INVERNESS RESEARCH

BRINGING THE MAP CLASSROOM CHALLENGES TO SCALE

A PROMISING PARTNERSHIP STRATEGY

The collaboration among three distinct but closely aligned groups offers a promising implementation strategy for bringing MAP Classroom Challenges to scale. It also serves as an illustration of how innovative curricular materials such as the Classroom Challenges can play a pivotal role in furthering the Bill & Melinda Gates Foundation's goal of having 80% of low-income and minority students ready for college by 2025.

In July 2013, Inverness Research conducted a survey of teachers and administrators in Colorado and Louisiana who were participating in professional development centered on the MAP Classroom Challenges and provided by the Mathematics Design Collaborative (MDC). These survey results, bolstered by interviews with key project leaders, show the efficacy of a particular large-scale implementation strategy aimed at helping teachers understand and practice rigorous new state standards, similar to and including the Common Core State Standards for Mathematics (CCSSM).

What is MAP?

The Mathematics Assessment Project (MAP) is a collaborative effort between teams of mathematics educators from the Shell Center for Mathematical Education at the University of Nottingham and from the University of California, Berkeley. The goal of the Mathematics Assessment Project is to design and develop well-engineered, high-quality assessment tools to support teachers and schools in implementing the Common Core State Standards for Mathematics (CCSSM).

Placing the eight Standards for Mathematical Practice at the core, the Mathematics Assessment Project has developed 100 Classroom Challenges (CCs) which are available to teachers for download, free of charge, for non-commercial usage, from the MAP website at http://map.mathshell.org.

Who were the partners?

Mathematics Assessment Project

MAP developed the Classroom Challenges, also known as formative assessment lessons (FALs), as a new, innovative set of curricular materials, the product of a five-year process funded by the Gates Foundation. The CCs are unique hybrids that include elements of mathematical investigations, lessons, assessments, and cooperative group discussions. They are of two types: Concept Development Lessons and Problem Solving Lessons. Concept Development lessons focus on assessing and developing conceptual understanding, while Problem Solving Lessons focus on applying previously learned mathematics to non-routine problems. Both types are anchored in the content described in the CCSSM and centered on the eight Standards for Mathematical Practice that pose major new challenges to teachers and students.

Mathematics Design Collaborative

The Mathematics Design Collaborative (MDC), also funded by the Bill & Melinda Gates Foundation, provides teachers and administrators in selected districts with professional development and

instructional tools aimed at helping their teachers understand and implement the CCSSM. Specifically, the MDC introduces teachers to MAP's Classroom Challenges. The MDC continues its support as teachers use the CCs to engage their students in a productive intellectual struggle aimed at building students' fluency with procedural skills and deepening their mathematical reasoning and conceptual understanding. Math Solutions[1] received an MDC grant from the Gates Foundation to support work in Colorado and Louisiana. Lisa Bush, the Director of Professional Learning at Math Solutions, became the project manager for the collaborative effort.

School Districts in Colorado and Louisiana

Both Colorado and Louisiana, as early adopters of the CCSS, received a three-year round of funding from the Gates Foundation to initiate and support educational reform in their states. As part of this larger thrust, teachers and administrators from approximately ten school districts in Colorado and eight school districts in Louisiana participated in professional development through the MDC, in which the MAP Classroom Challenges served as the centerpiece and teachers were expected to implement them in their local settings.

What were the goals of the partnership?

Project Manager Lisa Bush explains:

The intent is to help teachers implement the Common Core State Standards and to shift classroom instruction to align with extensive research into math instructional practices that we know lead to a significant increase in student learning. In the Math Design Collaborative we focus the professional experiences on the Classroom Challenges that were developed by MAP. The advantage is that the CCs are based in widely accepted research about best teaching practices. We are able to showcase them as examples of high-quality lesson design. Teachers recognize that after using CCs in their classrooms, and they are then able to bring those elements into their daily instruction. So the goal of the project really is to use the Classroom Challenge model to influence daily instructional practices, because those have been found to significantly impact and increase student learning—not only learning for today, but long-term learning as well. Research shows that students retain what they have learned over time when these strategies are used—that really is our goal.

