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Fanning the Flames of Greatness

In This Issue, We Offer Ideas for Extending Your Passion to Other Mathematics Professionals

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Table of Contents

CORRECTION FROM WINTER 2008 JOURNAL
The Winter 2008 *NCSM Journal* omitted co-author Daniel Clark Orey from the byline of the article, "It Takes A Village: Culturally Responsive Professional Development and Creating Professional Learning Communities in Guatemala." Dr. Orey is a professor of mathematics and multicultural education at California State University, Sacramento. We regret the omission.

Purpose Statement

The purpose of the National Journal of Mathematics Education Leadership is to advance the mission and vision of the National Council of Supervisors of Mathematics by:

- Strengthening mathematics education leadership through the dissemination of knowledge related to research, issues, trends, programs, policy, and practice in mathematics education
- Fostering inquiry into key challenges of mathematics education leadership
- Raising awareness about key challenges of mathematics education leadership, in order to influence research, programs, policy, and practice
- Engaging the attention and support of other education stakeholders, and business and government, in order to broaden as well as strengthen mathematics education leadership

Improving Mathematics Instruction for ELL Students

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Performance of English language learner (ELL) students in mathematics is a growing national concern—not only because of the persistent achievement gap between ELL students and their non-ELL counterparts, but also due to the increasing ELL population. Ten percent of all public school students received ELL services in the 2005–2006 school year (NCELA, n.d.) and those numbers are expected to grow dramatically. According to a study by the Pew Hispanic Center, "the projected number of school-age children of immigrants will increase from 12.3 million in 2005 to 17.9 million in 2020, accounting for all the projected growth in the school-age population" (Fry, 2008, p. iii).

ELL students consistently trail their non-ELL peers on the National Assessment of Educational Progress (NAEP). The 2007 NAEP data reveal that 44 percent of ELL students in fourth grade scored "below basic" in mathematics and that number rose to 70 percent for eighth-graders (Lee, Grigg, & Dion, 2007). In comparison, only 16 percent of non-ELL fourth-graders and 27 percent of non-ELL eighth-graders had below basic scores in mathematics.

Addressing the needs of ELL students in mathematics classrooms is a key component of promoting equity in mathematics. The National Council of Supervisors of Mathematics' *PRIME Leadership Framework* (NCSM, 2008) identifies equity as the first leadership principle, calling on leaders to close gaps in mathematics achievement expectations and in access to high-quality mathematics learning for every student. Equity is also the first of six principles of the National Council of Teachers of Mathematics, stating, "Excellence in mathematics education requires equity—high expectations and strong support for all students" (NCTM, 2000, p. 11).

One School's Approach

How does a school with a small and diverse ELL population put that principle into practice? The Northwest Regional Educational Laboratory (NWREL) in Portland, Oregon, worked with one elementary school in southwest Washington on a pilot program focusing on achieving equity for ELL students in mathematics. NWREL professional development provider Linda Griffin met with a cadre of six teachers at Dorothy Fox Elementary over a period of two semesters to apply research-based strategies to promote the success of ELL students in mathematics classrooms. The aim was to train these teacher leaders so they could, in turn, transfer their learning to the rest of the faculty.

Dorothy Fox Elementary is a 540-student school in rural/suburban Camas, Washington, where 15 percent of students go home to families that do not speak English. Fourteen different languages can be heard in the school's hallways with Russian and Spanish predominating. "We've outgrown the pull-out system, but we're not big enough to do a magnet program," explains Principal Cathy Sork. "We have a couple of ELL kids in every class, so every teacher was becoming an ELL teacher but they really didn't have the skills and training they needed."

Sork and her faculty had identified low proficiency in mathematics as a problem for both ELL students and a number of their non-ELL counterparts. Of the 47 students who did not pass the mathematics portion of the Washington

Assessment of Student Learning in 2008, more than 20 percent were ELL students. To address the issue, the school—with district support—applied for and received a two-year ELL demonstration grant from the Washington Office of Superintendent of Public Instruction (OSPI). According to Sork, the state was interested in sharing Dorothy Fox's lessons on how focused staff development might improve mathematics achievement of a multi-language population spread throughout the school.

Both school district and building leaders agreed that an important first step in structuring the grant activities was to conduct an external review of Dorothy Fox's ELL program with an emphasis on mathematics instruction. "We wanted to be sure our limited resources were going to be used very intentionally and focused on where the need was," says Sork. The school contracted with NWREL's Griffin to perform a program review that described the experience of an ELL student in math class and across the span of a school day. Griffin, who holds a doctorate in educational leadership and a master's in mathematics education, came to the task with 13 years of experience as a mathematics professional development provider and a dozen years as a middle and high school mathematics teacher. In addition, Griffin is trained in SIOP (Sheltered Instruction Observation Protocol) and has a personal interest in issues of equity as applied to the mathematics classroom.

During the course of two days, Griffin and a colleague collected data by observing mathematics lessons in all classrooms; surveying teachers, administrators, and ELL program staff; interviewing Sork, teachers, and staff members; holding focus group discussions with students and parents to find out about learning experiences; and examining documents related to the ELL program, such as the school improvement plan and the ELL handbook.

The classroom observations were particularly telling for school leaders. "One of the pieces that came out was the teachers were doing most of the talking and thinking about math and students were doing a lot of listening, and it should be the other way around," says Sork. "[Students] need to be able to use language to show their thinking and express their thoughts in lots of different ways. That was a big 'aha' that we hadn't noticed ourselves."

