Fall 2012

EXAMINING MATHEMATICS COACHING

# Coaching Chronicles

News and Events for EMC Project Participants

**In This Issue:**



## The PI's Corner: A New Year, Another Opportunity for Learning

BY JOHN SUTTON

Welcome back, EMC coaches, teachers, and administrators! This is the start of year four in our five-year project, and as the new school year gets underway, there are a great many new opportunities for teachers to recognize student strengths in mathematical understanding and deepen student knowledge to develop great problem solvers. Teachers will be looking for ways to capitalize on students' prior knowledge and experiences with mathematics, engage students in sharing their thinking, and build on culture and background to make mathematics interesting, challenging, and fun for students.

For many teachers, the new school year will present them with a number of students who are in the process of acquiring English and have a first language other than English—students often referred to as English Language Learners (ELLs). These students are developing skills in listening, speaking, reading, and writing in a second language while learning mathematics content. It's likely that many of our 250+ EMC coaches, teachers, and principals work directly with such students or have colleagues who do.

For that reason, I thought you might find it helpful to review what many experts already recognize regarding mathematics teaching and learning for ELLs, as well as others challenged by language difficulties. Recently two of our EMC staff, Clare Heidema and Arlene Mitchell, developed a nice summary of the research and recommendations on the topic that I want to share with you. You'll find it on pages 3-4 in this issue of the newsletter.

From all of us at the EMC Project, thank you in advance for your time and important contributions to our collaborative study of coaching. The work being done not only impacts what we teach and how we teach, but also what students learn and how they learn it. For your role in the process, we offer our praise and appreciation. We wish you a successful and rewarding school year. ▲

**Dr. John Sutton**
EMC Co–Principal Investigator
RMC Research Corporation

YEAR 4

# Professional Development Report: Coaching Knowledge 2012

Twenty-six EMC coaches and two special guests traveled to either Denver in June or Bozeman, Mont., in July for their second of two EMC professional development workshops—this time in Coaching Knowledge. During each of these separate but identical five-day workshops, coaches from six states received instruction and engaged in group discussion about coaching.

"The workshop included reading coaching cases, watching coaching and classroom video, engaging in role-play scenarios, and examining coaches' individual needs," says Beth Burroughs, EMC co-PI and one of the workshop's instructors. "We had some rich discussions that allowed us to delve deeply into important issues and choices that coaches make."

Over the five-year study, EMC offers two types of professional development to all project coaches: Mathematics Content and Coaching Knowledge. These PD workshops form the heart of the EMC research objective: determining what types of knowledge, and in what combination, make a coach most effective in shaping a teacher's mathematics knowledge and use of standards-based practices.

This summer's first workshop was held on June 18-22 in Denver and was followed by an identical workshop on July 23-27 on the campus of Montana State University in Bozeman. The five-day events covered topics including how teachers learn, student learning and teacher practices, "how to talk and how to listen," and relationships and leadership.

"I spent the week learning new ideas about coaching, and I'm excited to start using them," said one coach who attended the Denver workshop. "I hope I can share the excitement I have and my new knowledge to increase student learning."


*(Clockwise, from left)* **Coaches Jan Harwood, Jan Rasmussen, and Jenna Briggs engage in a role-playing scenario during the Denver workshop.**


**Coaches attending the Bozeman workshop enjoyed a productive week of listening, discussing, reading, writing, and ... *thinking!***

Another coach who attended in Bozeman added, "I feel that I've grasped the 'big idea' of how to approach my role as a coach. I'm excited to put all of my plans into practice."

According to the project's research design, coaches were sorted randomly at the start of the project into two PD groups. Group 1 received its first professional development in 2010, in Mathematics Content, followed by its second PD session in Coaching Knowledge this year.