What was the theory of action?

Stated in the simplest terms, each of the three partners—MAP, MDC, and Colorado and Louisiana school districts—aimed to contribute a necessary, but alone not sufficient element to an overall systemic effort to shift away from traditional teaching practices toward those exemplifying the eight Standards for Mathematical Practice.

- **MAP's Classroom Challenges** provided the instructional tools and materials that instantiated the new standards as well as the common focal point of the professional development design.
- **The MDC** provided the professional learning and supports to teachers and administrators, giving them the experiences necessary to use the CC tools effectively.
- The role of **the districts** in effecting success was to provide vision, articulation, and commitment for a new way of thinking about and delivering mathematics instruction at all levels of the system,

[1] An organization dedicated to the improvement of K-8 math education, Math Solutions was founded by Marilyn Burns in the mid-1980s. It makes available more than 20 professional development resources for teachers and administrators.

beginning at the top with the superintendent, and including curriculum and instruction leaders, principals, teachers, parents, and students.

Was the combined effort successful?

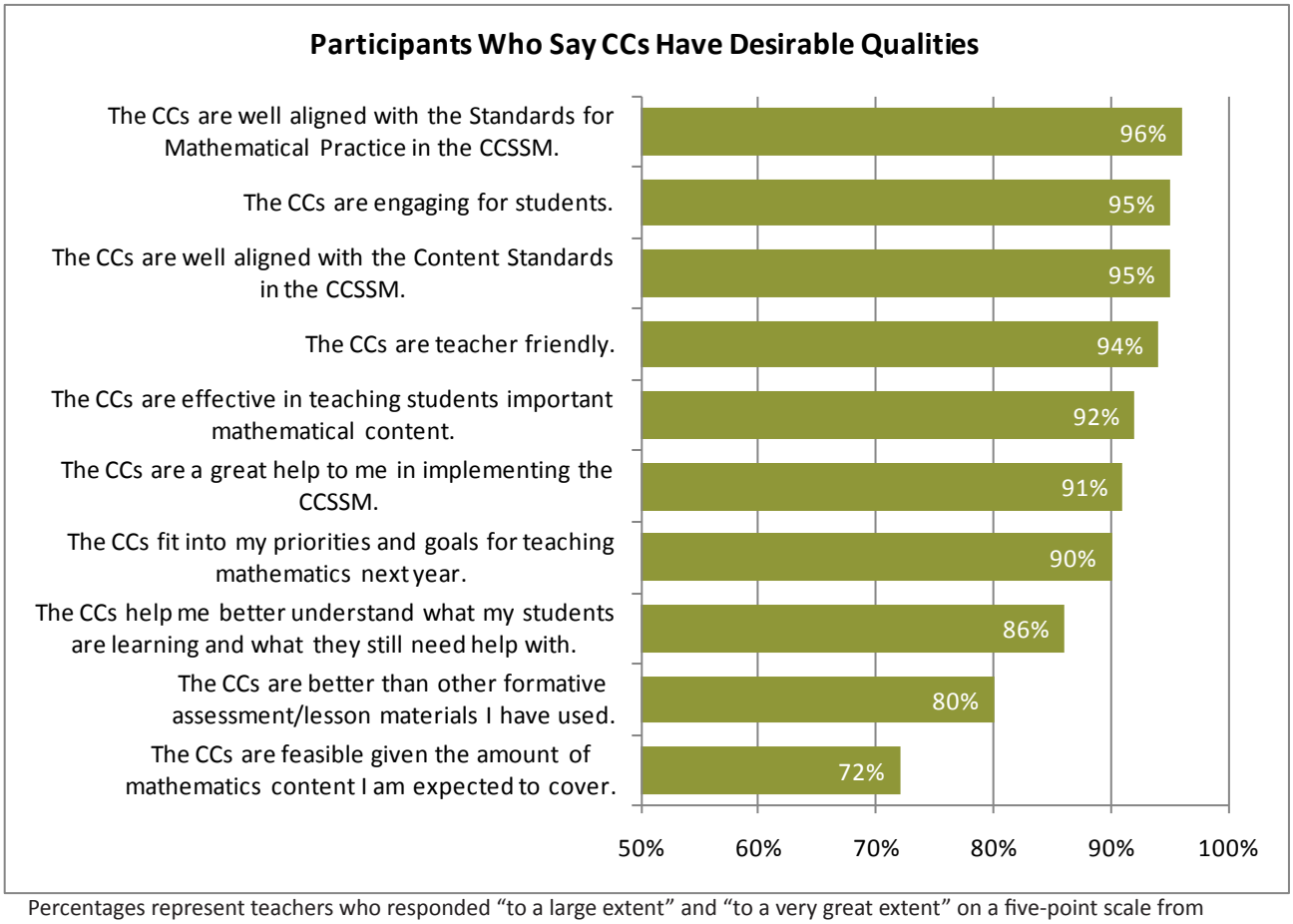
Results of the July 2013 survey administered by Inverness Research, coupled with interviews with project leaders, provide compelling evidence that in many of the Colorado and Louisiana districts that participated in the MDC programs, the collaborative effort produced the critical elements necessary to shift mathematics instruction. Key tenets of the theory of action were corroborated, in particular the efficacy of the combined contributions of each of the three partners: high-quality innovative curricular materials, effective professional development, and strong district support for instructional change.

