality textbooks and instructional materials to teach the CCSS-M" and/or "Aligning curriculum to the CCSS-M (both content and practice standards)" when asked to check all answers that apply to the following statement: "To effectively implement the CCSS in mathematics, I need support mostly in: ___"



guidance provided by the district). This difference suggests the potential payoff to teachers of concerted work over time on the part of district staff to lessen teachers' burden by providing guidance on instructional materials.[8]

In District E, teachers did not have an adopted curriculum at the time of the survey, and they expressed the greatest need for support in both areas: 59 percent of teachers wanted greater access to quality textbooks and instructional materials and 36 percent wanted support aligning curriculum to the standards. In contrast, District F is several years into its materials adoption and the district directs its teachers on special assignment (TOSAs) to provide support for teachers to implement those materials. In fact, that support is seen as a primary job component for the TOSAs. As Figure 4 shows, teachers in District F expressed the least need for support around materials: 14 percent of teachers wanted greater access to quality textbooks and instructional materials and 12 percent wanted support aligning curriculum to the standards. Other MiC districts fall somewhere between these two districts both in terms of district support with curriculum materials and teachers' reported needs for support.

8 Davis and Krajcik (2005) describe the ongoing tension in curriculum design between providing guidance and choice to teachers.

Summary

Many focus group respondents, including a teacher quoted earlier, indicated that they are not limiting their curriculum sources to district-provided materials, but are also "internet scavenging." We know that even given ample high-quality and perfectly aligned materials, teachers are likely to supplement and alter curriculum in order to complement their own teaching style and to serve the specific needs of their students — and that many teachers appreciate having the professional flexibility and autonomy to select their own materials (Bugler et al., 2017). At the same time, by selecting materials and "internet scavenging" on their own, teachers may be needlessly recreating work that their colleagues are also doing for the same units, across schools and sites.

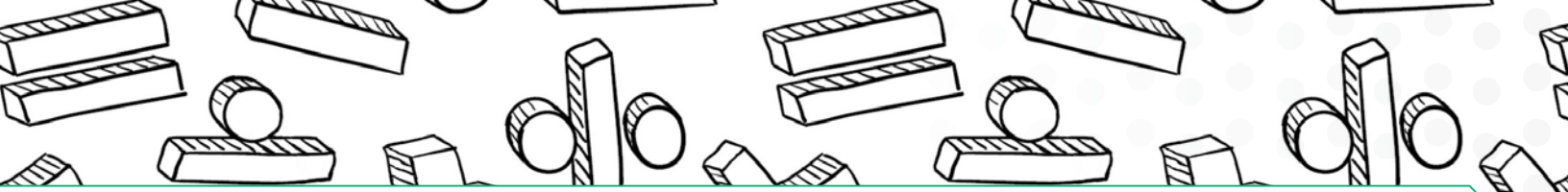
Additional support provided for teachers around instructional materials — especially more time to collaborate with peers, try out common materials, and debrief together — could help teachers better connect materials with instructional goals and reduce the amount of time they spend searching for supplemental materials. That sort of collaborative support could go a long way toward leveling the playing field, creating more equitable mathematical opportunities for students, and improving the education system (Hiebert & Stigler, 2017).

District support for teachers' use of instructional materials

It's clear from the survey results that teachers in the MiC districts still feel that they need more support for their work to effectively implement the CCSS-M. Indeed, we know from our work with the MiC districts over the years of this project that they have been working hard to meet these needs, creating a range of different learning opportunities positioned at the intersection of the standards and the instructional materials. For instance, two MiC districts chose to create their own materials by engaging mathematics teachers in developing curriculum — simultaneously creating a "user-friendly" set of materials while building teachers' capacity to understand the standards and enact instructional practices encouraged by the district. Other districts that chose commercial materials spent early energy with local technical support providers (e.g., county office of education math specialists), carefully reviewing commercial materials at each grade level and identifying the critical lesson ideas for teachers to consider based on their alignment to the standards. For example, educators in one district used a color-coding system to guide materials usage for their teachers: green for more central ideas, yellow for ideas to be taught if time was available, and red for parts of the materials that were lower priority or to be avoided. Still other districts looked to the best available online materials at the time, as determined by state and national math leaders (e.g., the National Council of Supervisors of Mathematics), and built professional development focused less on specific materials and more on the standards and powerful pedagogical practices to achieve them.

In each of these varying situations, district educators had a lot to learn themselves and a lot to do to build the capacity of their teachers to use the adopted or recommended materials — they were trying to build capacity on standards that they themselves were still learning. Early in the transition to CCSS-M, districts organized professional learning experiences to support teachers to both understand the standards (especially the cross-grade math practice standards that teachers are being asked to nurture) and use district-approved materials to enable students to achieve the standards. District leaders also recognized that they needed to develop teachers' content knowledge. Some MiC teachers told us that they felt these earlier professional learning sessions were not always helpful for supporting their instruction or for developing their understanding of the mathematics they needed to teach their students:

> *"We adopted the GO Math! series…and so much of our PD was just the nuts and bolts around the materials. I think that those PD sessions were not as effective in the sense that [it] was just, 'Find this book. What could this be used for? Find this resource. What could it be used for?'…*



So it did not feel personalized. It didn't feel like we had time to really dig in and make it our own in those sessions. It was just sort[ing] through these ginormous boxes of materials, and it was carried over for three days and was really tedious by the end."

"Especially in the upper grades…going from procedural to conceptual understanding, especially with fractions and things…That's a very difficult thing for someone to understand. I mean I've watched a million YouTube videos to finally understand how to multiply fractions…. I felt they should have been teaching me that instead of what are the best math practices."

Districts have now had several years to learn from their approach to CCSS-M implementation and fine-tune the guidance they offer their teachers around materials. They increasingly understand the strengths and weaknesses of their current materials through trial and error, or have now adopted materials and can use these new materials as a foundation for developing new learning experiences. WestEd has documented a shift in the professional learning that some MiC districts are offering to their teachers — and, in some cases, are now also offering to their principals — as more site-located and instruction-focused, rather than centralized, one-size-fits-all professional development (Seago, Perry, Reade, & Carroll, 2016).

We see examples of site-located, instruction-focused professional learning experiences across the MiC districts that include math coaching staff from the district organizing professional learning for teachers focused on reviewing curriculum materials to collaboratively plan units and lessons; addressing questions that site staff have about instruction; engaging teachers in the mathematics of the units and lessons; providing information on what teachers should attend to most in their district materials (based on experience gained over time with pacing and the materials); discussing relationships between the district materials and other resources (e.g., the California Math Framework or California Assessment of Student Performance and Progress [CAASPP] claim areas); or offering guidance on how to increase the mathematical rigor of problems presented in the district texts that some still find unsatisfactory.

A teacher and principal both offered their thoughts on site-based professional development that includes an emphasis on the use of instructional materials:

"One member of the math curriculum department came out to do an in-service with each grade level at our site for a half day, and she's come back to do some demo lessons in some classes. That's where we got a guide for taking some of the questions in the GO Math! and turning them into tasks instead of using them as they are specifically directed in the text book and in the teachers' manual. She even told us that some of these [tasks in the textbook] aren't the best." — Teacher

"We use GO Math! here in this district. There have been more [PD] opportunities for… getting teachers to feel comfortable [about using the textbook to consider:] 'How do I begin my lesson? Can I begin my lesson with having students explore a concept versus just going straight to into teaching them about it?'" — Principal

Summary

As district leaders have gained familiarity with the standards and instructional materials over the years, the support they have offered to teachers has evolved to become more site-located and instruction-focused. And, as these district leaders have gained new information and perspectives on the quality and variability of CCSS-M implementation, they have learned to adjust their efforts to build teachers' capacity to implement the CCSS-M across the system.

Teachers' Use of Instructional Materials

In addition to reviewing the instructional materials and correlating supports that districts have provided for teachers, this report has highlighted feedback from teachers that they still need support and they are choosing or adapting materials to meet their particular needs. Ball, Thames, and Phelps (2008) argue that teachers need specific pedagogical content knowledge of mathematics to be critical consumers of instructional materials. According to survey results, a large portion of teachers in the MiC districts report having this sort of knowledge. For instance, in 2017, 93 percent of teachers agreed with the statement, "I have adequate mathematics content knowledge to teach the CCSS-M." In addition, teachers' self-reported understanding of the scope and sequence of their school's mathematics curriculum for their grade level continues to improve with each year of survey administration. In 2017, 89 percent of teachers agreed that they have a solid understanding of the scope and sequence of the curriculum for their grade level; 29 percent of those teachers strongly agreed with this statement, a steady increase over 2016 (24 percent) and 2015 (19 percent).

With increased knowledge of the scope and sequence of their schools' curriculum and with their growing experience implementing the standards, teachers are likely better equipped than before to select and use high-quality materials that support CCSS-M implementation. While our survey did not specifically ask teachers about their use of professional judgment in choosing materials, we learned from focus group comments and responses to open-ended questions that teachers are using their professional judgment to pull and adapt the right materials to responsively meet the needs of students (see also Bugler et al., 2017).

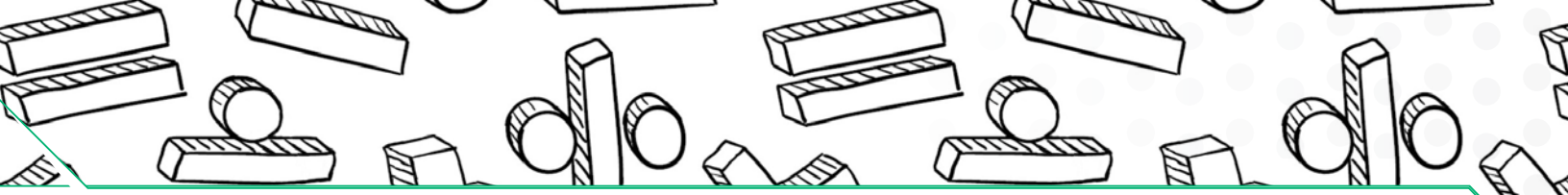
We included several questions on the survey to investigate which primary and supplemental materials teachers in the MiC districts were using and how they determine whether those materials are aligned to the CCSS-M.

What materials are teachers using?

There were three open-ended questions on the survey asking teachers to indicate which instructional materials they use; one question was about primary instructional materials and two questions were about supplemental materials (that is, materials not provided by the district).

