Playing Math with the Big Boys

According to the Third International Mathematics and Science Study (TIMSS), American students’ math performance deteriorates during their middle school years. While our fourth graders compare favorably with fourth graders around the world, by high school only students in South Africa and Cyprus do worse in mathematics. Our schools’ mathematics curricula have been justifiably criticized for too many topics taught too many times in too little depth. To change this, we need to learn how to connect young people’s natural interest in calculating with the abstract notational systems and algorithms necessary for advanced problem-solving. As Michigan State University researchers Leland Cogan and William Schmidt put it, “How math is taught is as important as what math is taught.”

Doing It Right the Harms Way

Detroit’s Harms School, in a Hispanic inner-city neighborhood, has discovered a successful mathematics formula that has its students performing on par with suburban schools.

“We don’t look to see how our scores compare with other schools in Detroit,” says principal Patricia Diaz. “We compare ourselves with the suburbs. We want to play with the big boys!” And the children and teachers at Harms play very well. The students topped the state averages on four of six math assessments. Although there is no secret to their success, there are three very strong principles that drive the school’s constant efforts to better itself.

First, the staff strongly believes that the children coming from the school’s Spanish-speaking neighborhood are just as capable of feeling good about success as their suburban counterparts. Second, the staff believes in the importance of balancing the basic functions of literacy and numeracy with the ability to solve problems and comprehend texts. Finally, the staff believes in a technology-enabled and joyful learning environment.

Balancing Math

Because of the school’s earlier success in getting its reading scores beyond the state averages by using a balanced literacy approach, Diaz felt her school was ready for a similar approach to math.

While the school had a strong history of teaching math for understanding and problem-solving (including teaching strategies using manipulatives and inquiry), students were still hampered by their lack of what cognitive scientists call “automaticity.” As Diaz explains, “I told the teachers that it really disturbs me to see third and fourth graders still counting on their fingers. So we put counting on the computer.”

Harms began using computerized Accelerated Math (and its assessment component Star Math), programs that put progress and reward under student control through a cycle of challenge, practice, and assessment. Diaz describes children excitedly waiting for their latest test scores, and then waiting just as excitedly for the next series of practice problems.

The best thing about the programs, says Diaz, is that they require no external rewards. “I have to beg and reward kids to read, but I never have to give them anything for math. No contest, no pies, no dunk tank, and no lunch in the limo.” According to math consultants, the reason for this is because in math you know right away whether you are right or wrong, and children find that rewarding.

“We think that drill and computational mastery can be taken care of with computers,” says Diaz. “Our time is better spent in conversations about mathematics. For example, if someone says to you, ‘I need to get to Ann Arbor in 20 minutes and the speed limit is 70. Can I make it?’ what does that mean and what do you have to think about?”

“Math has to be more than computation for kids,” she says. “It has to be an arena of investigation. If it becomes that, students will come to understand and actually like mathematics and science and maybe go into fields like engineering.”

“But,” she adds, “it’s like Maslow’s hierarchy of needs: Only by taking care of the basics can we become free to go on and have fun.”

Balance and joy! Now there is a new pedagogy!

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