Best Practices for ELL Students

The program review yielded research-based recommendations for effective ELL practices and for effective practices in mathematics. The intersection of these two bodies of work centers on improving the quality and quantity of communication in the classroom. NCTM emphasizes the role of communication in ensuring support for the mathematical development of ELL students. "It is important for all students, but especially for ELL students, to have opportunities to speak, write, read, and listen in mathematics classes, with teachers providing appropriate support and encouragement" (NCTM, 2008). The Center for Research on Education, Diversity, & Excellence (2002) also stresses communication in two of its Five Standards for Effective Pedagogy:

- Developing Language and Literacy Skills across all Curriculum—Develop competence in informal, problem-solving, and academic language through conversation and through reading and writing across the curriculum
- Emphasizing Dialogue over Lectures—Engage students in instructional conversations rather than through lectures

To apply those standards to the classroom and pave the way for ELL students' language development, Echevarria (1998) suggests some basic steps for teachers. These include understanding students' language needs, explicitly planning lessons to meet those needs, delivering lessons, and then conducting assessments to see if students understood the lessons.

Capturing Student Conversations on Video

With the research and program review results in hand, the school asked all teachers and paraeducators to commit to a professional development activity focused on ELL students or mathematics. Options, which were funded by the OSPI grant, included such activities as participating in a book study led by a Washington State University professor, serving on a parent communication committee, or joining the school leadership committee. A group of six teachers volunteered to form a video study group (VSG), facilitated by Griffin, that would allow them to capture and reflect on the participation of ELL students during their mathematics lessons. When signing up, none of the group members had a clear picture of what a VSG was, but they shared good relationships with one another and all had an interest in improving their practice.

At the outset, the group read about the principles behind VSGs (Linsenmeier & Sherin, 2007; Sherin, 2004; Sherin & Han, 2004) and then collaboratively analyzed how the process could be used to improve mathematics outcomes

for their ELL students. They determined that videos would give them added insights into the interactions among ELL and non-ELL students. They also hoped to investigate how different instructional strategies impacted ELL students' use of language in the mathematics class.

The group met monthly for 90 minutes during school time, with substitutes covering their classrooms. Prior to each VSG meeting, Griffin visited the classrooms of two or three group members and taped the class period. While taping, the camera was trained on students, rather than the teacher. The aim was to focus on students' work and their interactions, questions, and responses to instruction. The tape was then given to the teacher, who chose a short clip to share and use as a springboard for facilitated discussion about improving instructional practice.

While viewing the clips, the VSG developed group norms and used the following protocol to guide discussions:

- The teacher of the videotaped class provided background information about the class and the lesson.
- The teacher explained why he or she chose a particular clip to share.
- The teacher put the clip into the context of the whole lesson.
- The group viewed the clip.
- Each group member shared one or two observations that were factual statements (for example, "I noticed that…").
- The group discussed how the clip related to other teachers' experiences.

At one session, the group watched Mary LeFore's third-graders search for patterns in the hundreds chart. The teachers noted that students failed to use mathematical vocabulary as they worked in pairs to solve the problem and LeFore admitted she was "floored" by what her students were missing. Everyone agreed with Griffin's comment that "the crux of the matter is if we don't listen to what students are saying, how do we know what they're learning?"

Although this particular video highlighted a third-grade classroom, the feedback touched on issues common to all classrooms. Kathy McConnell, a first-grade teacher-leader, observed that the VSG's focus on students makes teachers more willing to participate in the tapings. "They realize, no one is counting your 'umms,'" she said. In fact, there's an understanding that the tapes are not used as teacher evaluations. "[The group] is looking to see if kids are talking, do they know how to work in groups, are they using their vocabulary, and are they showing their thinking by using language?" said Principal Sork.

After taking part in the VSG for two semesters, members of the group reflected on the changes to their practice. One teacher commented, "[The VSG was a] huge learning experience, [it] advanced my teaching quicker than with just classroom experience alone." Another participant remarked, "This process helped focus my instruction, gave me practical ideas to try and reflect on, offered encouragement and feedback, and helped me think of extensions or modifications to help clarify or differentiate." A VSG member felt the video allowed her to observe more students. "As I played it back I could consider what happened and how to improve," she said. "The debriefing with others' tapes reinforced my understanding and brought new ideas to consider."

In an evaluation at the end of the trainings, group members said that the experience has made them more intentional about how they hand out materials and give instructions during mathematics lessons. For example, the VSG teachers agreed to distribute or post cards with "sentence stems" for students to use in classroom discussions. These included prompts such as "The pattern I noticed is" or "I agree with you because." Teachers also said they became more aware of the need for students to have opportunities to use mathematical vocabulary and were more intentional about how to group students for collaborative problem-solving activities.

Sustaining and Expanding the Professional Development

At the beginning of 2009, the teacher-leaders planned to roll out VSGs school-wide. The teachers who participated in the original video study group were poised to serve as facilitators for new VSGs at Dorothy Fox Elementary with the goal of involving about half the faculty initially and eventually ramping up the practice to include all faculty. However, the economic downturn in early 2009 led OSPI to cut the project's funding. The school is now grappling with how to cover the cost of substitutes so more teachers can participate in the video groups; according to Principal Sork, VSGs are on the priority list for funding for the 2009–2010 school year. This situation points out the need for dedicated funding to broaden and sustain embedded professional development initiatives.

Prior to the funding cutback, Dorothy Fox was able to complete other parts of its multipronged ELL strategy,

including school-wide training in Guided Language Acquisition Design (GLAD). The staff has continued to monitor student progress on classroom mathematics assessments and will track ELL students' achievement on the state proficiency tests held in late spring. With these strategies, Principal Sork hopes that Dorothy Fox teachers will be better able to serve the diverse students that fill their classrooms, rather than "teaching the kids we used to have." At the end of the 2008–2009 school year, she'll ask NWREL to conduct a second ELL program review that will show how far the school has come, and where it still needs to go to improve learning for all children.

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