Next summer's participants, Group 2, will attend their second EMC workshop, this time in Mathematics Content, during the week of July 15-19, 2013, in Denver. ▲

**Our special thanks to the 28 coaches and guests who attended EMC professional development workshops this summer:**

**Matt Boelke**
Grand Junction, CO
**Jenna Briggs**
Idaho Falls, ID
**Julie Chamberlain**
Idaho Falls, ID
**Marni Driessen** *(guest)*
Omaha, NE
**Karol Gustin**
East Helena, MT
**Patti Harrison**
Bozeman, MT
**Jan Harwood**
Pocatello, ID
**Ken Jensen**
Aurora, CO
**Anne Keith**
Bozeman, MT
**Jeremy MacDonald**
Box Elder, MT
**Jan Marson**
La Crosse, WI
**Cassia McDiffett**
Craig, CO
**Kelly McNeil**
Bozeman, MT
**John Nielson**
Bozeman, MT
**Kim Pippenger**
Aurora, CO
**Kim Quigley**
Bozeman, MT
**Jan Rasmussen**
Charlo, MT
**Renee Sherry**
Aurora, CO
**Joyce Soldier**
Dunseith, ND
**Malissa Squires**
Grand Junction, CO
**Tracie Stauffer**
Northglenn, CO
**Lisa Stevens**
Hardin, MT
**Christina Tondevold**
Orofino, ID
**Sharon Tucker**
Browning, MT
**Chris Wemple**
Bozeman, MT
**Cindy White**
Pocatello, ID
**Deanna Wiatt**
La Crosse, WI
**Tara Zuspan** *(guest)*
Lincoln, NE

# Mathematics Teaching and Learning for English Language Learners

**By Clare Heidema and Arlene Mitchell**
**RMC Research Corporation and the EMC Project**

A common misconception about mathematics is that it is a "universal language" and is "culture-free." This misconception ignores the vital role of academic language in the development of important mathematical processes and practices highlighted in standards.

Standards-based mathematics instruction emphasizes the need for students to be able to read mathematics, explain their mathematical thinking (orally and in writing), and understand the approaches of others in solving mathematics problems. Having English Language Learners (ELLs) share their mathematical thinking positions them as competent problem solvers and, thus, contributors of mathematical knowledge, and it places them on a trajectory for increased participation in the learning process (Empson, 2003).

The National Council of Teachers of Mathematics (NCTM) communication process standard calls for instructional programs that enable all students to:

- organize and consolidate their mathematical thinking through communication;
- communicate their mathematical thinking coherently and clearly to peers, teachers, and others;
- analyze and evaluate the mathematical thinking and strategies of others;
- use the language of mathematics to express mathematical ideas precisely.

It is important for all students, but especially critical for ELL students, to have opportunities to speak, write, read, and listen in mathematics classes, with teachers providing appropriate support and encouragement (NCTM, 2000).

The Common Core State Standards (CCSS) for mathematical practice indicate that mathematically proficient students explain their thinking in problem solving, listen to and understand approaches of others to solving complex problems, justify and interpret their mathematical results, and communicate precisely to others (National Governors Association, 2010).

Given these CCSS and NCTM Process Standards, there is a need to consider principles specific for ELLs to engage in mathematical discourse that fosters the learning of rigorous mathematics (Ramirez & Celedon-Pattichis, 2012). Researchers from the Fostering Mathematics Success of English Language Learners (FMSELL) project identify three key principles of effective instruction that secure opportunities for ELLs to learn mathematics:

**1. Challenging mathematical tasks.** It is important and possible for students at all levels of language proficiency to engage in challenging and worthwhile mathematical tasks on a regular basis. The tasks can be made more accessible through supports that help clarify students' understanding. Furthermore, the tasks should include significant mathematics that challenges students to reason mathematically and solve problems. "Challenging mathematical tasks" refers to "high cognitive demand tasks" as described by the Quasar Project—tasks that involve students in doing mathematics or using procedures with awareness of connections to their underlying mathematical meaning (Silver & Stein, 1996; Stein et al., 2000).

**2. Representation using multiple modes.** The use of multiple modes (pictures, diagrams, presentations, written explanations, and gestures) gives students a way to understand the mathematics and express their thinking in problem solving. Mathematical tools and modeling are then a resource for all students, and especially ELLs, to engage in mathematics and communicate mathematically.

**3. Academic language.** All students can learn to express their mathematical thinking and reasoning in precise academic English, engaging productively in mathematical discourse. Communication about mathematical reasoning and problem solving relies on academic language for the precision required. There needs to be support for ELLs in learning the academic language of mathematics, taking into consideration linguistic demands in making mathematics comprehensible.