How was the evidence collected?

Inverness invited the 223 teachers and 62 administrators who attended the MDC 2013 Summer Institutes to take an online survey. Surveys were submitted by 177 participants for an overall response rate of 62%, with little difference between Colorado and Louisiana response rates.

The Efficacy of the Innovative Curricular Materials

As shown in the bar graph below, a very large majority of teachers and administrators in both Colorado and Louisiana say the Classroom Challenges have many of the desirable qualities that an innovative curriculum aimed at supporting teachers in implementing the CCSSM should have.



Percentages represent teachers who responded "to a large extent" and "to a very great extent" on a five-point scale from "not at all" to "a very great extent."

I just love the mathematical conversations the lessons invoke in my students. Their engagement is great. [2]

Colorado High School Teacher

All of the materials and resources are included with each Classroom Challenge, and that makes it so easy to teach the lessons the way they were intended to be taught.

Louisiana Middle School Teacher

I have seen students gain confidence in their abilities after working through Classroom Challenges. I have also seen more positive attitudes towards math and more excitement. Students are more willing to persevere, and their natural need to figure out something is being supported.

Colorado High School Teacher

I think the Classroom Challenges are wonderful. They allow students to enter into the lesson at different points of access and build on their knowledge from there. They allow students to make sense of the problem. This affirms the idea of multiple approaches to problem-solving.

Colorado District Administrator

I was surprised at how readily I could integrate the lessons into the comprehensive curriculum we use.

Louisiana Middle School Teacher

The Classroom Challenges are an excellent assessment tool for capturing what a student knows and then supporting the teacher in assisting in those areas in which a student may be weak.

