

3 STEPS, 1 GOAL

TEACHER TEAMS BOOST MATH INSTRUCTION USING 3-PART LEARNING DESIGN



By Regina M. Mistretta

Teacher education and professional development prepare teachers with up-to-date knowledge, skills, and dispositions necessary for effective teaching. To sustain this, however, hinges on continued professional learning within schools. Research shows that establishing long-term conditions that allow teachers to learn continuously from one another within schools is among the most effective ways to support teacher learning (Heck, Banilower, Weiss, & Rosenberg, 2008).

At a private school in metropolitan New York City, eight pre-K through 8th-grade teachers have the chance to do just that by participating in monthly professional learning focused on improving math instruction.

The program engages multilevel teacher groups in three steps: brief, observe, and debrief. Using this framework, the school supports teacher learning about reform-based instructional practices, including content development across grade levels.

THE GROUP

The eight teachers who participate in the program have varying levels of experience — two are first-year teachers, four have three to five years of experience, and two have more than five years of experience. They work in two groups: The first group consists of one teacher from each of grades pre-K through 2; the other group consists of one teacher from each of grades 3 through 5 and one teacher from grades 6 through 8.

The groups meet for 90 minutes each month. The school's principal supports the release of these teachers for their group sessions, and the teachers' schedules have been modified to give the teachers common learning time. The school hired substitute teachers to take charge of teachers' classrooms so that they could participate in the professional development.

THE FRAMEWORK

Each 90-minute session consists of three segments:

brief, observe, and debrief. When acceptable by all participants, the brief and debrief sessions are audiotaped and the observe session is videotaped to keep a record of teacher intentions, lesson dynamics, and teacher reflective comments.

1 The brief, which lasts about 25 minutes, introduces teachers to student learning objectives and instructional strategies related to the focus lesson that will follow. Once the group is assembled, a designated facilitator orients the group to the lesson using these discussion points:

- Describe your focus lesson's objective(s) to your colleagues.
- Explain the instructional strategies you intend to use to accomplish those objectives.
- Engage your colleagues in a student task related to your focus lesson.

2 The observe segment is set in a classroom, providing real-life conditions that support teacher learning and instructional change (Donegan & Shantz, 2007). The group observes the facilitator teach the focus lesson, which lasts about 35 minutes, and documents their observations using these discussion points as a guide:

- How are students reacting to specific instructional practices used during the focus lesson?
- Describe the responses students are giving to specific questions posed during the focus lesson.
- Describe the thinking strategies/methods of solution students are using during the focus lesson.

3 The debrief, which takes about 30 minutes, follows the focus lesson. The group returns to the original meeting room, where the facilitator uses these discussion points to guide the conversation about what teachers observed during the focus lesson:

- Elicit your colleagues' responses concerning students':
 - Reactions to specific instructional practices used during the focus lesson.

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- Responses to specific questions posed during the focus lesson.
- Thinking strategies/methods of solution used during the focus lesson.
- Generate discussion about existing and/or possible connections among content, grade levels, and instructional practices.

To provide feedback while the lesson is still fresh in their minds, teachers use the following discussion points to write a reflective journal entry. These journal entries are submitted to the facilitator and used to determine each teacher's learning outcomes as well as plan future professional learning sessions tailored around teachers' feedback.

- Describe specific ways, if any, the brief segment supported you as a mathematics teacher.
- Describe specific ways, if any, the observe segment supported you as a mathematics teacher.
- Describe specific ways, if any, the debrief segment supported you as a mathematics teacher.

IMPLEMENTING THE FRAMEWORK

Both teacher groups met monthly from October to May during one school year. To introduce the framework, I facilitated the first session with each group, focusing on a geometry lesson about the use of the manipulative (moveable object) known as tangrams.

This content area and manipulative were chosen to tailor the program to teachers' needs and strengths. To keep a record of teachers' perspectives, I audiotaped, when acceptable, interviews with individual teachers before the session. During these interviews, I asked them to identify areas of teaching mathematics they viewed as strengths and those needing improvement.

The lesson demonstrated during this first session reflected lessons posted on the website of the National Council of Teachers of Mathematics (<http://illuminations.nctm.org/Lessons.aspx>). I often referred teachers to this website to build awareness of this substantial resource for mathematics teachers.

After the introductory session and using information gathered from teacher interviews, I assigned each teacher the role of facilitator for a future session. Each teacher's assignment focused on an area of teaching mathematics he or she viewed as a strength and the majority of the group viewed as needing improvement.

OUTCOMES

I analyzed reflective journal entries, the recorded brief and debrief, and videotaped focus lessons to determine the framework's impact on participants. Each teacher submitted a journal entry for seven sessions. Every time a teacher stated in his or her reflective journal entry a specific way the session supported him or her as a mathematics teacher, I noted it as a support statement.