Seventy-nine percent of all teachers provided responses to these open-ended questions on the survey (see Appendix C for our methodology on coding those responses). In order to code teachers' responses, we developed the following six overarching categories based on what these teachers told us about the primary and supplemental materials they were drawing on to use in their instruction:

- **Teacher-developed.** Used for any reference teachers made to creating, adapting, or sourcing materials themselves. Most commonly they stated, "self-made," "my own," or "personal." Also includes references to "online," "Google," or "websites" without a specific site and websites that did not fit into another category (e.g., http://www.commoncoresheets.com/ and Teachers pay Teachers).
- **District or state resource.** Used when teachers wrote, "the district," "our district," or the initials or names of their school districts as a source for materials. Also includes references to "the Framework."
- **Commercial books.** Include traditional textbooks, such as GO Math!, as well as any mention of a major textbook publisher (e.g., Houghton Mifflin Harcourt).
- **Open educational resources.** These include materials that teachers can access all or much of online



for free (e.g., Eureka [EngageNY], Khan Academy). Schools might purchase site licenses to access additional elements or services connected to materials in this category.

» **Strategies and tools.** Used to include mentions of sources such as manipulatives, number talks, and other teaching tools/methods.

» **Resources from math-focused professional development and research.** Several MiC districts are currently, or have in the past, partnered with organizations that offer a professional development and curriculum program (e.g., the Silicon Valley Math Initiative, the Irvine Math Project).

Table 2 on page 16 reports findings from our coding of teachers' open-ended teacher responses about instructional materials. The blue-shaded portions of the table represent the six overall categories of materials mentioned by teachers. The most frequently reported category was teacher-developed sources, representing 45 percent of respondents. A district or state resource was the second most commonly reported category of materials, mentioned by 32 percent of the responding teachers. About a quarter of respondents mentioned some commercial book (29 percent) or open educational resource (22 percent). Strategies and tools were reported by 16 percent of the sample as materials being used, and 15 percent of teachers mentioned using resources from some math-focused professional development and research.

Underneath each of the six overarching categories of materials in Table 2 are specific resource examples (shown as bulleted items in the table) that were mentioned by respondents and included in the category. For example, the words "my own" or "self-made" were used by 22 percent of teachers to describe the sources of instructional material they drew upon; these phrases were coded under the "teacher-developed" category and were included in the 45 percent total for that category.[9]

That teacher-developed category also includes commonly mentioned general references to "online" or "the internet" (reported by 19 percent of teachers), as well as the specific online sites Teachers Pay Teachers (14 percent) and Pinterest (5 percent).

Table 2 also includes the top three sources of instructional materials mentioned by teachers in each district. The sources that are highlighted are those that were adopted by the respective districts as a primary material. In looking at the top three sources of materials cited in each district, we can see where particular instructional materials are being used most frequently. For instance, although Cognitively Guided Instruction is mentioned by only 2 percent of teachers across all districts, it is one of the three most frequently mentioned sources of instructional materials in District G (where 20 percent of teachers mentioned using it), even though it is not district curriculum. District F is different from the rest of the MiC districts in that their teachers' top three most frequently mentioned resources are all district-adopted. Teachers in this district and District G frequently included a resource from a math-focused professional development or research project in their most frequently cited sources (e.g., Irvine Math Project).

In Districts F and G, which have adopted CCSS-M–aligned materials and support these with a math-focused teacher professional development program, teachers were less likely to report utilizing teacher-developed materials. The approach used by Districts F and G potentially offers two key benefits for instruction and learning: freed from the need to source and align supplemental materials, teachers may be able to focus more on other elements of their instruction, and there may be less variation in curriculum across classrooms. The sources cited most heavily by teachers in the districts other than F and G fell into the teacher-developed category, suggesting that teachers in these districts are spending more time and effort working to find and produce materials to support their instruction. Educators across these systems will need to evaluate whether

9 A recent national survey reported that 83 percent of elementary school mathematics teachers and 87 percent of secondary math teachers used self-developed materials at least once a week, and drew from an eclectic mix of online resources that may or may not have an association with CCSS (Opfer, Kaufman, & Thompson, 2016).

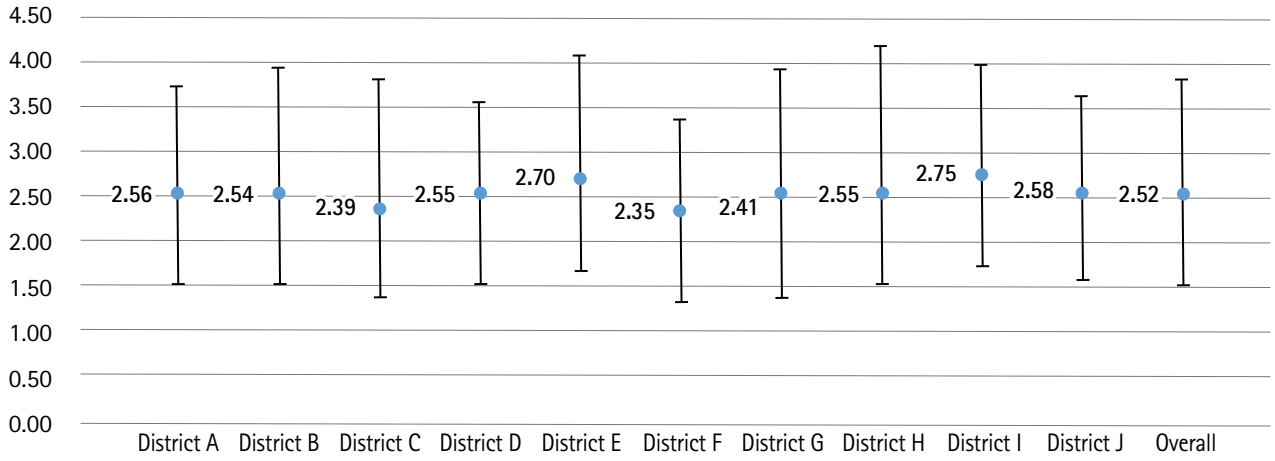
Table 2. Types of Instructional Materials That Teachers Reported Using

OVERALL CATEGORY OF INSTRUCTIONAL MATERIAL • Individual coded sources	PERCENTAGE OF TEACHERS ACROSS ALL DISTRICTS WHO MENTIONED THIS SOURCE	THREE MOST FREQUENTLY MENTIONED SOURCES, BY DISTRICT									
		A	B	C	D	E	F	G	H	I	J
Teacher-developed	45%										
• "My own," "self-made," etc.	22%		X		X				X	X	X
• Online	19%	X	X	X		X					X
• Teachers pay teachers	14%	X								X	
• Pinterest	5%										
District or state resources	32%										
• "District source"	30%		X	X		X	X		X		X
• Commercial books	29%										
• GO Math!	7%				X			X	X		
• Pearson	7%						X				
• Prior Textbooks	4%										
• Everyday Mathematics	4%			X							
• Houghton Mifflin	3%										
Open educational resources	22%										
• EngageNY	12%	X			X	X		X			
• Kahn Academy	4%										
• Illustrative Mathematicsw	3%										
• Eureka Math[a]	2%										
Strategies and tools	16%										
• Manipulatives	13%									X	
• Number talk	4%										
Resources from math-focused PD and research	15%										
• Irvine Math Project	9%						X				
• Cognitively Guided Instruction	2%							X			

Note: The highlighted cells indicate the sources that were district-adopted or district-recommended material in each district.

[a]*Eureka Math* is a second-generation California version of EngageNY math materials. An up-to-date version of the curriculum is available for free download on the Great Minds website (see https://greatminds.org/store/products/eureka-basic-curriculum), along with support resources suitable for parents and anyone teaching. Additional payment enables educators access to the digital suite of resources and print materials.

Figure 5. Average Number of Instructional Materials Sources Used, by Math in Common District



Note: Teachers were asked three open-ended questions in which they could write in up to seven sources of instructional materials. Each source was coded per the materials categories shown in Table 2. This figure shows a point representing the average number of codes (individual materials) written in by teachers in each district. The bar shows the variability in the number of codes (standard deviation) mentioned by teachers in each district.

this is time well spent and what the overall impact on instruction is.

How many different sources of materials are teachers using?

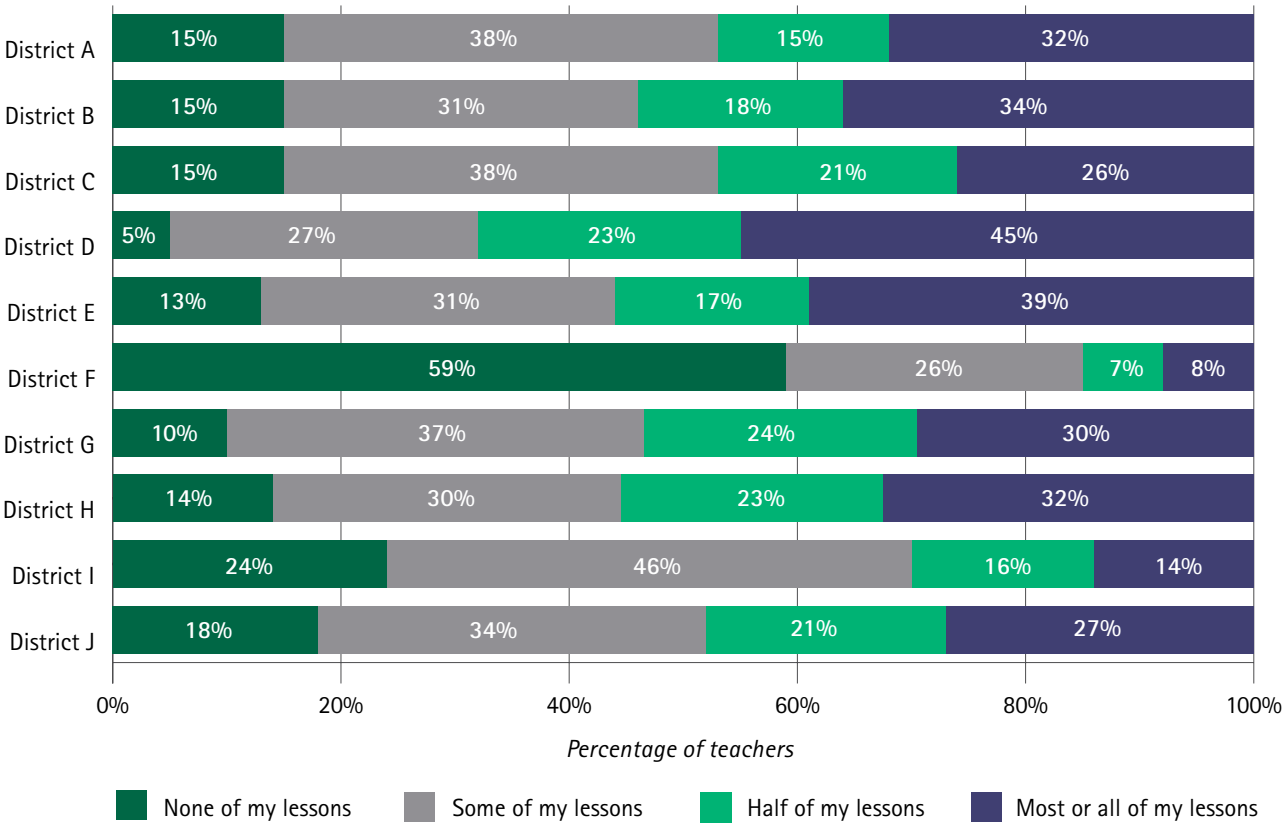
We also looked at the average number of sources of instructional materials coded for teachers in each district. Based on the coding of open-ended responses — where teachers had opportunities to write in up to seven sources they use in their planning and instruction — on average, teachers reported using about two and a half different sources (as shown at the far right of Figure 5, labeled "Overall"), a number which is largely consistent across districts. When we looked at the variation in the number of sources that teachers within each district reported regularly using for their instruction (the standard deviation, indicated by the black error lines in Figure 5), we found that teachers in some districts (particularly Districts B, E, G, H, and I) referenced as many as four different sources used regularly to develop their lessons.