Using the principles noted above and remembering cultural and linguistic differences as intellectual resources, we consider what researchers and practitioners recognize as effective strategies for engaging and supporting ELLs in the mathematics classroom. Mathematics instruction for ELLs should follow recommendations for high-quality mathematics instruction and teaching mathematics for understanding. Teaching that makes a difference in student achievement and promotes conceptual understanding has two central features: (1) teachers and students attend explicitly to connections and concepts, and (2) teachers give students time to wrestle with important mathematics (Hiebert & Grouws, 2007). A prescription to keep in mind is the fact that effective mathematics instruction for native English speakers is similarly effective for ELLs, provided

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that specific attention is given to bridging language difficulties.

Research-based strategies that are key toward supporting ELLs' mathematics proficiency include the following:

**1. Connect mathematics with students' life experiences and existing knowledge** (Barwell, 2003; Secada & De La Cruz, 1996). It is essential to take into account students' unique experiences, prior learning, and individual strengths, as these contribute to their mathematics learning. This strategy suggests using students' experiences and prior knowledge to create contexts for instruction that are meaningful and motivational. Being aware of student backgrounds and prior knowledge will help ELL students know that their experiences and culture are valued.

**2. Create classroom environments that are rich in language and mathematics content** (Anstrom, 1997; Khisty & Chval, 2002). This includes treating students' language as a resource, involving everyday ways of communicating in mathematical discourse. Cultural and linguistic differences are viewed as intellectual resources to connect prior knowledge and provide opportunities for students to learn mathematics (Ramirez & Celedon-Pattichis, 2012).

**3. Emphasize meaning and the multiple meanings of words.** Students may need to communicate meaning by using gestures, drawings, or their first language while they develop command of the English language and mathematics (Morales, Khisty, & Chval, 2003; Moschkovich, 2002). There are a number of tips for explicitly teaching mathematical academic vocabulary. For example:

- Demonstrate that vocabulary can have multiple meanings, helping students understand different meanings and how to use them correctly in mathematics.
- Encourage students to offer bilingual support to each other, especially for students who will benefit from hearing an explanation in their first language.
- Identify key phrases or new vocabulary to pre-teach.
- Offer students objects and images to portray and master vocabulary.
- Use vocabulary strategies such as concept circles, Frayer models, and word sorts.

**4. Use visual supports** such as concrete objects, videos, illustrations, and gestures in classroom conversations (Moschkovich, 2002; Raborn, 1995).

**5. Utilize a variety of learning modalities** in teaching mathematics concepts and skills (Williams, 2009). For example:

- Provide a variety of manipulatives and use them purposefully.
- Teach rote concepts through songs or rhymes.
- Use movement to reinforce concepts.
- Explore math concepts with art projects.
- Access technology; provide time for use of problem-solving or skill-building programs on the computer; and explore calculators.

**6. Connect language with mathematical representations** (e.g., pictures, tables, graphs, equations) (Khisty & Chval, 2002).

**7. Write essential ideas, concepts, representations, and words on the board** without erasing so that students can refer to them throughout the lesson (Stigler, Fernandez, & Yoshida, 1996).

**8. Use pairs or small groups as an instructional strategy.** Consider language and mathematics skills when grouping students (Winsor, 2007).

**9. Discuss examples of students' mathematical writing** and provide opportunities for students to revise their writing (Chval & Khisty, 2009).

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# EMC COACH PROFILE: DANIELLE INSERRA AND JANE McGILL

**Names:** Danielle Inserra *(pictured, left)* and Jane McGill *(right)*
**Fun fact:** EMC's only two coaches in the state of Nebraska!
**District:** Papillion–La Vista Public Schools, Papillion, Neb.
**EMC participants since:** August 2010
**EMC teachers:** *Danielle:* Allison Guiney, Sarah Novacek, and Laura Stout, all at Patriot Elementary.

*Jane:* Ashley Hollibaugh, Diane King, and Jamie Reed, all at Carriage Hill Elementary.

**Family:** *Danielle:* "My husband, Sam, and I were high school sweethearts and have been married for 11 years. We have a 10-year-old daughter, Callie, who's in fifth grade, and a six-year-old daughter, Skylar, who's in first grade. We're also expecting a baby in November. We don't know if this baby is a boy or a girl, so we'll have to wait a few more months to find out!"