I compared these support statements — 256 altogether — with their related focus lessons and dialogue during the brief and debrief to confirm consistency between the content of the statements and actual occurrences. Of those support statements, 67% cited being able to witness and discuss the impact of instructional practices on student learning, and 54% cited the development of curriculum content across grade levels.

IMPACT ON STUDENTS

Participants said the brief and observe segments allowed them to feel and witness student reactions.

"Discussing and taking part in the lesson before observing it in the classroom helped me identify some challenges students may face when working with manipulatives," said the 2nd-grade teacher. "If I'm struggling with the placement of these tangram pieces, some of my students may struggle as well. I need to plan incremental steps for some students such as using fewer pieces at first and building up to using all seven at once."

"Seeing the varying ability levels while observing helped me realize the need to modify instruction to accommodate all ability levels and learning styles," said the 1st-grade teacher.

"Witnessing the peer communication present during the lesson allowed me to see how students can learn from each other by sharing alternate methods of solution," said the 4th-grade teacher.

"It was helpful to see how the 2nd-grade teacher's use of probing questions really made the kids think and generated rich conversations that allowed the students to grapple with ideas," said the 3rd-grade teacher.

These representative comments show how the program gave participants a field-based rationale for broadening their tool kit with sound instructional practices. Teachers witnessed how peer collaboration provides supportive student-to-student interaction in the mathematics classroom, which has a positive impact on student achievement (Ginsburg-Block & Fantuzzo, 1998).

In addition, teachers saw how posing probing questions heightens students' communication about mathematical ideas. This is an area of instruction in need of improvement among U.S. mathematics teachers (Weiss, Pasley, Smith, Banilower, & Heck, 2003).

CURRICULUM DEVELOPMENT

While engaged in the observe and debrief segments, participants noted existing content connections among grade levels.

"At one point in the lesson, the students were asked how many tangram triangles cover a square," said the middle grades teacher. "I immediately related that spatial task as one that sets the groundwork for the work I do in my grade with area formulas."

"The connection I made between my grade level and this lesson came during our teacher discussion after the lesson concerning the use of pattern blocks and the implications for

further developmental learning,” said the 5th-grade teacher. “I realized that I could build upon the lesson I observed. I could take the concrete experiences in 4th grade concerning equivalent fractions and develop my 5th-grade students’ conceptual understanding of the procedure for turning an improper fraction into a mixed number.”

Teachers were able to focus on developing disciplinary content through the grades. Such an outcome is worth noting because mathematics teachers, as highlighted recently in the Common Core State Standards, are responsible for developing students’ understandings of how mathematical ideas interconnect and build upon one another (Gadanidis & Hughes, 2011).

FRAMEWORK’S BENEFITS

This professional learning framework proved to have several benefits:

- **The program provides long-term support of teacher learning.** Research shows that continuous, sustained learning — as opposed to one-shot workshops — have a positive impact on classroom practice (Zucker, Shields, Adelman, Corcoran, & Goertz, 1998). Opportunities to engage in practical learning experiences grounded all sessions.
- **Teachers gained experience in leading their colleagues’ professional learning.** In addition, teachers developed a sense of community, an essential ingredient in any kind of lasting reform (Franke, Kazemi, & Battey, 2007).
- **Teachers’ collaborative learning helps to sustain use of best practices.** These practices include lesson modifications, student-to-student communication, probing questions, and grade-level connections. During follow-up visits to the school, I noticed the teachers chose to continue their roles as facilitators of group sessions to sustain professional learning within their school. As the kindergarten teacher said, “We all have a mindset now for collectively sustaining our professional learning.” The principal noted that teachers’ use of the framework led to better-aligned developmental instructional practices throughout the grades.

ADAPTING THE FRAMEWORK

Teacher knowledge is the greatest factor in student achievement (Cochran-Smith, 2004), and principal support is among the most important and influential factors on teachers’ practice (Borko, 2004). Because “one size of professional development does not fit all, and each school has a unique atmosphere of students, faculty, staff, and parent populations” (Wiseman & Fox, 2010, p. 35), this framework can be modified to support teacher learning in ways that reflect specific educational contexts:

- **Grade levels:** If school schedules won’t allow common availability for multiple grade levels, include as many grade levels as possible. Even if only two grade levels participate, teachers can learn about content development and instructional practices for parts of the grade-level spectrum.

- **Components:** If one 90-minute session is difficult to arrange, consider spreading out the segments through the week.
- **Subject:** Adapting this framework to other discipline areas may address additional student goals.

Adaptations to the framework will vary according to specific school conditions. What all share in common is the value in providing teachers with learning opportunities that support professional growth within their school.

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