How extensively are teachers using supplemental materials?

We asked teachers to indicate the frequency with which they supplement their teaching with materials not provided by the district. Across the MiC districts, 79 percent of teachers reported that they used materials to supplement their teaching in "some" to "most" of their lessons each week. Figure 6 on page 18 shows the frequency with which teachers reported using materials to supplement their teaching in a typical week, by MiC district. The rate of using supplemental materials is relatively similar across MiC districts, with the exception of District F, which had a uniquely high percentage of teachers (59 percent) who reported using supplemental materials for "none" of their lessons.

Figure 6. Frequency of Using Supplemental Materials for Teaching, by Math in Common District

Teachers were asked the following question: "In a typical week of math instruction, how many of your lessons do you teach using supplemental materials (i.e., materials not provided by the district)?"

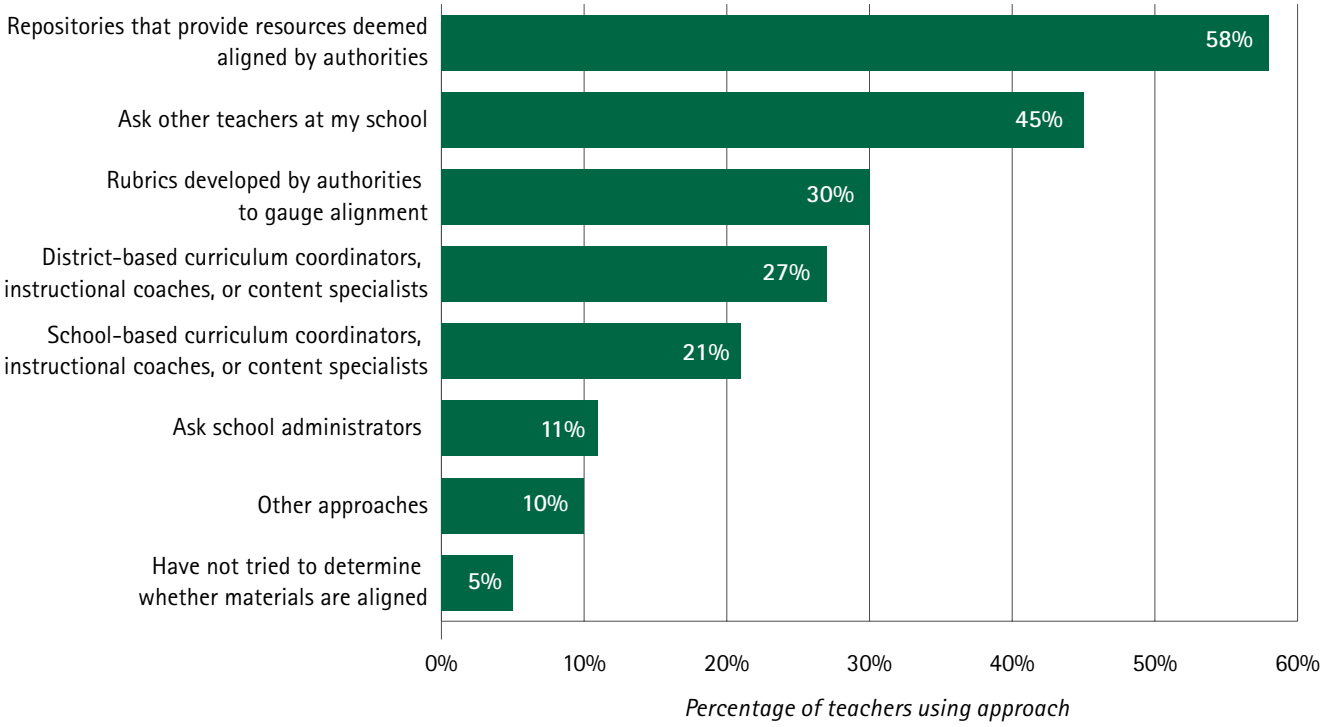


How are teachers determining whether materials are aligned to the CCSS-M?

We know from the information described above that teachers are working hard and culling from multiple sources to identify materials to support their instruction. We wondered how teachers determined whether these materials were aligned to the CCSS-M. As shown in Figure 7, the majority of teachers (58 percent) reported relying on repositories with resources deemed aligned by CCSS-M authorities, while almost half of the teachers (45 percent) also asked other teachers at their schools. Teachers in districts with district-recommended materials were less likely to ask other teachers at their school than teachers in districts where the curriculum materials guidelines were less established. For example, in District B where there is a district-created curriculum that is expected to be used by all, only 35 percent of teachers asked other teachers whether instructional materials were aligned, presumably because they can rely on the materials provided for them by their district authorities. By contrast, in a smaller district (District D) where teachers are given more freedom to use different resources, 62 percent of teachers reported asking other teachers whether materials were aligned to the CCSS-M.

Figure 7. Approaches Used by Teachers to Determine Whether Instructional Materials Align with the CCSS-M

Teachers were asked to select all answers that apply to the following question: "Which of the following approaches do you use to determine whether instructional materials are aligned to the CCSS-M?"



Summary

Across the MiC network, the data show that teachers draw from a wide variety of sources to supplement their district-adopted curriculum, including a high percentage of teachers that use online resources, such as Teachers Pay Teachers. Additionally, in the absence of (or along with) guidance from the district office or centrally provided curriculum, almost half of teachers reported asking their peers for support to determine whether instructional materials are aligned to the standards. The data suggest that teachers in districts without either a strongly supported central curriculum or structured support from coaches or TOSAs around curriculum spend much more of their time and energy sourcing and adapting materials, potentially at the expense of other instructional foci. Administrators in those districts should consider whether this is the right use of teachers' time.

Conclusion and Ideas for Action

Within educational systems, institutional structures and cultures that limit opportunities for some groups of students weaken overall education quality and lead to disparities in student outcomes (O'Day & Smith, 2016). A primary goal of the CCSS-M is to improve college and career readiness for *all* students. Thus, states and districts attempting to achieve the promise of the CCSS-M for their students must simultaneously tackle challenges related to both access and quality — by creating more equitable opportunities for students and by focusing on continuous improvement of instruction and learning. And as we have long known, ensuring that students have access to high-quality, standards-aligned curriculum and instruction is central to education improvement efforts (Smith & O'Day, 1990).

Drawing from our work on this study as well as the literature on standards implementation, we have outlined three key steps for educators — including teachers, coaches, and district staff — to consider as they move forward with their curriculum:

- Define the quality of the instructional materials.
- Examine variation in what materials are being used and how they are being used.
- Build capacity for educators to assess and use the instructional materials.

We briefly discuss each of these steps, and provide correlating ideas for action, below.

Define quality

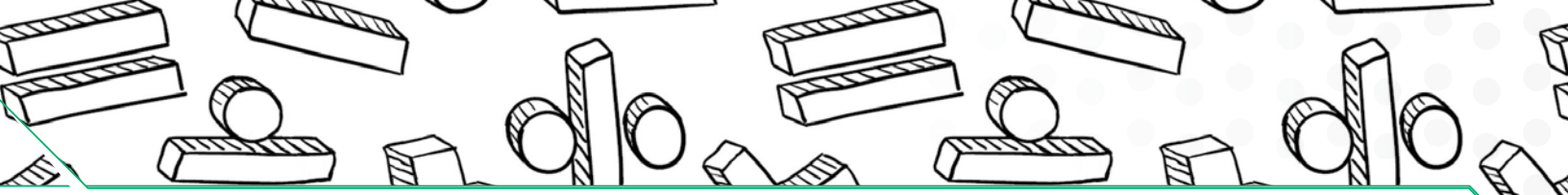
Teachers use an array of materials of varying quality, some of which are better than others at producing the results district leaders are hoping for. Accordingly, it is important for teachers and administrators to effectively define the quality of instructional materials, and for teachers to confidently fill in any gaps in those materials in order to help their students succeed. We want to enable all educators across district systems — especially teachers — to understand how to identify and choose high-quality lesson resources that are content-rich, rather than merely "flashy" (a term used by one of the focus group teachers), and educative for the teachers who use them, and which ultimately provide access to vital mathematical opportunities for students (Ball, Thames, & Phelps, 2008; Davis & Krajcik, 2005). Below are some recommendations to help educators define and assess the quality of their CCSS-M–aligned curriculum materials.

➢ Consult existing research or ask other districts

Some research is now available to support district decision-making on instructional materials, and district leaders who are still choosing materials or looking to adopt new ones will want to review this information (e.g., EdReports staff, 2017a, 2017b). Another option is what some MiC districts did: call other districts to ask about the merits and shortcomings of their adopted programs. In the absence of a research base, this base of practical information provides invaluable evidence about quality.

➢ Learn about the quality of instructional materials by gathering evidence at the district level

To support and build effective classroom practices, district leaders must begin to investigate "what works, for whom, under what circumstances" (Bryk, Gomez, Grunow, & LeMahieu, 2015), including how teachers are using instructional materials in their classrooms. This process requires open and inclusive dialogue around the



resources teachers use (district-provided or not), evidence of how effectively these resources guide instruction, and efficient and productive ways of sharing what is learned.

Several MiC districts have created opportunities for teachers to provide feedback (e.g., via online feedback forms) on the quality of lessons and units from the district materials as they are using them. District specialists can then draw on this feedback to revise and improve the materials, build teachers' capacity, or see whether teachers are drawing on other materials for particular grades or topics. One district that created their own materials, for example, has revised their units over multiple years by adding a clearer message about the main mathematical idea(s) in the units, providing links to additional resources to support particular groups of students, and recommending accompanying pedagogical strategies for some units to help build the mathematical practices the district is hoping to see. The process of gathering and addressing information from curriculum users is consistent with Hiebert and Stigler's (2017, p. 174) recent call to develop "instructional products for teaching, vetted by teachers, with the goal of continuous improvement in teaching over time."

