

THE GREATER SUM OF COLLABORATION: ADDING VALUE TO MATHEMATICS EDUCATION THROUGH TEAMWORK

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Abstract

The role of a Mathematics Specialist can vary from pre-K through grade 8 schools. One of the most distinguishing factors involves the relationship between the Mathematics Specialists, administrators, and teachers. In this article, we share our experiences in a school culture that supports common language, collective commitments, trust, and transparency. Using this model, we have experienced high levels of teacher professionalism and student success. As lifelong learners, we continually reflect upon our practices and look for ways to meet the needs of our students. This occurs by implementing purposeful meeting structures that allow us to facilitate discussions around mathematics content, lesson planning, assessment results, and student progress. Administrators Brian Butler and Diane Kerr, along with Mathematics Specialists Tracey Hulen and Jennifer Deinhart, have formed a powerful relationship at Mason Crest Elementary School. This is a Title I school with 560 students, pre-K through grade 5, which promotes reflective practices and allows for flexibility and creativity as we continue to strengthen and improve our practices. Together, we share a story of our collaborative journey with teachers and students to create an effective mathematics program that embraces a conceptual learning philosophy.

“Ultimately there are two kinds of schools: learning-enriched schools and learning impoverished schools. I have yet to see a school where the learning curves...of the adults were steeped upward and those of the students were not. Teachers and students go hand in hand as learners...or they don’t go at all.” [1]

Roland Barth, “Hand in Hand, We All Learn”

The Collaborative Culture

Our journey as a school began by collectively creating a vision and mission to ensure high levels of learning for *all* students and adults. As a school, we embrace the “Professional Learning Community at Work” model as defined in the book *Learning by Doing* [2]. The authors describe a Professional Learning Community (PLC) in the following manner:

...an ongoing process in which educators work collaboratively in recurring cycles of collective inquiry and action research to achieve better results for the students they serve. Professional learning communities operate under the assumption that the key to improved learning for students is continuous job-embedded learning for educators [2].

It is a never-ending learning journey for all and it begins by building common knowledge, common language, and common expectations in order to move forward as one school made up of collaborative teams. A school that functions as a high performing Professional Learning Community focuses on the Three Big Ideas: A Focus on Learning, A Culture of Collaboration, and A Focus on Results. The Three Big Ideas drive the work that we do each and every day. Within our collaborative culture, as Mathematics Specialists and administrators, we have developed strong relationships with each other and all of the teachers at Mason Crest. These relationships are the cornerstone of our work. They are based on mutual trust and respect. It is because of these relationships that we are able to consistently communicate our vision and meet our goals. In the Mathematics Specialist role, we act as coaches, facilitators, and teacher models to develop pedagogical content knowledge and overall best practices for teaching mathematics. In the administrator role, we encourage and expect the Mathematics Specialists to bring ideas to the table; they are, after all, the Mathematics Specialists and experts in their content area, and we allow them to use research-based programs and resources that enhance the mathematics program at our school.

The Relationship between Mathematics Specialists and Principals

At the beginning of our relationship, we met on a bi-weekly basis to discuss plans for meeting with teams, whole staff professional development, and how our goals would meet the needs of our students throughout the school. Over time, a trusting relationship developed. Now, when either party feels the need to discuss any element of our mathematics program, meetings are scheduled on an as-needed basis. Problem solving around student progress is done in a mutually respectful environment so that we can effectively support all staff members in the work of teaching mathematics. In these discussions, together we make key decisions, such as extending the mathematics instructional block from sixty minutes to ninety minutes, implementing the use of the *Investigations* text series schoolwide, and developing a five-week course for the entire staff that highlighted components of effective mathematics instruction [3].

Common Language and Learning

In order to realize our mission of high levels of learning for all, while developing and implementing highly effective mathematics practices, we felt that it was important to build a foundation of common knowledge. This would set the stage for our continued learning together with our entire staff.

Through our own professional learning (respective Mathematics Specialists master's programs, national conferences, and countywide in-services), we were able to use ideas learned to develop a mathematics course that focused on four elements of instruction:

- 1) Creating the physical and cultural classroom environment;
- 2) Identifying effective facilitation techniques;
- 3) Defining formative and summative assessment; and,
- 4) Writing and evaluating effective tasks.

All instructional staff, including administrators, participated in all fifteen hours of the course. While this course was an effective start, we needed to develop a structure of meetings that would support further collaborative work, and build on and strengthen the learning from the course. Ultimately, this course would deepen the learning for individuals, teams, and students.

Learning is an ongoing process, and as teachers, our best learning is through the day-to-day work of instructing our students and actively addressing the Professional Learning Community's critical questions of learning. The following four critical questions should be addressed:

- 1) What is it we want our students to know?
- 2) How will we know if our students are learning?
- 3) How will we respond when some students do not learn?
- 4) How will we extend the learning for students who are proficient?

These questions keep us focused on the right work in our collaborative time together and prevent us from getting lost in trivial, meaningless housekeeping that can be done through other means.

Planning Meetings

The following are the purposeful meeting structures that allow us to answer the four critical questions as we facilitate discussions around mathematics content, lesson planning, and discussing assessment results and student progress. This is the work; this is the process that leads to higher adult learning. At Mason Crest, we meet formally in the following ways:

- Weekly planning meetings to create our instructional plan;
- Monthly data discussions to analyze the results of our common assessments;
- One-on-one coaching for all first-year teachers or those new to a grade level; and,
- Vertical team observations and reflection based on team needs.