*Jane:* "My husband, John, and I will celebrate our 25th wedding anniversary this December. He's recently retired from being a junior high principal and is currently working at the University of Nebraska at Omaha in the Department of Education. And loving it! Our oldest son, Michael, recently graduated from college and is working full time now. Our son Andrew is a junior at Wesleyan University, and our youngest son, Nathan, is a freshman at Midland University."

**Years as a teacher:** *Danielle:* "I taught third grade for 10 years."

*Jane:* "I taught fourth grade for eight years, stayed home for nine years, then taught third grade for 10 years."

**Years as a coach:** *Danielle:* "This is my third year as a math coach."

*Jane:* "Same for me!"

**What do you each find most rewarding about being a coach?** *Danielle:* "I'd say the vast knowledge I've gained. I get to work with many great K-6 teachers who've taught me so much about student learning and what math looks like across all elementary levels. I'm able to see the progression of learning from early counting to algebra. It's fascinating! I've also had the opportunity to work at a district level to align standards, concepts, and indicators, and to develop common summative assessments. This has given me a better understanding of mathematics as a whole and how our focus always comes back to student learning and what's best for our students."

*Jane:* "For me, it's being able to share my knowledge about teaching mathematics with teachers. I love building relationships with teachers not only on a personal level but on a professional level too. I enjoy getting to know them as mathematics teachers and then figuring out how I can help them become even better at what they do to improve student learning. It's exciting for me to hear teachers having conversations about mathematics on that deeper level."

**You know each other really well. What's one thing you admire about each other?** *Danielle:* "I admire Jane's passion for knowledge. She's always reading the latest book, journal, or article and finding a way to share with others. She wants to share all she knows about math and will take the time to make sure everyone feels they have her undivided attention as they work together."

*Jane:* "I admire Danielle's passion for teaching. She's so caring and truly wants teachers and students to achieve at whatever they're involved in. She's always willing to go the extra mile for teachers and students. Her knowledge of teaching mathematics is always growing, and she has a way of communicating that with teachers. Teachers, administrators, and anyone who's in contact with her admire her passion and dedication."

**How have you been able to work together, even though you're based at different schools, and what have you enjoyed about that work?** *Danielle:* "Jane and I have worked together on our district's math curriculum committee for over 10 years and have formed a working and personal relationship. We lean on each other for guidance and support and meet several times each month to work together on district-level activities and for a coaching PLC. Jane and I took a risk together as we ventured through the PrimarilyMath program (part of the NSF-funded NebraskaMATH grant that covers math in grades K-3), and we became our district's first two math coaches! I've learned so much from Jane and deeply respect her as a teacher, a mom, a friend, and a math coach."

*Jane:* "We've also gone through the EMC Project together, and we've supported each other in that capacity for three years. We had the opportunity to help instruct the cohort from PrimarilyMath last summer, and that was an amazing experience. We've always been in different schools but still make time to collaborate. Honestly, I couldn't do my job without her support."

**What, in your opinion, is one of the biggest challenges that we face as mathematics educators today?** *Danielle:* "Several challenges come to my mind, including educating parents on what learning mathematics is like in today's classroom and meeting the needs of all students in an inquiry-based classroom. Teachers also need to *understand* mathematics, not just know how to *do* mathematics, in order to facilitate an environment that supports students taking risks in grappling with learning math."

*Jane:* "I would add to that the challenge of reaching all learners in a very fast-paced world. Teachers are being held accountable for student learning but find it challenging to meet the needs of their students with the time they have with them. We want students to be able to have the understanding with an inquiry


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## EMC COACH PROFILE (Continued from Page 5)

approach, and it can be challenging for parents to help their child. We need to help bridge that gap with parents."

**How do you like to spend your time when you aren't working?** *Danielle:* "Cheering on the Huskers football team, enjoying time with family and friends, and reading—both professional and pleasure reading."

*Jane:* "Also cheering on the Huskers, cooking, and spending time with my family."

**What's one goal you each have for this school year?** *Danielle:* "This year I have the opportunity to work with two new staffs, and I want to build trusting relationships with them. As I build relationships I want to be able to impact student learning and build teachers' capacity about teaching math. I want to be a part of their team and work together to show students how fun learning math is. I want to share my passion not only with teachers, but with their students as well."

