DOINGWHATWORKS

VIDEO
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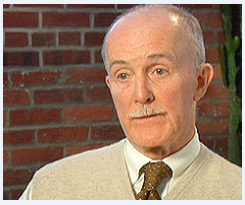
Full Details and Transcript



# Helping Students Debrief

Mark J. Driscoll, Ph.D., September 2011

**Topic** IMPROVING MATHEMATICAL PROBLEM SOLVING IN GRADES 4 THROUGH 8

**Practice** REFLECT AND DEBRIEF

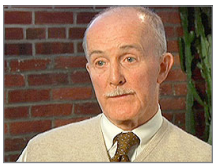
**Highlights**

- Dr. Driscoll comments that teachers can debrief problem-solving strategies systematically by structuring discussions.
- He suggests written tools for structuring discussions (e.g., sentence frames) to help students be reflective and share their thinking.
- Research supports the importance of metacognition, which is being reflective about thinking.
- Teachers need to use questions to help students be aware of and express their thinking during problem solving. These types of questions promote habits of mind in students.
- Teachers' questions can help students be analytical in looking at their own and others' solutions to problems.
- Dr. Driscoll explains how teachers can prompt students to learn from mistakes and value false starts.
- He notes the Common Core mathematical practice of making sense and persevering in problem solving can become part of the culture in a classroom.

## About the Interviewee

Mark Driscoll has directed a range of teacher enhancement, leadership, and materials development projects at Education Development Center. These include the MathPartners tutoring materials, the *Fostering Algebraic Thinking* book and toolkit, and the *Fostering Geometric Thinking* book and toolkit. He co-directs Fostering Mathematics Success of English Language Learners, an NSF-funded research project, as well as Mathematics Coaching Supporting English Learners, a research project funded by the Institute of Education Sciences. He received his Ph.D. in mathematics (differential geometry) from Washington University in St. Louis and taught mathematics at Logos School, an alternative high school in inner-city St. Louis. He has been co-chair of the National Council of Teachers of Mathematics (NCTM) Task Force on Reaching All Students with Mathematics and a member of the writing team for NCTM's *Assessment Standards for School Mathematics*. From 2003-2007, Dr. Driscoll served as editor of *Mathematics Education Leadership*, the journal of the National Council of Supervisors of Mathematics (NCSM). In 2010, he was on the development team for the What Works Clearinghouse Practice Guide on Mathematical Problem Solving. In April 2010 he received the NCSM Ross Taylor/Glenn Gilbert National Leadership Award.

## Full Transcript



**00:04** I am Mark Driscoll at Education Development Center. Education Development Center is also known as EDC, Inc.

**00:12** Teachers can build to debriefing multiple problem-solving strategies with students systematically. Teachers have several ways—proven ways—to help students become more skilled in discussing multiple solutions to problems, and one is to structure the discussion at the table with written tools that the students can use. Like one that's commonly used today is sentence frames. So, a sentence frame might do something like "I tried _____ because I thought _____." I mean, this is along those lines of structuring the student's statement along the lines of being reflective, about thinking, and then having the student personalize it by putting in the answers to that and then having them compare. Students can talk about that together and

begin to develop this kind of normal discourse that we share our mathematical thinking.

01:19 The research does back up a lot of this by way of the importance of metacognition, which is a fancy word for saying we as problem solvers become more reflective about our thinking. And so helping students to do that with the simple problems like sentence frames can carry—in my experience, kids will start to ask each other the kinds of questions that the teacher asks them, and kind of spontaneously. And so I think making sure those questions really help the students express their thinking, their mathematical thinking, that I think has a lot of long-term value for the kids as mathematical problem solvers.

02:06 Teachers can prompt student sensitivity and student awareness of strategies being employed in a number of ways, and one is through a set of questions that really try to get at what the students are noticing in a particular solution. If a teacher has student solutions up on chart paper or up on the board, can ask the questions, "What do you see in diagram A from student A that's giving information that isn't in the diagram of student B? Now what do you see in B that's not in A?" to develop that eye; it is an eye and it's a habit of learning to be more analytical. And then broadening the questions out, I think it's a matter of prompting students to become aware of their own thinking. It's a set of metacognitive skills that has the student really thinking about his or her own thinking and then being able to put it to words. And those questions can be "What did you try first and why?" not just "What did you try first?" It's "Why did you try that?" and "Why did you decide to try something different?" It's those *why* questions and *when* questions and *how* questions that I think become habitual, and kids will start to use those questions themselves.

03:32 Another prompt is for students to learn from their mistakes, and one way to do that is for the teacher to have the students value in their written student work that they are showing false starts and to inculcate in the students that that's what mathematicians do; they have false starts all the time. If you look at the current mathematical

practice standards of the Common Core Standards, the first of the eight mathematical practice standards is make sense of problems and persevere in solving them. Well, there aren't any formulas for making sense of problems and certainly not any for persevering unless it becomes part of the culture in the classroom. And that students learn that even great mathematicians learn from their mistakes and that the teacher should be an agent in helping the student do that, by looking at the student work and helping the student become more reflective of his or her thinking about the problem.

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