➢ Use professional learning communities to gather evidence about the quality of materials

Implementation will always be strongest when it is a social, not individual, process and professional learning communities (PLCs) can be an effective way to promote teacher collaboration. We heard from some of our focus group respondents that PLCs can engage teachers in discussions of what specific supplemental materials are most relevant for their students, and then support common work to integrate these materials with curriculum provided by the district to build lessons, units, or broader interventions. In doing so, the PLC's discussion should start with reviewing definitions of quality and materials provided by the district, then move toward understanding *why* the materials are of high quality (or where they fall short for their students), *how* they are used to build capacity for teachers and students, and *how to document* this learning for future users.

Examine variation

Districts cannot fully support and guide instructional practice toward the common goals of the CCSS-M or create equitable opportunities for students without understanding the variations in materials that individual teachers are using in their classrooms and how materials are used. In all districts, there are inevitable variations in how teachers and principals understand and use (or encourage the use of) provided materials. For instance, in some MiC districts, we saw that there is a discrepancy between the materials principals believe teachers are using and the materials teachers report using. In many cases, principals (and coaches) will be the best positioned to help district staff understand how teachers are taking up or leaving behind curriculum. While the goal of examining variation in curriculum is not to end up with complete uniformity across classrooms in the materials that are used and how they are used (teachers should still be able to supplement with materials and strategies they feel are most appropriate for *their* students), there should be a consistent and high-quality set of materials guiding instruction in all classrooms and enabling all students to achieve the same standards.

➢ Create opportunities for classroom visits and tools for documenting materials use

Principals and coaches should be supported to help central offices learn about the materials that teachers use and why and how teachers make the choices they do. MiC districts have several different ways of gathering evidence of classroom instruction (e.g., lesson study, instructional rounds) and they have used these opportunities to better understand the variations in how materials are being used. Particularly important are opportunities being organized in some districts where shared materials are used to support instruction in multiple classrooms. By examining how different teachers use the same materials to support instruction, district

leaders can start to unpack the influence of the materials in relation to the "art" of teaching, and provide more evidence about what works, for whom, and under what circumstances. Observations about variability in instructional materials used within and across classrooms can be aggregated and used to inform school-level and district-level actions.

➢ Develop practical district systems to help teachers identify and use common materials

MiC districts have all done work to pre-screen some amount of supplemental materials for teachers to use at their discretion. Once this selection and vetting work is done at the central office, the challenge is making the materials available in a "user-friendly" way that enables teachers to easily find, sort, and select from the district's curated selection. Some districts have experimented with sharing materials through grade-level blogs or with interactive pacing guides. Districts will want to monitor whether both the selected materials and the roadmaps for their use are being accessed (and by whom) to understand if they are really helping teachers.

Build capacity

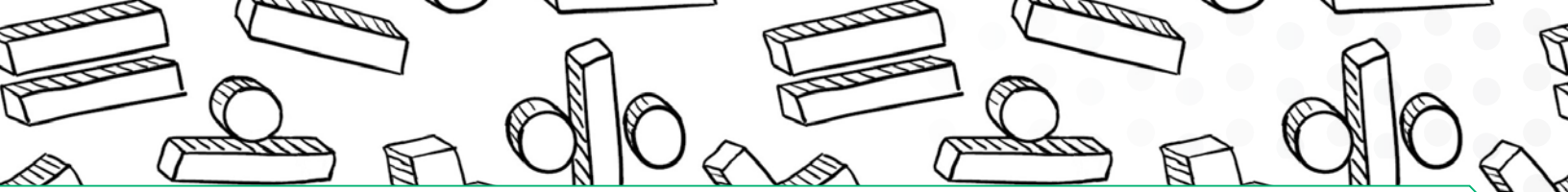
Districts are always working to build teachers' capacity to provide high-quality mathematics instruction for their students. When the quality of teachers' instructional materials is in question or there is significant variation in how teachers are using (and supplementing) the materials, district leaders must also put supports in place to help teachers address these challenges. In addition to ensuring that teachers have the capacity to make sense of their primary materials and to select high-quality supplemental materials, principals could benefit from more exposure to instructional materials in order to both improve their content knowledge and provide more useful support and feedback to teachers.

➢ Use PLCs to build teacher capacity to identify and use instructional materials

Teachers' requests for more time to plan lessons with peers points to a natural format for building capacity around materials selection and use: PLCs. Several MiC districts are organizing and encouraging PLCs to do meaningful work in relevant areas like materials alignment. These PLCs are also being used to both build capacity and share knowledge about all aspects of practice, including instructional materials. In some cases, PLCs are discussing the range of resources available to them and how to identify the materials that are of high quality and best support teachers' instruction. These include materials such as the California Math Framework and their district's adopted text; other materials provided by their district (e.g., a toolkit of particular focal pedagogical strategies, conceptual lessons, CAASPP claim-level descriptors); and teachers' own self-identified or teacher-developed materials.

Final thoughts

One benefit of the kind of localized, instruction-focused professional learning sessions and PLC discussions we see in some MiC districts is the opportunity for teachers to reflect with peers and math leaders on the materials as "inputs" to instruction, which influence teaching and learning. If planning for classroom instruction is a goal of PLC work, PLC discussions can engage a group of professional educators in all three areas we define here as critical to implementation: defining the quality of the materials, examining variation in what materials are used and how they are used, and building capacity to assess and use the materials. Most MiC districts are encouraging site leaders to create PLCs as ongoing activities at school sites so that discussions about classroom instruction are central to the work. As a result of the ongoing focus on classrooms, these functions of assessing quality, examining variation, and building capacity are not "one-and-done" events, but structures put in place to support CCSS-M implementation and continuous improvement over time.



We think districts across the state can learn from the kind of localized reflections, in PLCs and other formats, that are happening within the MiC districts on quality, variation, and capacity. For example, many California districts use the same curriculum materials, yet to our knowledge there is insufficient sharing and statewide knowledge development about how well these materials are working in the classroom, and what parts of these materials matter most for students. Districts, schools, and teachers should not have to learn these lessons about materials independently, recreating the wheel thousands of times across California, but should aim to share knowledge and evidence communally and learn together about what materials work for students.

Math in Common districts have benefitted tremendously from their formal and informal opportunities to discuss common problems of practice like curriculum selection, whether through phone calls to one another ahead of an adoption decision or in facilitated sessions at our leadership convenings. We encourage districts to form PLCs for teachers and administrators and to monitor their implementation efforts. We also encourage county offices of education and state-level policymakers to think about ways they can support districts to learn together. We hope the learnings from our network can serve as an example of how to build a stronger understanding across the state about instructional materials and teachers' implementation of the CCSS-M.

Appendix A. Research Methodology and Survey Sample

Methodology

To develop the 2017 surveys, we reviewed the 2016 survey drafts and conducted an additional review of the literature on CCSS-M implementation to add any developments from the field since the prior year. In particular, we identified recent surveys (e.g., Bay-Williams, Duffett, & Griffith, 2016; Kane et al., 2016) conducted by other agencies and reviewed survey items to add to our information on educators' understandings of the standards and central ideas and priorities they were putting in place to move toward CCSS-M implementation.

Once survey drafts were complete, WestEd examined 2016 survey results again to determine whether some items could be removed to reduce participant response burden. WestEd asked several representatives from the Math in Common (MiC) districts to review the surveys for content and clarity, and to make recommendations for survey items that might be removed. (See Appendix B for additional information about differences between the 2016 and 2017 surveys.)

As with prior surveys, an important feature of the 2017 surveys was to capture both the unique and shared perspectives on implementation from stakeholders in different job roles. We were interested in ideas about instruction from teachers (e.g., what instructional practices they used to support CCSS-M) and ideas about leadership from principals (e.g., the steps they had taken thus far to support CCSS-M implementation in their schools and districts). We were also interested in the coherence of ideas across groups, such as whether principals and teachers agree on which instructional practices are most important to support CCSS-M. To get at these ideas of coherence, we included verbatim or parallel questions across the two groups being surveyed, to the extent possible.

Survey items

The overall length of both surveys was reduced in 2017. Teachers were asked 29 questions (totaling 97 items, with sub-items and including all possible skip patterns and open-ended questions); site administrators were asked 22 questions (totaling 84 items, again with sub-items and including all possible skip patterns and open-ended questions).

The surveys emphasized the same topics as in prior years (i.e., professional learning opportunities, curriculum and instruction, preparedness to enact and implement the CCSS-M, and respondent background), with some additional focus on instructional materials. The surveys included Likert-scale items asking respondents to rate the extent to which they agreed or disagreed with statements about CCSS-M; forced-choice items (e.g., on instructional materials use); and open-response items asking respondents to elaborate on opinions about the CCSS-M (e.g., regarding needs for effective implementation).

Survey administration

Surveys were administered in all 10 MiC districts (although they were not administered to site administrators in one district and one district chose to have the survey administered to only elementary teachers). Over the three-week administration period, non-respondents were sent two follow-up email reminders requesting their participation. Each respondent was eligible to receive a 10 dollar Amazon gift card as a small token of appreciation for their participation. Response rates varied significantly by group and district, ranging from 17 to 37 percent across the districts for teachers and 14 to 45 percent for principals.

Table A1. Characteristics of the Math in Common 2017 Survey Respondents

SCHOOL LEVEL	TEACHERS	ADMINISTRATORS
Elementary	86%	67%
Middle	9%	24%
Multi-grade (e.g., K–8 or K–12)	5%	9%

Respondent sample

We received responses from 2,148 teachers and 119 site administrators across the 10 districts. We asked teachers several questions to understand the nature of their teaching assignment, including whether they currently had a classroom or were without a classroom (e.g., coach or teacher on special assignment); whether their assignment was as a specialist teacher or a teacher with a self-contained classroom; what their school type (elementary, middle, K-8) was; and what specific grade levels they taught. The majority of our sample were elementary teachers (86 percent) and administrators (67 percent) as shown in Table A1.

Appendix B. Differences Between the 2016 and 2017 Surveys

To collect more detailed information about particular aspects of CCSS-M implementation, several changes were made in the administrator and teacher surveys between the 2016 and 2017 administrations.

Teacher survey

On the teacher survey, we added several items — both closed-ended and open-ended — to obtain additional insights about learning activities during professional development (PD), district PD offerings, feedback to teachers from professional learning communities (PLCs), sources of instructional materials and their alignment with the CCSS-M, supplemental materials used in instruction, vertical math curriculum scope and sequence, and expectations for diverse learners.

We added a sub-item for teachers to indicate whether they disagreed that they or their school was revising math instruction because they had either already revised such instruction or had not yet begun.

As with the site administrator survey, we added an item inquiring whether the respondent had completed the 2016 administration of the survey, to assess the extent of overlap in respondents from 2016 to 2017. We also added an item inquiring whether the respondent would be interested in participating in a focus group on CCSS-M implementation to be conducted by WestEd.

In addition, one item and one sub-item WestEd researchers deemed less informative to districts were eliminated.