*Jane:* "Having two schools this year for coaching has presented a huge challenge for me, so I would have to say finding the balance of coaching twice as many teachers while building relationships with all of them will be my goal for this year." ▲

## Did You Know?

EMC researchers make presentations about the project at major national and regional conferences across the country, such as NCTM. You can learn more online on the Results page of our Web site.

# Your Coaching Sessions This Year: Eight Would Be *Great!*

Each year, the EMC Project sets a target for coaches of eight (8) three-part coaching sessions per teacher during the year, or roughly one per month. And each year, some coaches meet that target, others exceed it, and some don't quite make it.

"We know that coaches and teachers have so many different responsibilities, and that can make scheduling regular coaching sessions a tall order sometimes," says Beth Burroughs, EMC co-PI and associate professor of Mathematics Education at Montana State University. "At the start of each year we simply ask that each of our coach-teacher pairs renew their effort to meet this target. It really does make a huge difference to our research study."

Why? In short, undertaking at least eight sessions per year ensures that a coach and teacher are working together closely and consistently. Because EMC is studying how changes in a coach's knowledge may bring about changes in a teacher's knowledge and practices, the project wants coaches to have as many opportunities as possible to impart their new knowledge to teachers, explains Mark Greenwood, EMC researcher and associate professor of Statistics at Montana State. "And the more consistent our coaches can be in how they go about this, the better it is for our study," he adds.

> *Undertaking at least **eight sessions** per year ensures that a coach and teacher are working together closely and consistently. … The number of sessions and the lesson content **really** **do make a difference.***

Burroughs points out that sessions don't necessarily have to be once a month. "Some coaches and teachers like to cluster more sessions at the start of the school year, for example, and then spread out the rest for the remainder of the year. That's fine," she says.

The second component of the project's annual target for coaching sessions is that at least four of the eight sessions involve a lesson in number and operations. That's because this is the one focused area within the breadth of mathematics content that researchers chose to measure throughout the study—through both online assessments and annual classroom observations by EMC staff.

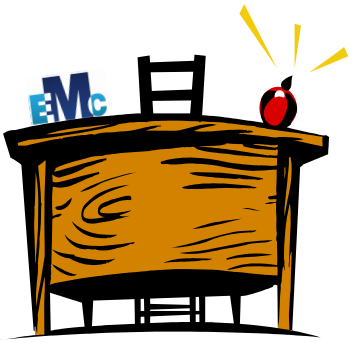
"The progression of mathematics in grades K through 8 has a preponderance of number and operations," Burroughs says, "so when we had to limit our study to one area of mathematics, it was the natural choice."

So, as you plan your coaching sessions for this year, remember that the number of sessions and the lesson content really *do* make a difference in the continuing success of the project. If you ever have questions or concerns about the EMC target for your coaching, please contact Project Director James Burroughs at emc@math.montana.edu. ▲

# EMC Project Events for 2012-13

Here's a quick summary of what's coming up in the EMC Project for the entire 2012-13 school year. If you ever have questions related to the project, just send us an e-mail or check the Participants page on our Web site.

**Coaching sessions start fresh:** Project coaches are planning now to complete a



total of *eight* three-part coaching sessions with each project teacher during the 2012-13 school year, or about one per month. *(See "Your Coaching Sessions This Year: Eight Would Be Great!" on page 6.)* At least four of these sessions should cover mathematics content focused on number and operations. Remember, a single coaching session is made up of a pre-observation conference, an observation or model lesson, *and* a post-observation conference. Coaches: be sure to keep notes on your sessions, which will help you fill out the EMC Coach Reflection and Impact Survey at the end of the year. Questions? Contact James Burroughs.

**Teacher Needs Inventory surveys ready for use:** Project teachers took the "Teacher Needs Inventory" last spring as it pertains to this school year. Coaches have already received one-page summary reports of the surveys, so now is a great time for coaches and teachers to use this important tool as a starting point for planning the year's coaching sessions.

**Assessments for coaches currently in progress:** In mid-September, coaches began their latest round of three annual online assessments. Their fourth, the Coach Reflection and Impact Survey, will again go out to coaches at the end of the school year.