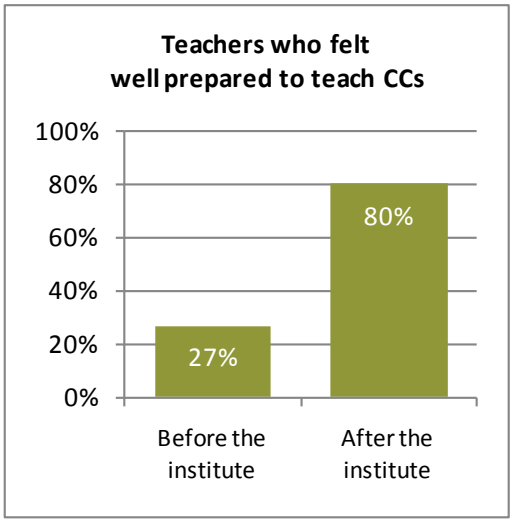
Louisiana District Administrator

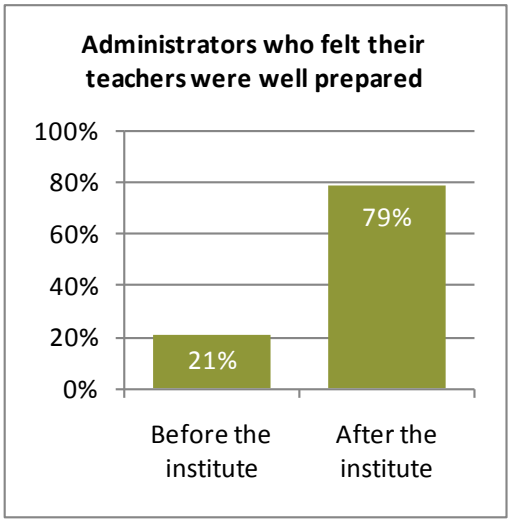
The Efficacy of the Professional Development

- **The professional development was high quality.**

  From 95% to 100% of survey respondents rated the quality and value of the summer institute as good or excellent.

- **The professional development made a dramatic difference in teachers feeling prepared to teach the Classroom Challenges and in administrators feeling confident that teachers were prepared.**





[2] Quotes are taken directly from survey comments and edited for grammatical correctness and readability. The intent and meaning have not been altered.

- **The professional development motivated teachers to plan to use the Classroom Challenges.**

  After attending the professional development, a large majority of participants (86%) "definitely" planned to use the CCs in 2013-14. Almost all others (13%) said they would "probably" use the CCs.

> ***What was valuable about the professional development was seeing and experiencing more tasks! I was much more apt to use them in my class this year because I felt so comfortable with them.***
>
> Louisiana Middle School Teacher

> ***I enjoyed being a "student" very much, putting myself in the shoes of my students. Through doing that, learning the strategies of CCs was very relevant and easier for me to implement in the classroom.***
>
> Colorado High School Teacher

> ***The information and activities aligned very well with the Classroom Challenges. I was able to use the strategies and theories from MDC to apply to my teaching of the CCs. I am very impressed!***
>
> Colorado Middle School Teacher

> ***The most useful aspect of the summer institute was actually participating and performing the Classroom Challenges myself. I believe this helped my understanding of students' common misconceptions.***
>
> Louisiana Middle School Teacher

> ***The discussion with the professionals who had used the Classroom Challenges the preceding school year was so valuable to gain insight into their difficulties and successes. The opportunity to actually plan and teach one of the lessons gave me confidence that I could be successful in my own classroom and that I would know how to negotiate my way through the lesson to give the students the maximum learning opportunity the CCs afford.***
>
> Colorado High School Teacher

The Efficacy of the Support from the District

Project Manager Lisa Bush explains:

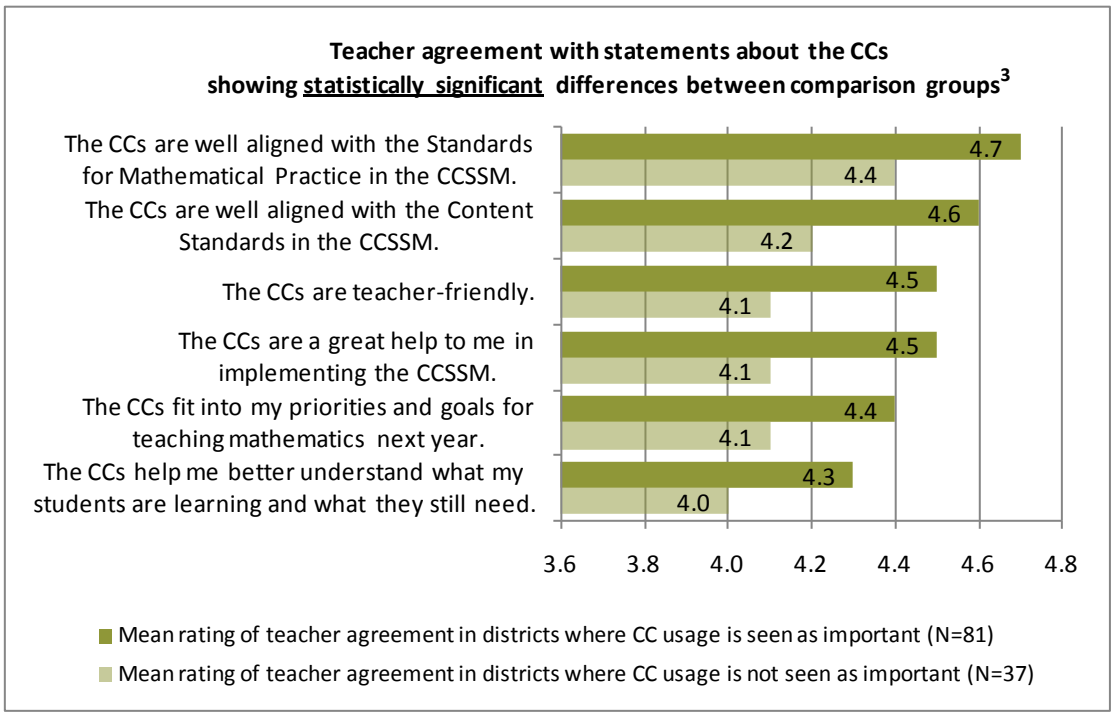
The districts where we have had significant success are the places where all the different levels of staff are involved. When that happens it lets everyone in the system know this is very, very important, and to pay attention to it. In particular, a superintendent's active participation influences what the district comes to expect from students in math classrooms and from teachers' instruction... so the view of what math teaching and learning should look like has changed. The same is true for the principal's knowledge and support... in order to get daily shift in practice, the principal and other school leaders need to be involved.