Site administrator survey

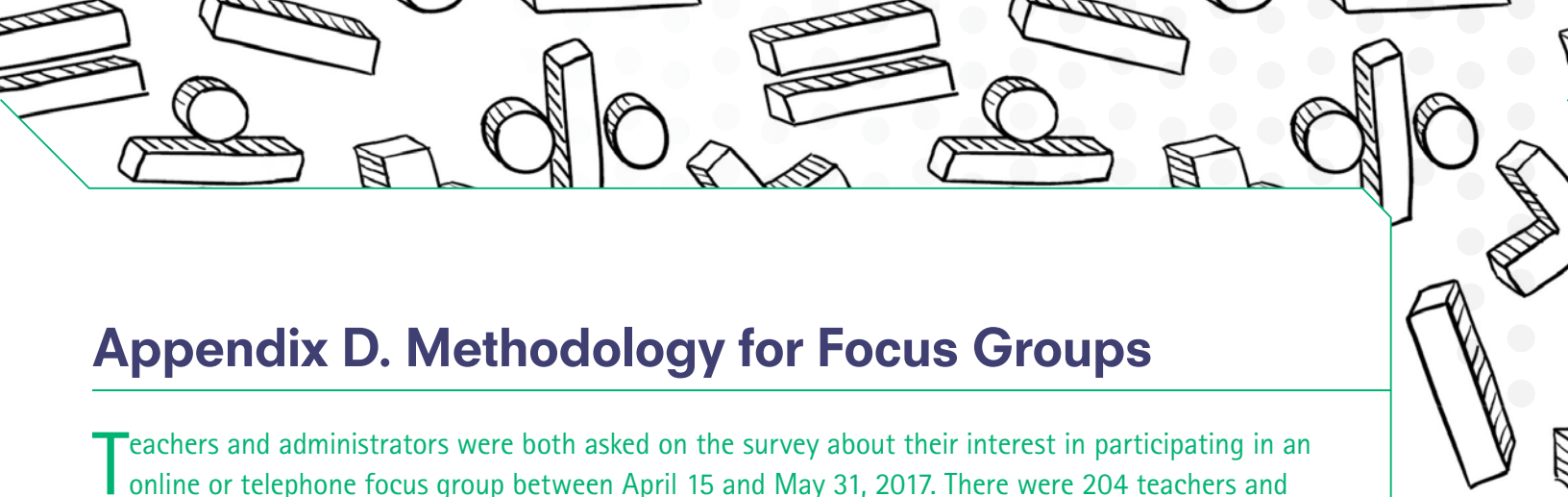
On the site administrator survey, we added several items — both closed-ended and open-ended — to obtain additional insights about leadership plan implementation, teacher knowledge of math content and instructional practices, and sources of instructional materials. We also added an item inquiring whether the respondent had completed the 2016 administration of the survey, to assess the extent of overlap in respondents from 2016 to 2017. And we added an item inquiring whether the respondent would be interested in participating in a focus group on CCSS-M implementation to be conducted by WestEd.

Several items and sub-items WestEd researchers deemed to be of limited relevance to and potential for informing districts about their efforts via Math in Common were eliminated.

Appendix C. Methodology for Coding of Open-Ended Questions

Seventy-nine percent of teachers (1,693 out of 2,148 total) completed responses to open-ended survey questions and were included in the coding sample. Teachers had three opportunities in the survey to report what instructional materials they use and how commonly they use them. If teachers indicated using non-commercial materials on a regular basis, they were prompted: "please list the three sources you use the most to obtain these instructional materials" (Questions 20 and 20.1). Additionally, all teachers who participated in the survey were asked to list supplemental materials (described in the survey as "i.e., materials not provided by the district") that they found most useful for planning as well as those that were more useful for teaching (Questions 22.1 and 22.2).

Using qualitative analysis software (atlas.ti), the responses were coded using an auto-coding process that was then reviewed by two researchers for accuracy. We made a coding category for any source mentioned by 10 or more teachers, coding a total of 37 different sources of instructional materials. These 37 sources accounted for roughly 87 percent of all sources cited by teachers; 13 percent of the sources were more unique sources mentioned by fewer than 10 teachers. For any given teacher, any code included across their three survey responses was counted only once. For example, if a teacher mentioned "online" sources in response to two different questions, the coding category of "online" would be activated only once.



Appendix D. Methodology for Focus Groups

Teachers and administrators were both asked on the survey about their interest in participating in an online or telephone focus group between April 15 and May 31, 2017. There were 204 teachers and 54 administrators who indicated their interest in participating and we invited all of these individuals to sign up for eight focus group opportunities (five for teachers and three for administrators). Each focus group was limited to six to eight spots, with the goal of representing teachers across all MiC districts and grade levels. Forty teachers and 19 administrators signed up for an open spot. Not everyone attended; in all, 18 teachers and 6 administrators participated, and each participant received a 100 dollar Amazon gift card in exchange for their participation.

The focus groups answered questions in three categories: professional learning, considerations in choosing instructional materials, and classroom instruction. Focus group interviews were facilitated by one WestEd researcher while another took notes. In addition, the discussions were audio recorded and transcripts were prepared from the audio recordings.

Appendix E. Teacher Survey Results

Implementing the Common Core State Standards in Mathematics (CCSS-M) Teacher Survey

1. I consent to participate in this survey.

- ☐ Yes (Go to Background Section.) [N=2148]
- ☐ No (Go to "Thank You" Page.)

Background

2. Did you complete this survey (Implementing the Common Core State Standards in Mathematics Teacher Survey) last year? [N=2140]

- ☐ Yes – 21%
- ☐ No – 34%
- ☐ I don't know – 44%

3. In which school district are you currently employed? [N=2147]

- ☐ Dinuba – 2%
- ☐ Elk Grove – 13%
- ☐ Garden Grove – 11%
- ☐ Long Beach – 14%
- ☐ Oakland – 12%
- ☐ Oceanside – 3%
- ☐ Sacramento City – 14%
- ☐ San Francisco – 14%
- ☐ Sanger – 3%
- ☐ Santa Ana – 13%

4. Select the type of school in which you teach: [N=2135]

- ☐ Elementary (K-5/K-6) – 86%
- ☐ Middle (6-8/7-8) – 9%
- ☐ Multi-grade (e.g., K-8/K-12) – 5%

5. What grade levels do you teach? *(Check all that apply.)* [N=2148]

- ☐ TK – 2% (Go to "Thank You" Page.)
- ☐ K – 17%
- ☐ 1st – 17%
- ☐ 2nd – 18%
- ☐ 3rd – 19%
- ☐ 4th – 18%
- ☐ 5th – 18%
- ☐ 6th – 10%
- ☐ 7th – 6%
- ☐ 8th – 6%

6. Are you currently teaching mathematics to students in any of grades K–8? [N=2148]

- ☐ Yes (Go to question number 7.) – 100%
- ☐ No (Go to "Thank You" Page.)

7. Which best describes your *main* teaching assignment? [N=2119]

- ☐ Do not have a teaching assignment (i.e., full-time mathematics specialist or instructional coach) – 1%
- ☐ Teach multiple subjects in a self-contained class – 89%
- ☐ Teach a single subject(s) to different classes (i.e., specialist teacher) – 10% (Answer question number 7.1.)

7.1 Mark below your primary subject area(s) assignment this year. *(Check all that apply.)* [N=208]

- ☐ Mathematics – 89%
- ☐ English as a Second Language – <1%
- ☐ Science – 13%
- ☐ Special Education – 14%
- ☐ Other (please specify): – 12%

8. How long have you...	0 (This is my first year)	1–2 years	3–5 years	6–10 years	11–15 years	16–20 years	Over 20 years
a. ...been teaching? [N=2126]	5%	5%	9%	10%	15%	23%	34%
b. ...taught in this district? [N=2056]	9%	8%	9%	9%	16%	25%	25%
c. ...taught at this school? [N=2056]	12%	13%	19%	15%	13%	16%	13%
d. ...taught at your current grade level? [N=2078]	11%	13%	22%	23%	13%	10%	7%

Skip pattern: if a respondent indicates a "0" to 8a., then the survey does not ask question 24.
"24. I have spent more time this year than in prior years collaborating with teachers on..."

Professional learning opportunities

9. Approximately how much time did you spend in the following kinds of *district or school mathematics-related professional learning activities* during the past 12 months?	No time	4 hours or less	5–10 hours	11–15 hours	16 hours or more
a. Listening to a formal presentation by an "expert" presenter (e.g., on mathematics, pedagogy, supporting special student populations in mathematics, or the CCSS-M) [N=2110]	15%	33%	24%	10%	18%
b. Applying learning during activities facilitated by the expert presenter(s) of formal presentations [N=2082]	20%	40%	19%	8%	13%
c. Receiving one-on-one coaching or mentoring related to the CCSS-M [N=2035]	59%	28%	8%	3%	3%
d. Observing live classroom lessons and afterwards reflecting with colleagues on CCSS-M implementation in the classroom [N=2093]	50%	39%	8%	2%	2%
e. Participating in district-led efforts to create or select curriculum guidelines or curriculum or assessment materials for CCSS-M implementation [N=2101]	57%	23%	10%	4%	6%
f. Participating in district-led efforts to score student performance assessments to specify/calibrate levels of student mastery of the CCSS-M [N=2103]	59%	28%	9%	2%	2%

9.1 On average, how useful was this activity for supporting your implementation of the CCSS-M?	Not at all useful	Somewhat useful	Useful	Very useful
a. Listening to a formal presentation by an "expert" presenter (e.g., on mathematics, pedagogy, supporting special student populations in mathematics, or the CCSS-M) [N=1766]	7%	39%	38%	17%

9.2 On average, how useful was this activity for supporting your implementation of the CCSS-M?	Not at all useful	Somewhat useful	Useful	Very useful
b. Applying learning during activities facilitated by the expert presenter(s) of formal presentations [N=1660]	5%	37%	39%	18%

9.3 On average, how useful was this activity for supporting your implementation of the CCSS-M?	Not at all useful	Somewhat useful	Useful	Very useful
c. Receiving one-on-one coaching or mentoring related to the CCSS-M [N=820]	8%	27%	38%	27%

9.4 On average, how useful was this activity for supporting your implementation of the CCSS-M?	Not at all useful	Somewhat useful	Useful	Very useful
d. Observing live classroom lessons and afterwards reflecting with colleagues on CCSS-M implementation in the classroom [N=1045]	5%	27%	37%	30%

9.5 On average, how useful was this activity for supporting your implementation of the CCSS-M?	Not at all useful	Somewhat useful	Useful	Very useful
e. Participating in district-led efforts to create or select curriculum guidelines, or curriculum or assessment materials for CCSS-M implementation [N=884]	10%	39%	38%	13%