**Teacher observations start in March:** Next spring, project staff will again contact all teachers to arrange a classroom observation at each teacher's convenience. *(See "Teacher Observations: What Are They For?" in the Fall 2010 edition of the newsletter.)* Please note that teachers just joining the project this fall will be observed *twice*: once this fall before most of their coaching begins and again toward the end of the school year.

**Assessments for teachers return in April and May:** Like last spring, project teachers will take all four of their online assessments near the end of the school year. The usual stipend will apply.

**Professional development for "Group 2" coaches:** Coaches in Group 2 (PD 2011/2013) have already received and confirmed their assigned dates for their second and final EMC professional development workshop, this time in Mathematics Content. The workshop will be held in downtown Denver on **July 15-19, 2013**. Coaches will receive information about travel and other workshop details in the spring. ▲

## EMC TEACHER PROFILE: KATHY PRUMMER

**Name:** Kathy Prummer
**School:** Sandpoint Middle School, Grade 7; Lake Pend Oreille School District, Sandpoint, Idaho.
**EMC participant since:** September 2011
**EMC coach:** Abe Wallin
**Principal:** Mr. Kim Keaton
**Family:** "I have four children: Jeremiah (21), Abbie (20), Tim (18), and Katelin (16). Jeremiah *(pictured, right)* graduated last May from Montana State University. Abbie is attending Boise Bible College, and Tim and Katelin attend Sandpoint High School."

**Years as a teacher:** 10
**What do you find most rewarding about being a mathematics teacher?** "I love watching kids grow! Many kids come into class in the fall feeling and expressing a lack of confidence. Once they begin to experience success with problem solving, their confidence begins to build, which motivates them to keep persevering, which creates more success and further confidence. When a student walks out in June *loving* math and feeling good at it, my heart is very happy."
**What's one way that your coach has helped you in your mathematics classroom?** "Abe is an amazing resource in my life. He provides useful problems and helps me to understand how kids will approach those problems, what prior knowledge they may bring, and where to take kids who are ready for the next steps. He has helped to build my own confidence as a mathematician and mathematics teacher. In fact, I had been teaching fifth grade, and because of Abe's encouragement and help, I decided to transfer to a full-time math position."
**What, in your opinion, is one of the biggest challenges that we face as mathematics educators today?** "Time limitations. In order for kids to think and solve problems, they need time to do that. It has been very difficult to cover all of the standards and still be able to slow down to provide time for problem solving, collaboration with other students, and communication of student thinking. We are very hopeful that Common Core will help us to meet this challenge."
**Favorite pastimes away from school:** "Hiking, biking, golfing, kayaking, cooking, and spending time with family and friends."
**What are you reading right now?** *Five Practices for Orchestrating Productive Mathematics Discussions* by Margaret S. Smith and Mary Kay Stein (NCTM, 2011). "The five practices are: anticipating, monitoring, selecting, sequencing, and connecting. I've been working hard on all of these as a math teacher, but I don't feel like I'm as successful yet as I would like to be. This book gives great ideas about how to implement these practices more effectively."
**One personal or professional goal for this school year:** "My main goal for this year is to maintain a better balance in my life. I tend to work too much and play too little. I will be more available to my family and students if I make time to balance." ▲

# And Don't Forget These Important Announcements!

## Annual Coach Assessments Are Underway, Due Soon

It's that time of year again. Last week all EMC coaches received their annual fall assessments, to be completed online. For coaches who have participated in EMC since the project's beginning, this round of assessments is their *fifth*. That's a lot of important information that EMC has gathered!

These annual assessments are a crucial part of the EMC Project's research focus—a way to quantify changes in coaches' knowledge of both coaching and mathematics content over time.

Special thanks to all coaches for completing this fall's round as soon as possible. ▲

## Have You Moved?

Remember, if you ever have any changes to your e-mail address, your name, your school location or work assignment, or especially your home mailing address (where we send your stipends), please send us a quick e-mail to let us know. *The Post Office will* NOT *forward or hold stipend payments*.

Also, we send you several important e-mails throughout the year. Please be sure that our messages make it to your in-box and not your junk mail folder! (It may help to add emc@math.montana.edu to your address book.) ▲

EXAMINING MATHEMATICS COACHING

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