

BUILDING A CULTURE OF NUMERACY



Schools that create positive perceptions about math instruction can boost performance, too

By Kim VerMerris and Christopher Wooleyhand



American schools struggle to provide effective, impactful math instruction, and the performance of students on several indicators of math progress suggests we have much work to do. In an October 2018 *Education Week* article, Catherine Gewertz noted that ACT scores in math have reached a 20-year low. SAT scores in math were stagnant over that same period.

Interestingly, the National Center for Education Statistics found that elementary school students demonstrated a gradual improvement in math scores on the National Assessment of Educational Progress in 2013, with scores for 9-year-olds increasing since 1973. Even so, the 2015 Program for International Student Assessment ranked American students 39th in the world in math achievement.

Elementary schools aren't waiting for state and federal education officials to step in, though; they are working diligently to deliver quality math instruction themselves. Some have started with a cultural change—fostering a positive math culture in elementary schools to have a significant impact on the success of teachers and students. Such change requires collaboration, but schools that work to develop consistent expectations and targeted strategies are helping students become confident and competent critical thinkers.

Math Specialists Wanted

Federal and state education officials can help by providing school systems with the resources and tools necessary to address this growing concern. What might happen if

schools were provided resources in math commensurate with those provided for reading? When did we decide that numeracy should take a back seat to literacy?

Organizations such as the Association of Mathematics Teacher Educators (AMTE), the National Council of Supervisors of Mathematics (NCSM), and the National Council of Teachers of Mathematics (NCTM) have been advocating on behalf of math specialists in elementary schools for more than 40 years, and more school districts should have adopted their recommendations by now.

NCSM continues to advocate for math leadership in all elementary schools. As the publisher of several position papers, they note that math specialists have a positive influence on teachers and students. They believe that elementary math specialists can have an incredible impact on the effectiveness of others, and that they are crucial to developing high-quality math programs.

Francis “Skip” Fennell, professor emeritus at McDaniel College, said in a 2011 *NCSM Journal* article that the simple (and yes, costly) step of installing state-certified math teachers in elementary schools would go a long way toward improved math performance. The director of the Elementary Mathematics Specialists and Teacher Leaders Project and past president of AMTE and NCTM, he suggests the following practices to assist in building a math culture:

- Find creative ways to attain, use, and sustain math resource/specialist/coach support;

COMMON CORE STANDARDS for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for, and make use of, structure.
8. Look for, and express regularity in, repeated reasoning.

- Identify teachers in the building who are passionate about math to build instructional capacity;
- Use the Common Core State Standards for Mathematical Practice as a foundation for engaging all students in the mathematics they are learning;
- Display math-themed bulletin boards, visuals, and student products to promote student interest;
- Regularly communicate with parents to share your school's math vision;
- Connect mathematics learning to contexts that make the subject come alive (and underline that yes, it's a fun subject!);
- Promote games and schoolwide math challenges to build mathematics excitement; and
- Select grade-level math reps who meet regularly to discuss math instruction and constantly monitor and promote the school's math culture.

Consistency Builds Culture

The work related to promoting a positive math culture is ongoing. School leaders need to be relentless and consistent in their efforts. Schools that consistently focus their efforts on the following practices might find that as their math culture grows, so do the confidence and performance of their staff and students. Here's how:

Provide administrative support. School leaders must serve as the catalysts in the growth of a positive math culture. For instructional change to occur, math must be a focus area of the school improvement plan. Math goals in your school improvement plan

should include realistic steps to meet the needs of your students, create accountability in analyzing data, and encourage teachers to be open to changes in instructional practices. Teachers need opportunities to learn together and plan together. Collaborative planning, vertical teaming, and professional development should be aligned with the improvement plan.

Foster collaborative planning. As leaders create a collaborative planning schedule for the year, they can schedule teachers' meetings around math instruction. It is important for administrators to attend these meetings to promote the value and importance of consistent math planning. Consider inviting outside math resource teachers or building staff to support grade-level teams.

Develop meeting agendas with teachers and share them with grade-level teams a week ahead of time to allow everyone to prepare. Sessions should include time to celebrate and share classroom successes; everyone will benefit from the opportunity to show off what they're proud of and acknowledge peers' contributions. Teachers must be encouraged to share best practices related to the standards on which they are focusing.

Each planning session should include time for teachers to complete math problems themselves. "Doing the math" will help them focus on finding and using effective strategies to teach the standards, and it will create a culture that values job-embedded professional development. When cooperation and modeling strategies are used consistently during planning, they flow over into the classroom.

Offer vertical teaming opportunities. Teachers rarely have an opportunity to talk with peers from other grade levels, much less share strategies and discuss the progression and coherence of standards across grade levels. Having teachers work on schoolwide math goals with teachers in every grade helps build a collegial atmosphere in which teachers can grow by learning from their peers. Vertical team meetings will help teachers learn from each other through classroom visits and engaging, hands-on learning experiences. Vertical team meetings also allow schools to showcase teachers who are implementing the best instructional practices. Through vertical teaming, teachers get a feel for what instruction looks like throughout the building.

Elementary schools also benefit by teaming with the middle schools their students feed into, encouraging transitions with less skill regression. Vertical meetings are great opportunities to highlight in-house resources, including teachers who are strong in math or have a passion for the subject. Most importantly, vertical meetings help grow a positive and productive math culture.

Establish a math growth mindset. Everyone is a mathematician; we all have the capability to learn math strategies and communicate math thinking. Creating a school in which teachers and students persevere and use mistakes as learning opportunities builds a growth mindset that discourages teachers from saying “I’m no good at math” or accepting the same belief from students. A growth mindset will help staff and students see struggle as a path to new learning.


Involve the community. Parents sometimes struggle to understand Common Core standards and the strategies taught in school, and they want resources and support to assist their children with math. Regular communication can help parents understand the dialogue around what their children are learning. Schools can provide parents with a monthly newsletter that includes upcoming math concepts, vocabulary, and games or practice activities.

To involve them in math learning skills and strategies, invite parents to math events where they can interact with teachers and other parents. Focus the events on the major content standards taught within each grade level to help parents walk away with a sense



of accomplishment and confidence as well as the tools they need to support their child.

Make math visible. A positive math culture should be evident throughout the school. Display student work to promote the importance of math in the building. Post bulletin boards, displays, and motivational signage everywhere to emphasize the Standards for Mathematical Practice and growth mindset. Offer students afterschool clubs that focus on math, centered on the 24 Game, Bedtime Math Crazy 8s, or robotics. STEM/STEAM programs are a great way to promote an integrated approach with math and other subject areas.

For years, schools have embraced the value of promoting a literacy-rich culture, and students have benefited from state and local efforts to improve reading instruction and performance. We can do the same for math. What could happen if school districts put their time, resources, and professional development efforts toward math practices that lead to proficiency? Schools that decide to promote a positive math culture might find that their students are better prepared for the future—and that would be good for everyone. 

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