9.6 On average, how useful was this activity for supporting your implementation of the CCSS-M?	Not at all useful	Somewhat useful	Useful	Very useful
f. Participating in district-led efforts to score student performance assessments to specify/calibrate levels of student mastery of the CCSS-M [N=849]	10%	40%	39%	10%

10. Thinking about all of your mathematics-related professional learning during the past 12 months, to what extent does each of the following describe your experiences?	Not at all	To a minimal extent	To a moderate extent	To a good extent	To a great extent
a. You had opportunities to examine classroom artifacts (for example, student work samples) [N=2083]	14%	30%	26%	21%	9%
b. You worked closely with other mathematics teachers [N=2085]	11%	25%	23%	25%	15%
c. You had opportunities to do math tasks [N=2074]	8%	23%	27%	27%	14%

11. To what extent have your *professional learning activities* during the past 12 months provided you with the support needed to...	Not at all	To a minimal extent	To a moderate extent	To a good extent	To a great extent
a. ...engage students in deep mathematical content [N=2025]	7%	21%	32%	30%	11%
b. ...use instructional practices that nurture students' understanding of the CCSS Standards for Mathematical Practice [N=2025]	7%	20%	32%	30%	10%
c. ...find out what students think or already know about the key mathematical ideas prior to instruction on those ideas [N=2027]	9%	26%	33%	25%	7%
d. ...formatively assess student understanding during mathematics instruction [N=2037]	8%	21%	31%	30%	11%
e. ...assess student understanding at the conclusion of instruction on a topic [N=2030]	8%	20%	30%	31%	11%
f. ...develop unit and lesson plans aligned to the CCSS-M [N=2027]	16%	24%	26%	25%	9%
g. ...differentiate and scaffold instruction so all students can increase their understanding of the targeted ideas [N=2021]	10%	25%	29%	27%	9%
h. ...deeply understand the mathematics content you need to teach to your students [N=2036]	9%	17%	29%	31%	14%
i ...foster a growth mindset (i.e., the belief that our most basic abilities can be developed through dedication and hard work) in my students [N=2038]	7%	17%	26%	32%	18%
j. ...understand mathematical content connections across grade levels [N=2033]	11%	28%	29%	24%	8%
k. ...support students with special needs (e.g., students with disabilities, English learners) [N=2034]	17%	28%	27%	20%	9%

12. During the past 12 months, the district updated its PD offerings to meet the changing needs of teachers around the CCSS-M. [N=2020]

- ☐ Not at all – 9%
- ☐ To a minimal extent – 32%
- ☐ To a moderate extent – 28%
- ☐ To a good extent – 22%
- ☐ To a great extent – 8%

13. At your school is there a dedicated block of time for professional learning communities (PLCs)? A professional learning community, or PLC, is a group of educators that meets regularly, shares expertise, and works collaboratively to improve teaching and the academic performance of students. Your district may call PLCs by a different name. [N=2024]

- ☐ Yes – 79% (Go to question number 14.)
- ☐ No – 21% (Go to question number 18.)

14. On average, how frequently do you participate in professional learning communities? [N=1619]

- ☐ At least every week – 48%
- ☐ At least every 2 weeks – 20%
- ☐ At least every month – 19%
- ☐ At least every quarter – 4%
- ☐ At least every trimester – 4%
- ☐ At least every semester – 3%
- ☐ I do not participate in any PLC – 3% (Go to question number 18.)

15. On average, how many minutes do you spend working with other teachers in *each* PLC meeting? [N=1568]

- ☐ 15 minutes – 5%
- ☐ 30 minutes – 14%
- ☐ 45 minutes – 25%
- ☐ 60 minutes – 39%
- ☐ More than 60 minutes – 17%

16. Regarding CCSS-M implementation, *how engaged is your professional learning community* in each of the following activities during this school year?	Not yet begun to address this issue	Talking – no significant action taken	Begun implementation – initial	Beyond initial implementation with support & enthusiasm growing	Deeply embedded in our culture (most staff committed)
a. Building collective knowledge regarding the CCSS-M to clarify what all students must know and be able to do at the end of each unit of instruction [N=1556]	8%	15%	30%	34%	13%
b. Working together to identify the most powerful teaching strategies and best practices that ensure student learning of the CCSS-M (e.g., deeper content, Standards for Mathematical Practice) [N=1556]	8%	15%	30%	34%	13%
c. Analyzing data from common assessments and student work to support teachers' instructional decisions [N=1554]	9%	14%	33%	32%	13%
d. Using a continuous improvement model (such as "Plan, Do, Study, Act [PDSA]") to act on student data and increase teacher/team effectiveness [N=1548]	23%	18%	26%	24%	9%

17. How useful is the feedback provided to you by peers in your PLCs? [N=1553]

- ☐ Not at all useful – 4%
- ☐ Somewhat useful – 31%
- ☐ Useful – 39%
- ☐ Very useful – 26%

18. How often do you typically use the following instructional practices to teach the Common Core State Standards during your mathematics lessons?	Never	Rarely (e.g., a few times a year)	Sometimes (e.g., once or twice a month)	Often (e.g., once or twice a week)	All or almost all mathematics lessons
a. Structuring class time for students to develop procedural skill and fluency in core operations (such as multiplication tables) so they can solve more complex math problems [N=1983]	2%	9%	20%	45%	25%
b. Having students compare and contrast different methods for solving a problem [N=1981]	1%	5%	19%	46%	29%
c. Listening/asking questions as students work to gauge student understanding [N=1959]	0%	2%	8%	33%	57%
d. Having students consider multiple representations in solving a problem (e.g., numbers, tables, graphs, pictures) [N=1983]	1%	2%	12%	41%	44%
e. Demonstrating for students how to most efficiently get a correct answer [N=1967]	1%	3%	16%	40%	40%
f. Having students explain and justify their method for solving a problem [N=1974]	0%	2%	10%	35%	54%
g. Using rigorous problems to prompt students' engagement and thinking about the math content of a lesson [N=1981]	1%	4%	17%	47%	31%
h. Encouraging students to build on and explain each other's ideas [N=1974]	1%	5%	19%	42%	34%
i. Having students present their solution strategies to the rest of the class [N=1967]	1%	5%	18%	43%	33%
j. Summarizing mathematics lessons by referencing student work and student discussions [N=1983]	2%	8%	24%	41%	24%
k. Helping students use math language appropriately when communicating about math [N=1979]	0%	2%	10%	36%	52%

19. To what extent do you disagree or agree with each of the following statements?	Strongly disagree	Disagree	Agree	Strongly agree
a. My site administrators are able to speak in detail about their understanding of the CCSS-M [N=1970]	6%	16%	58%	19%
b. My site administrators know what is going on in my mathematics classroom [N=1975]	7%	18%	58%	17%
c. My site administrators are well-prepared to be instructional leaders in support of the CCSS-M [N=1961]	8%	22%	52%	18%
d. My site administrators and I share similar ideas about what CCSS-aligned mathematics instruction should look like [N=1952]	5%	14%	63%	18%

Curriculum, instruction, and teacher decision-making

20. Which best describes the mathematics instructional materials students most frequently use in your class? [N=1968]

- ☐ One commercially-published textbook or program most of the time – 34%
- ☐ Multiple commercially-published textbooks/programs most of the time – 16%
- ☐ Non-commercially-published instructional materials most of the time – 16% (Answer question number 20.1.)
- ☐ A roughly equal combination of commercially-published textbooks/programs and non-commercially-published instructional materials – 34% (Answer question number 20.1.)

20.1 Please list the three (3) sources you use the most to obtain these instructional materials.

1.

2.

3.

21. Which of the following approaches do you use to determine whether instructional materials are aligned to the CCSS-M? *(Check all that apply.)* [N=2148]

- ☐ I get materials from repositories that provide resources which authorities on the CCSS-M have deemed to be aligned – 59%
- ☐ I use rubrics developed by authorities on CCSS-M to gauge alignment – 30%
- ☐ I ask curriculum coordinators, instructional coaches, or content specialists from the district office – 27%
- ☐ I ask curriculum coordinators, instructional coaches, or content specialists based at my school – 21%
- ☐ I ask administrators at my school – 11%
- ☐ I ask other teachers at my school – 45%
- ☐ I have not tried to determine whether curricular materials are aligned to the CCSS-M – 5%
- ☐ Other – 10% (Answer question number 21.1.)

21.1 What other approaches have you used to determine whether instructional materials are aligned to the CCSS-M?

22. In a typical week of math instruction, how many of your lessons do you...	None of my lessons	Some of my lessons	Half of my lessons	Most of my lessons	All of my lessons
a. ...plan using supplemental materials (i.e., materials not provided by the district)? [N=1962]	25%	32%	15%	20%	8%
b. ...teach using supplemental materials (i.e., materials not provided by the district)? [N=1946]	21%	35%	17%	19%	8%

22.1 Please list the one or two supplemental materials you find most useful for planning.

22.2 Please list the one or two supplemental materials you find most useful for teaching.

23. To what extent do you disagree or agree with each of the following statements?	Strongly disagree	Disagree	Agree	Strongly agree
a. I am revising my math instruction to align with the CCSS-M [N=1911]	3%	10%	59%	29%
b. I have a solid understanding of the scope and sequence for my school's mathematics curriculum at my grade level [N=1944]	1%	9%	60%	29%
c. I have a solid understanding of the scope and sequence for my school's mathematics curriculum across grade levels [N=1937]	4%	38%	48%	10%
d. I have a solid understanding of my principal's expectations for providing access to CCSS-M instruction to diverse learners (students with disabilities, English learners, etc.) [N=1939]	4%	17%	60%	20%
e. Teachers at my school share the same expectations for providing diverse learners (students with disabilities, English learners, etc.) access to CCSS-M instruction [N=1940]	4%	19%	60%	18%
f. My school provides me with the resources I need to align my instruction with the CCSS-M [N=1939]	5%	18%	61%	16%
g. Our school is revising mathematics instruction to align with the CCSS-M [N=1911]	4%	16%	61%	19%
h. Teachers at my school are trained to provide students with disabilities access to the CCSS-M [N=1925]	9%	36%	46%	9%
i. Teachers at my school are trained to provide English learners access to the CCSS-M [N=1939]	4%	22%	58%	16%

23.1 a. Why do you disagree? [N=216]

- ☐ Because I have not yet begun to align my math instruction with the CCSS-M – 17%
- ☐ Because I have already aligned my math instruction with the CCSS-M – 82%

23.2 g. Why do you disagree? [N=358]

- ☐ Because our school has not yet begun to revise math instruction to align with the CCSS-M – 42%
- ☐ Because our school has already revised math instruction to align with the CCSS-M – 58%

To what extent do you disagree or agree with each of the following?