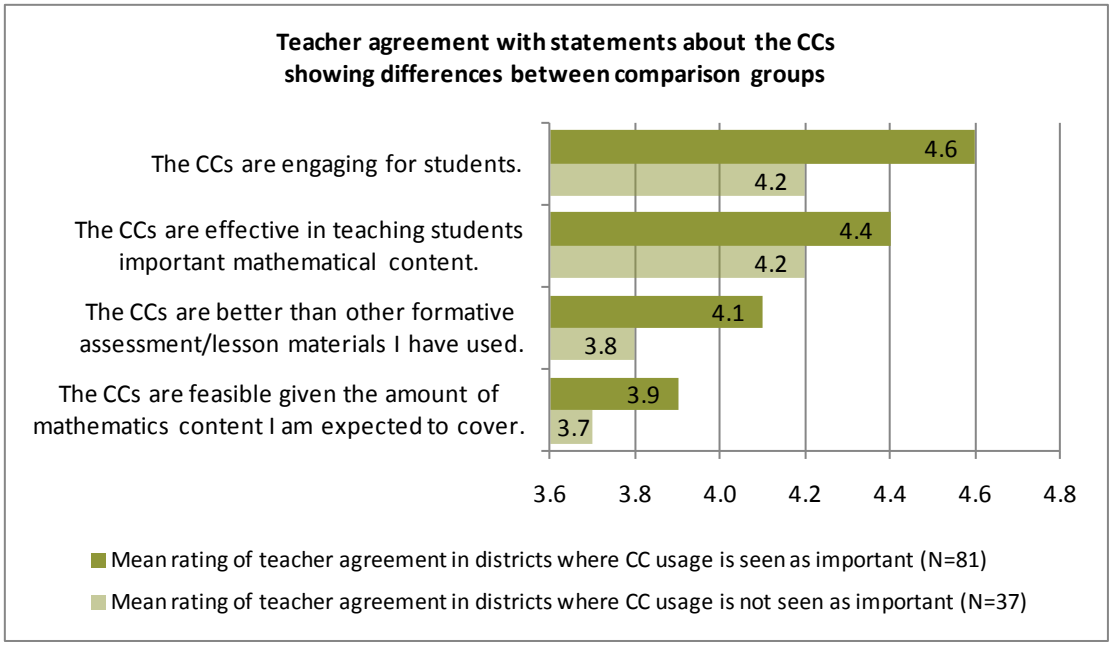
To understand better the qualities of district context that support CC usage, Inverness created a "district context score" for each CC user by adding up their responses (ratings) to five key questions for a total possible score of 25 per survey respondent. The five survey questions focused on:

1. the extent and consistency of the district's message about math teaching
2. the importance of CCs' use to district
3. the CCs' fit with other district priorities
4. the district's support and capacity for providing professional development
5. the level of focused effort for CCs' use districtwide.