In addition, we monitor all students during quarterly progress meetings in which we take the following actions:

- Analyze assessment results from our district tests;
- Create homogeneous and heterogeneous student groupings to use in guided mathematics instruction;
- Develop an instructional plan that will allow additional time and support for some students who are not yet showing mastery and extend the learning of those who did show mastery of the objectives assessed; and,
- Note the frequency, duration, and ratio of any guided instruction.

While the Mathematics Specialists facilitate these meetings, administrators support the process not only by being a part of the meetings themselves, but by having the expectation that all teachers involved in the learning of students at a particular grade level are present. These include teachers, such as classroom, special education, and English as a Second Language, as well as instructional assistants. We share a collective responsibility for the learning goals of all students in our school, so all team members are seen as equal contributors. We do not see students as “my students” or “your students,” but “our students.” This collective commitment to each other allows us to share ideas, learn from each other’s strengths, and share the workload as we develop lessons and assessments.

During weekly planning, we explore content, create scaffolds such as sentence frames and visual vocabulary, and from our collective resources, develop focus lessons and active

learning tasks for each day of the week. We differentiate our instruction for the varied needs of our students by using tiered tasks, mathematics menus, and guided instruction. We decide as a team how to set up our mathematics workshop each week so that teachers can support students in small groups based on their needs.

Since we share the responsibility of planning instruction together, we share the responsibility of teaching together in an inclusive environment. Classroom teachers and resource teachers use a variety of co-teaching models, such as the following examples:

- Team teaching—where teachers jointly deliver instruction.
- Parallel teaching—where one teacher leads the larger group during the focus lesson and the other provides specific scaffolding for a small group of learners.
- Guided instruction—where after the focus lesson, teachers support students as they solve problems and complete tasks.

Data Discussions

At Mason Crest, after every unit assessment, grade-level teams engage in data discussions. The data comes from common assessments which our team created to match the rigor of the state assessments. This process relies heavily on our ability to trust our teammates, be honest and transparent about our strengths and weaknesses, and recognize that we are collectively responsible for the success of every student. While the Mathematics Specialist is the facilitator of our data discussions, all team members are seen as equal contributors. Administrators are often present and participate in the discussions, further encouraging the culture of trust and transparency. Their presence is not seen as top down but as members of the team who want to learn together to ensure that we are honoring our mission. The one thing that administration tries to model is transparency, and that making mistakes and admitting our own individual challenges is part of the process. Having the courage to share mistakes openly with teammates helps the entire team learn and grow. A motto that we have is “Get Comfortable Being Uncomfortable,” and it means that we don’t expect perfection—just that progress and mistakes are welcomed as opportunities to learn and grow! The administration is quick to admit that they make more mistakes than anyone and are fine with this because they get better each time they learn from a mistake or challenging situation.

Teams use a protocol for the discussion that focuses on these key ideas:

- Identifying students who need extra time and support, and those who may need to be extended in their learning;

- Identifying student needs (objectives where students were successful and areas where they will need more support) that have been identified by the individual teacher;
- Identifying team trends that highlight a need for re-teaching across the grade level;
- Sharing strategies from teachers who were successful in particular areas that may benefit the whole team;
- Reflecting on the reasons for our successes or shortcomings; and,
- Making general next steps for addressing student needs.

Progress Monitoring

A data discussion is most meaningful when there is follow-through at our next weekly planning meeting. As a response to trends in the data, we plan for instructional changes based on student needs. Examples include creating small-group focus lessons for particular students, incorporating another teacher's strategy that was deemed successful, providing an opportunity for whole-group re-teaching with a different approach than the initial instruction, or planning for additional practice opportunities for students during the mathematics workshop in the form of games and independent tasks. These conversations about student learning become deeper at progress monitoring meetings. These meetings are held quarterly to discuss individual student progress in the area of mathematics. Students requiring specific interventions or extensions are identified, and specific goals and plans are created.

Learning through Observation

We at Mason Crest value the job-embedded professional development described above, but also included in this work is observing each other teach. Teachers have the opportunity to visit other classrooms or watch videos of others at their grade level or vertical teams. For example, if one team is looking to implement a new workshop model or instructional strategy, the Mathematics Specialist has the vertical lens of the school and can help direct teams in choosing a specific teacher or team to observe. Teachers take observational notes on the practices seen and generate questions. After the observation, the team debriefs with the Mathematics Specialist to reflect on which parts of this new learning can be applied in the classroom setting.

The role of a Mathematics Specialist can look very different depending on the school culture and the involvement of administration. We have found this model to be effective based on the progress of our teachers and, most importantly, our students. We continue to reflect on our

roles, both as Mathematics Specialists and administrators, recognizing that this partnership is crucial in our work to build capacity in mathematics among teachers.

References

- [1] R. Barth, *Learning by Heart*, Jossey-Bass, San Francisco, CA, 2001.
- [2] R. DuFour, R. DuFour, R. Eaker, and T. Many, *Learning by Doing: A Handbook for Professional Learning Communities at Work*, Solution Tree Press, Bloomington, IN, 2010.
- [3] *Investigations in Number, Data, and Space*, TERC, Cambridge, MA, 1998; Internet: <http://www.investigations.terc.edu>.