24. I have spent more time this year than in prior years collaborating with teachers on...	Strongly disagree	Disagree	Agree	Strongly agree
a. ...selecting content, topics, and skills to be taught [N=1848]	6%	35%	45%	15%
b. ...selecting instructional materials [N=1849]	6%	37%	42%	14%
c. ...selecting teaching techniques [N=1844]	5%	29%	50%	16%
d. ...selecting assessment techniques to inform my instruction [N=1847]	5%	29%	49%	17%
e. ...my own professional growth and development [N=1847]	5%	28%	48%	18%

25. During this school year, how often did you participate in a post-observation conference where you received coaching or feedback on the alignment of your observed instruction with the CCSS-M? [N=1945]

- ☐ Never – 46%
- ☐ 1-2 times – 41% (Answer question number 25.1.)
- ☐ 3-4 times – 9% (Answer question number 25.1.)
- ☐ More than 4 times – 4% (Answer question number 25.1.)

25.1 How useful was the coaching or feedback you received? [N=1050]

- ☐ Not at all useful – 4%
- ☐ Somewhat useful – 31%
- ☐ Useful – 44%
- ☐ Very useful – 22%

26. To what extent do you disagree or agree with each of the following statements?	Strongly disagree	Disagree	Agree	Strongly agree
a. I feel well-prepared to support my students to achieve proficiency in the CCSS-M [N=1947]	1%	15%	64%	20%
b. I have adequate mathematics content knowledge to teach the CCSS-M [N=1946]	1%	7%	62%	31%
c. The CCSS-M is having a positive effect on my mathematics teaching [N=1930]	2%	15%	60%	23%
d. My instruction supports students' use of the Standards for Mathematical Practice [N=1946]	1%	6%	69%	25%

27. To effectively implement the CCSS in mathematics, I need support mostly in: *(Check all that apply.)* [N=2148]

- ☐ Gaining a firm understanding of the CCSS-M content standards – 17%
- ☐ Gaining a firm understanding of the Standards for Mathematical Practice outlined in the CCSS-M – 17%
- ☐ Gaining a firm understanding of how students' thinking of mathematics develops over time/grade level – 34%
- ☐ Aligning curriculum to the CCSS-M standards (both content and practice standards) – 22%
- ☐ Meeting the needs of all students – 53%
- ☐ Access to quality textbooks and instructional materials to teach the CCSS-M standards – 33%
- ☐ Allotting time to discuss and plan lessons with my colleagues – 47%
- ☐ Creating lesson plans that embody the CCSS-M content standards – 20%
- ☐ Creating lesson plans that embody the CCSS-M Standards for Mathematical Practice – 22%
- ☐ Monitoring student progress on mastering the CCSS-M standards – 28%
- ☐ Adapting my instruction to integrate the CCSS-M standards effectively – 21%
- ☐ Preparing students for the Smarter Balanced assessments (including interim assessments) – 33%
- ☐ Using Smarter Balanced assessment results to support my teaching and student learning – 24%
- ☐ Other (please specify): – 3%

28. Please describe the way the CCSS has changed how you teach mathematics to your students this year.

29. WestEd is planning on conducting teacher focus groups to collect more detailed information regarding the implementation of the CCSS-M in each of the MiC districts. Would you be interested in participating in a focus group? [N=1931]

- ☐ Yes – 31%
- ☐ No – 39%

Thank you for your time. This completes the survey!

Appendix F. Administrator Survey Results

Implementing the Common Core State Standards in Mathematics (CCSS-M)
Site Administrator Survey

1. I consent to participate in this survey.

- ☐ Yes (Go to Background Section.) [N=119]
- ☐ No (Go to "Thank You" Page.)

Background

2. In which school district are you currently employed? [N=119]

- ☐ Dinuba – 2%
- ☐ Elk Grove – 19%
- ☐ Garden Grove – 16%
- ☐ Long Beach – 14%
- ☐ Oakland – 12%
- ☐ Oceanside – 2%
- ☐ Sacramento City – 0%
- ☐ San Francisco – 11%
- ☐ Sanger – 7%
- ☐ Santa Ana – 18%

3. Select the type of school in which you work: [N=119]

- ☐ Elementary (K-5/K-6) – 67%
- ☐ Middle (6-8/7-8) – 24%
- ☐ Multi-grade (e.g., K-8/K-12) – 9%

4. Are you a site administrator in a school that serves students in any of grades K-8? [N=119]

- ☐ Yes – 100% (Go to question number 5.)
- ☐ No (Go to "Thank You" Page.)

5. Which best describes your *main* assignment at your school? [N=118]

- ☐ Principal – 79%
- ☐ Assistant principal – 20%
- ☐ Other (please specify): – 1%

6. How long have you...	0 (This is my first year)	1–2 years	3–5 years	6–10 years	11–15 years	16–20 years	Over 20 years
a. ...been in this district? [N=119]	3%	3%	8%	12%	18%	24%	34%
b. ...been at this school? [N=115]	20%	18%	38%	17%	2%	3%	2%
c. ...been in your current job role? [N=116]	15%	21%	25%	19%	14%	4%	3%

Skip pattern: if a respondent indicates a "0" to 6a., then the survey does not ask question 20.
"20. At my school, teachers have spent more time this year than in prior years collaborating on..."

7. Did you complete this survey (Implementing the Common Core State Standards in Mathematics Site Administrator Survey) last year? [N=118]

- ☐ Yes – 53%
- ☐ No – 47%

Professional learning opportunities

8. Approximately how much total time did you spend in each of the following kinds of *district or school mathematics-related professional learning activities* during the past 12 months?	No time	3 hours or less	4–10 hours	11–15 hours	16 hours or more
a. Consulting independently with other administrators [N=117]	9%	44%	26%	9%	13%
b. Consulting independently with external providers in their areas of expertise [N=117]	32%	38%	23%	3%	4%
c. Using other CCSS-M resources such as professional literature and websites [N=115]	13%	44%	30%	5%	7%
d. Visiting other schools [N=114]	33%	31%	21%	7%	8%
e. Participating in district-provided PD on the CCSS-M [N=116]	8%	22%	43%	14%	14%
f. Receiving one-on-one coaching or mentoring to change my practices to better support CCSS-M implementation [N=115]	42%	35%	16%	4%	3%
g. Reflecting with teachers on CCSS-M implementation after observing live classroom lessons [N=116]	5%	28%	34%	15%	18%
h. Participating in district-led efforts to systematically review SBAC data [N=117]	7%	56%	28%	5%	4%

Preparedness to enact the Common Core State Standards in Mathematics

Please rate the extent to which you are *prepared* to support implementation of the CCSS-M at your school on each of the following factors.

9. Communicating the need	Not at all	To a minimal extent	To a moderate extent	To a good extent	To a great extent
a. Convey what the CCSS-M are about to your school staff [N=114]	2%	11%	30%	46%	12%
b. Convey what the CCSS-M are about to parents and the community [N=113]	2%	19%	34%	36%	9%
c. Influence teachers' motivation to implement the CCSS-M [N=113]	1%	10%	24%	50%	16%
d. Clearly communicate to teachers the types of changes required by the CCSS-M (e.g., deeper content, Standards for Mathematical Practice) [N=114]	2%	11%	25%	44%	18%
e. Prioritize CCSS-M implementation [N=114]	0%	12%	25%	48%	15%

10. Supporting teacher change	Not at all	To a minimal extent	To a moderate extent	To a good extent	To a great extent
f. Plan effective professional learning for school staff to facilitate CCSS-M implementation [N=113]	1%	19%	35%	33%	13%
g. Provide effective instructional models for teachers to support CCSS-M implementation in the classroom [N=112]	3%	18%	34%	37%	9%
h. Access practical "how-to" guidance to support the necessary changes in instruction [N=113]	3%	22%	38%	27%	10%
i. Make high-quality professional development available to teachers [N=112]	3%	13%	29%	45%	10%
j. Allocate resources to support effective CCSS-M implementation [N=110]	2%	16%	24%	41%	17%
k. Ensure that instructional coaches can provide effective guidance on CCSS-M implementation [N=112]	5%	15%	21%	42%	17%

11. Integrating practices into the organization	Not at all	To a minimal extent	To a moderate extent	To a good extent	To a great extent
l. Align the school's curriculum and instructional focus [N=114]	1%	5%	25%	46%	23%
m. Evaluate teachers on CCSS-M implementation [N=114]	3%	6%	32%	42%	18%
n. Ensure that standards-aligned programs are in place to support students who struggle academically [N=114]	3%	8%	30%	43%	17%
o. Integrate the CCSS-M with programs serving English learners, special education students, or students in other subgroups [N=114]	3%	11%	38%	34%	15%

Steps taken by site administrators to support implementation of the CCSS-M

Please rate the extent to which you took the following *key actions* to support implementation of the CCSS-M at your school during the past 12 months.

12. Communicating the need	Not at all	To a minimal extent	To a moderate extent	To a good extent	To a great extent
a. Made CCSS-M implementation a priority for school improvement [N=111]	2%	14%	27%	33%	24%
b. Created a leadership plan, objectives, and a timeline for CCSS-M implementation [N=112]	5%	15%	30%	32%	17%
c. Implemented a leadership plan, objectives, and a timeline for CCSS-M implementation [N=112]	5%	20%	29%	31%	15%
d. Helped my parents and local community develop a clear understanding of how the CCSS-M will change teaching and learning [N=112]	4%	30%	37%	25%	4%

13. Supporting teacher change	Not at all	To a minimal extent	To a moderate extent	To a good extent	To a great extent
e. Convened teacher grade-level teams, professional learning communities (PLCs), or other teacher teams to support CCSS-M implementation [N=110]	1%	11%	22%	38%	28%
f. Sent school staff to professional development sessions on the CCSS-M [N=112]	5%	13%	22%	36%	23%
g. Modified our mathematics curriculum to align with the CCSS-M [N=111]	4%	11%	19%	41%	26%
h. Created short-term and long-term (3 years or longer) plans for continuous, connected, and job-embedded teacher professional development [N=112]	4%	11%	19%	41%	26%

14. Integrating practices into the organization	Not at all	To a minimal extent	To a moderate extent	To a good extent	To a great extent
i. Gathered evidence (e.g., through lesson plans, walk-throughs, or classroom observations) to assess how effective teachers are at implementing the CCSS-M [N=111]	4%	14%	30%	36%	17%
j. Cultivated a cadre of teacher leaders to move CCSS-M implementation forward [N=112]	5%	19%	29%	33%	14%