This district context score revealed numerous differences in beliefs and attitudes about the CCs between teachers in districts where CCs are important to the district and those in districts where they are not. In particular, in districts where the message about mathematics instruction is strong and consistent, where CCs are important to and aligned with other priorities, where capacity and support for professional development is high, and where the implementation effort is intense and widespread, teachers' perspectives on the Classroom Challenges are considerably more positive than in districts that do not provide a supportive context.

The graphs below show the effect of district context on teachers' perspectives.





[3] The two sets of data were compared using a standard T-Test, which compares the different average values. In our comparison, the difference in averages was deemed "statistically significant" if there was a 5% or less probability of that difference occurring in 2 randomly selected sets of data. Ratings were made on a five-point scale where 1 = "not at all" and 5 = "to a great extent."

Most importantly, not only is a favorable district context important to creating positive teacher attitudes about instructional change, but it also seems to be associated with higher usage. According to the survey data, 67% of high-usage teachers are in districts where the measure of the favorability of context is high.

> ***Teachers know the benefits of the CCs and the great assistance that is given to accomplish the rigors of Common Core, therefore the expectation is that they will continue to implement the CCs in their lessons.***
>
> Louisiana District Administrator

> ***The Classroom Challenges help us implement the true Common Core practices and standards so that we may provide our students with a higher quality math education.***
>
> Louisiana Middle School Teacher

> ***As a participant of this inservice we are asked to use Classroom Challenges. They have been aligned with our pacing guides to make them easy to find and to know where they belong in our pacing.***
>
> Louisiana Middle School Teacher

> ***I think it is very important for the MDC to work with getting administrator buy-in. CCs will not continue to be used if every administrator in the Colorado Legacy Foundation is not making it an expectation that their teachers will use them.***
>
> Colorado High School Teacher

> ***The CCs are a very good start at addressing a much bigger picture—formative teaching. We are working to prevent CCs from becoming a singular event that happens at a given point in time, but instead to be viewed as a part of a process that informs teachers on a continuous cycle as to what their students understand, can do, and can transport and apply to new and unique situations.***
>
> Colorado Math Coach

What can we conclude?

Our study shows that the collaboration among the three partners—MAP's Classroom Challenges, the Mathematics Design Collaborative, and select districts in Colorado and Louisiana—provided effective supports in three key areas necessary to helping teachers shift instructional practices. Study data shows:

The MAP Classroom Challenges are

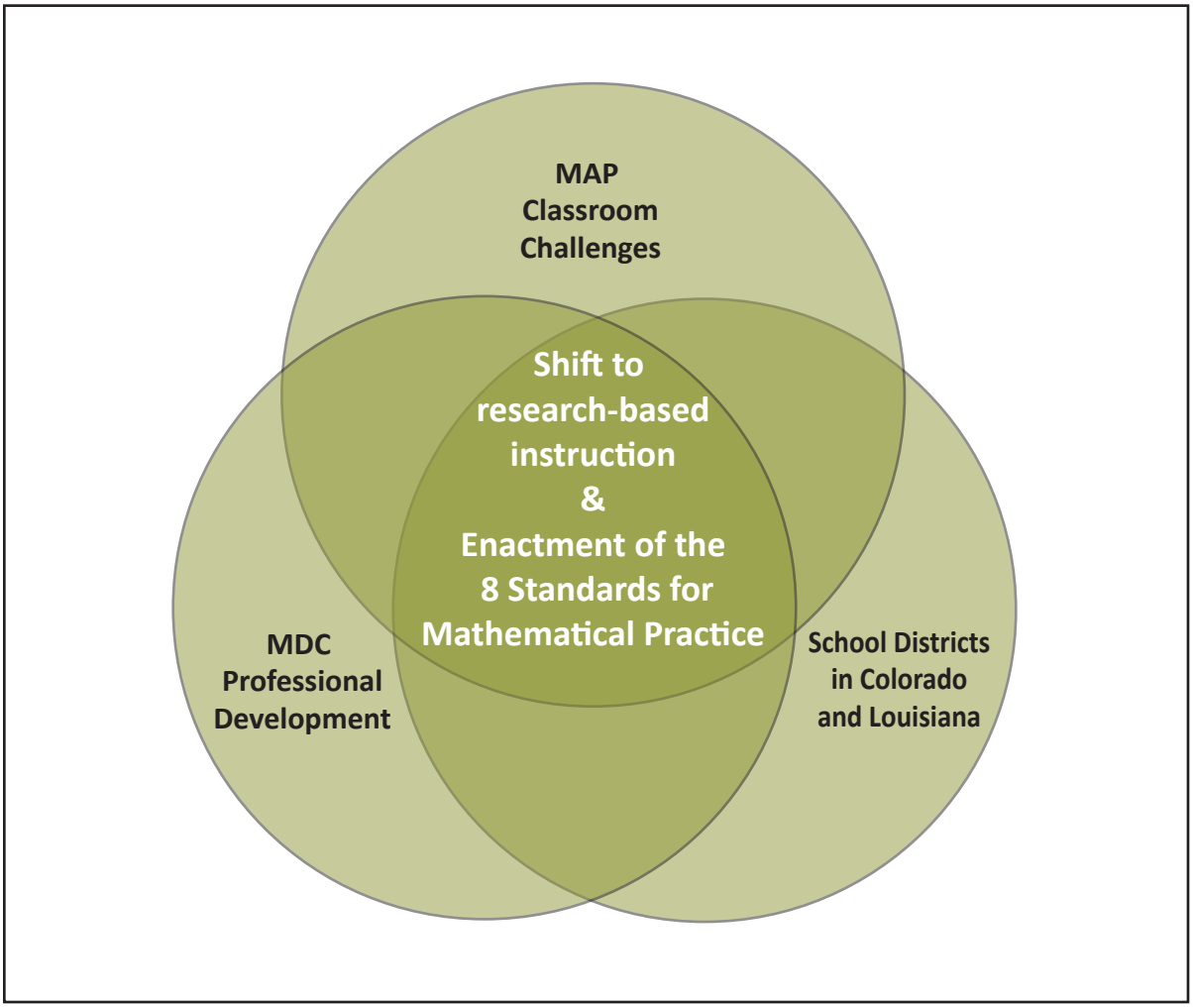
- well aligned with the CCSSM
- teacher-friendly
- engaging for students
- useful to teachers in illuminating their students' thinking and their level of knowledge vis-à-vis the standards.

The Mathematics Design Collaborative professional development is

- high quality
- helpful to teachers, making them feel prepared to teach the Classroom Challenges
- motivating to teachers, making them eager to use the Classroom Challenges.

Where District support was strongest

- teacher attitudes about adopting the CCSSM and innovative curriculum were most positive
- teacher usage of the innovative curriculum, Classroom Challenges, was highest.



In summary, survey data shows that the Gates Foundation's three-pronged, simultaneous investment—in key states and districts, in professional development, and especially in the development of innovative curricular tools and materials—created noteworthy changes in mathematics instruction.

Participant ratings were highest in those venues where all three efforts were strong and worked synergistically to reinforce one another. In these cases, the Classroom Challenges provided a concrete focal point, offering teachers a stimulating and educative way to illuminate and instantiate the eight Standards for Mathematical Practice. The Classroom Challenges helped move these reform efforts beyond the rhetoric of the standards by providing actual tools and instructional materials that both illustrated standards-based practices and enabled teachers and students to enact them. These cases show that the MAP Classroom Challenges, through carefully designed and well-supported partnerships, can be implemented at scale and with fidelity.

Inverness Research, a national education evaluation and consulting group headquartered in Northern California, has over 25 years of experience studying local, state, and national investments in the improvement of education.

Inverness Research * P.O. Box 313, Inverness, CA 94937 * Ph: 415-669-7156 * Fax: 415-669-7186
www.inverness-research.org