15. How often do your teachers typically use the following instructional practices to teach the Common Core State Standards during their mathematics lessons?	Never	Rarely (e.g., a few times a year)	Sometimes (e.g., once or twice a month)	Often (e.g., once or twice a week)	All or almost all mathematics lessons
a. Structuring class time for students to develop procedural skill and fluency in core operations (such as multiplication tables) so they can solve more complex math problems [N=109]	1%	4%	12%	67%	17%
b. Having students compare and contrast different methods for solving a problem [N=109]	1%	4%	10%	51%	34%
c. Listening/asking questions as students work to gauge student understanding [N=108]	1%	3%	7%	42%	47%
d. Having students consider multiple representations in solving a problem (e.g., numbers, tables, graphs, pictures) [N=109]	1%	2%	6%	52%	39%
e. Having students explain and justify their method for solving a problem [N=108]	0%	4%	5%	44%	48%
f. Using rigorous problems to prompt students' engagement and thinking about the math content of a lesson [N=109]	0%	4%	17%	47%	33%
g. Encouraging students to build on and explain each other's ideas [N=109]	0%	4%	18%	47%	31%
h. Summarizing mathematics lessons by referencing student work and student discussions [N=109]	1%	9%	18%	53%	18%

Curriculum, instruction, and decision-making

16. To what extent do you disagree or agree with each of the following statements?	Strongly disagree	Disagree	Agree	Strongly agree
a. District-funded professional development opportunities develop my teachers' knowledge of the mathematics content they need to implement the CCSS-M [N=108]	4%	7%	53%	36%
b. District-funded professional development opportunities develop my teachers' knowledge of the instructional practices they need to implement the CCSS-M [N=108]	3%	6%	56%	36%
c. Our district has invested in helping teachers learn how to reliably score student work to determine alignment with the CCSS-M [N=108]	6%	24%	48%	22%
d. I feel well prepared to be an instructional leader in support of the CCSS-M [N=107]	2%	19%	61%	19%
e. I have a good understanding of what professional development my teachers need to implement the CCSS-M [N=108]	1%	13%	61%	25%
f. I have a good understanding of teachers' course content and instructional approaches necessary to evaluate their teaching [N=108]	1%	9%	67%	23%

17. What knowledge of math content and/or instructional practices do your teachers still need to develop in order to implement the CCSS-M?

18. Which best describes the mathematics instructional materials students most frequently use at this school? [N=109]

- ☐ One commercially-published textbook or program most of the time – 47%
- ☐ Multiple commercially-published textbooks/programs most of the time – 9%
- ☐ Non-commercially-published instructional materials most of the time – 19% (Answer question number 18.1.)
- ☐ A roughly equal combination of commercially-published textbooks/programs and non-commercially-published instructional materials – 25% (Answer question number 18.1.)

18.1 Please list the three (3) sources your teachers use the most to obtain these instructional materials.

1.

2.

3.

19. To what extent do you disagree or agree with each of the following statements?	Strongly disagree	Disagree	Agree	Strongly agree
a. I have a solid understanding of the scope and sequence for our district's mathematics curriculum [N=109]	4%	17%	65%	15%
b. I regularly monitor the quality of math instruction in my school [N=108]	0%	10%	71%	19%
c. Our district provides all the resources teachers need to align their mathematics instruction with the CCSS-M [N=108]	6%	16%	56%	22%
d. Our district has an effective system for evaluating the quality of mathematics instruction [N=107]	3%	24%	55%	18%
e. Our district has an effective system for providing feedback to my mathematics teachers about their instruction [N=108]	3%	34%	47%	16%
f. Our school has the data we need to carefully monitor student progress on the CCSS-M [N=109]	7%	20%	52%	20%
g. Our district has an effective system for analyzing and using collected performance data to inform CCSS-M implementation [N=108]	6%	23%	55%	17%
h. Teachers at my school are trained to ensure that students with disabilities have access to the CCSS-M [N=109]	5%	34%	46%	16%
i. Teachers at my school are trained to ensure that English learners have access to the CCSS-M [N=109]	4%	22%	52%	22%
j. Teachers at this school and I share similar ideas about what CCSS-aligned mathematics instruction looks like [N=109]	2%	15%	67%	17%
k. Teachers at this school are able to speak in detail about their understanding of the CCSS-M [N=108]	1%	22%	60%	17%
l. I have more responsibility for my teachers' professional growth and development this year than in prior years [N=108]	4%	25%	56%	15%
m. I have adequate knowledge about mathematics content to support CCSS-M implementation [N=109]	1%	14%	64%	21%
n. The CCSS-M is having a positive effect on students' mathematics learning at my school [N=109]	1%	6%	70%	23%

To what extent do you disagree or agree with each of the following?

20. At my school, teachers have spent more time this year than in prior years collaborating on...	Strongly disagree	Disagree	Agree	Strongly agree
a. ...selecting content, topics, and skills to be taught [N=106]	1%	32%	51%	16%
b. ...selecting instructional materials [N=107]	3%	38%	47%	12%
c. ...selecting teaching strategies [N=107]	0%	15%	64%	22%
d. ...selecting assessment techniques to inform instruction [N=107]	2%	27%	55%	16%
e. ...their own professional growth and development [N=107]	1%	22%	63%	15%

21. To effectively support implementation of the CCSS-M at my school, the five things I need most are… (Check the five areas that apply.) [N=119]

- ☐ A firmer understanding of the CCSS-M content standards – 19%
- ☐ A firmer understanding of the CCSS-M Standards for Mathematical Practice – 25%
- ☐ A firmer understanding of how students' thinking of mathematics develops over time/grade level – 33%
- ☐ Curriculum that is aligned to the CCSS-M standards (both content and practice standards) – 29%
- ☐ Higher quality textbooks and instructional materials for teaching the CCSS-M standards – 24%
- ☐ More opportunities for teacher collaboration – 47% (Answer question number 21.1.)
- ☐ More professional development for teachers – 45% (Answer question number 21.2.)
- ☐ More time to observe teachers teaching in their classroom – 43%
- ☐ More training on facilitating school leadership teams – 18%
- ☐ More time to discuss CCSS-M with other administrators – 26%
- ☐ More effective strategies for teaching special needs students – 28%
- ☐ More effective strategies for teaching ELL students – 29%
- ☐ More information on how to use Smarter Balanced assessment results to support teaching and student learning – 46%
- ☐ Better data on instructional effectiveness – 40%
- ☐ Other (please specify): – 3%

21.1 Please specify what you mean by more opportunities for teacher collaboration.

21.2 Please specify what you mean by more professional development for teachers.

22. WestEd is planning on conducting site administrator focus groups to collect more detailed information regarding the implementation of the CCSS-M in each of the MiC districts. Would you be interested in participating in a focus group? [N=108]

- ☐ Yes – 43%
- ☐ No – 57%

Thank you for your time. This completes the survey!

References

Ball, D. L., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? *Journal of Teacher Education*, *59*(5), 389–407. https://doi.org/10.1177/0022487108324554

Bay-Williams, J., Duffett, A., & Griffith, D. (2016). *Common Core math in the K-8 classroom: Results from a national teacher survey.* Washington D.C.: Thomas B. Fordham Institute. Retrieved from https://eric.ed.gov/?id=ED570138

Bryk, A. S., Gomez, L. M., Grunow, A., & LeMahieu, P. G. (2015). *Learning to improve: How America's schools can get better at getting better.* Cambridge, MA: Harvard Education Press.

Bugler, D., Marple, S., Burr, E., Chen-Gaddini, M., & Finkelstein, N. (2017). *How teachers judge the quality of instructional materials: Selecting instructional materials.* San Francisco, CA: WestEd.

Chingos, M. M., & Whitehurst, G. J. (2012). *Choosing blindly: Instructional materials, teacher effectiveness, and the common core.* Washington, DC: Brookings Institution. Retrieved from https://eric.ed.gov/?id=ED530985

Cohen, D. K. (1990). A revolution in one classroom: The case of Mrs. Oublier. *Educational Evaluation and Policy Analysis*, *12*(3), 311–329.

Davis, E. A., & Krajcik, J. S. (2005). Designing educative curriculum materials to promote teacher learning. *Educational Researcher, 34*(3), 3–14.

Dewey, J. (1929). *The quest for certainty.* Oxford, England: Minton, Balch. Retrieved from http://psycnet.apa.org/psycinfo/1930-00008-000

EdReports staff. (2017a). Eureka Math, Grades K-8. Retrieved July 11, 2017, from http://www.edreports.org/math/reports/series/eureka-math.html

EdReports staff. (2017b). Houghton Mifflin Harcourt GO MATH, Grades K-8. Retrieved June 30, 2017, from http://www.edreports.org/math/reports/series/go-math.html

Hiebert, J., & Stigler, J. W. (2017). Teaching versus teachers as a lever for change: Comparing a Japanese and a U.S. perspective on improving instruction. *Educational Researcher*, *46*(4), 169–176.

Kane, T. J., Owens, A. M., Marinell, W. H., Thal, D. R., & Staiger, D. O. (2016). *Teaching higher: Educators' perspectives on Common Core implementation.* Cambridge, MA: Harvard University Center for Education Policy Research.

Monahan, R. (2015, March 31). *How Common Core is killing the textbook.* Retrieved July 25, 2017, from http://hechingerreport.org/how-common-core-is-killing-the-textbook/

National Governors Association Center for Best Practices, & Council of Chief State School Officers. (2010). *Common Core State Standards for Mathematics.* Washington D.C.: National Governors Association Center for Best Practices, Council of Chief State School Officers.

National Research Council. (2001). *Adding it up: Helping children learn mathematics.* Washington, DC: National Academies Press.

O'Day, J. A., & Smith, M. S. (2016). Quality and equality in American education: Systemic problems, systemic solutions. In I. Kirsch & H. Braun (Eds.), *The dynamics of opportunity in America* (pp. 299–360). New York, NY: Springer Publishing Company. Retrieved from https://www.carnegiefoundation.org/wp-content/uploads/2016/02/ODay-Smith_Systemic_reform.pdf

Opfer, V. D., Kaufman, J. H., & Thompson, L. E. (2016). *Implementation of K–12 State Standards for Mathematics and English Language Arts and Literacy*. Santa Monica, CA: RAND Corporation. Retrieved from http://www.rand.org/pubs/research_reports/RR1529.html

Polikoff, M. S. (2015). How well aligned are textbooks to the Common Core Standards in mathematics? *American Educational Research Journal*, *52*(6), 1185–1211.

Remillard, J. T. (2005). Examining key concepts in research on teachers' use of mathematics curricula. *Review of Educational Research*, *75*(2), 211–246.

Remillard, J. T., & Bryans, M. B. (2004). Teachers' orientations toward mathematics curriculum materials: Implications for teacher learning. *Journal for Research in Mathematics Education*, 352–388.

Remillard, J. T., & Heck, D. J. (2014). Conceptualizing the curriculum enactment process in mathematics education. *ZDM*, *46*(5), 705–718.

Seago, N., Perry, R., Reade, F., & Carroll, C. (2016). *Bringing the Common Core State Standards to life through site-located teacher learning structures* (No. 5). San Francisco, CA: WestEd.

Smith, M. S., & O'Day, J. (1990). Systemic school reform. *Journal of Education Policy*, *5*(5), 233–267.