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FULL DETAILS AND TRANSCRIPT

Helping Students Who Aren't Ready for Algebra

Bonnie Grossen, Ph.D. • November 2008

Topic: National Math Panel: Major Topics of School Algebra

Practice: Multiple Paths

Highlights

- Challenge for algebra teachers of unprepared students
- Example of problems students have with fractions, decimals, percents
- Collision between algebra requirements and student preparation
- Importance of programs to support students who have not mastered fundamentals
- Need for more time and efficient, organized curriculum to catch students up

About the Interviewee

Bonnie Grossen, Ph.D. is Executive Director of the Center for Applied Research in Education (CARE) affiliated with the University of Oregon. In that capacity, she is leading a professional development team in implementing best practices for math and science instruction in middle and high schools serving high-need schools in the South Pacific, California, Florida and other states.

Dr. Grossen has over 50 scholarly publications: over 30 reports of original research studies published in peer-reviewed journals such as *International Review of Education, South African Journal of Education, Journal of Learning*

Disabilities, School Psychology Review, Journal of Research in Science Teaching, over 10 chapters in books, and 20 reviews and syntheses of research. The thrust of her research work is to improve higher-level thinking and problem solving for all students, including students with disabilities, and research in math and science instruction. Most recently her work has focused on turning low-performing middle and high schools around by implementing the findings of scientific research.

She has presented at over 50 national conferences, including keynotes presented at over 20 conferences. She has worked with the American Federation of Teachers over several years in aligning their professional development program with the latest research on effective instruction.

Full Transcript

I am Bonnie Grossen, Executive Director for the Center for Applied Research in Education, also known as CARE, and CARE is affiliated with the University of Oregon.

One of the most serious problems that teachers of algebra have is that students come to them so ill-prepared. I have here a stack of papers from a small high school. All the tenth graders in the high school took this little test. Particularly on one question where they're asked to show the equivalence between a decimal, a fraction, and a percent, 90% of them are unable to do that task. For example 3.15, written as a decimal, this student writes as the equivalent of 3/15 as a fraction and equals 15%. And 7/100, written as a fraction, equals 7.100 as a decimal and equals 700%. So, total lack of understanding in the relationship between decimals, percents, and fractions for 90% of the students in this tenth grade class.

The big question is how are we going to teach these students algebra and higher math and prepare them for the big wide world they are going into? I have observed a collision between what students come in prepared to be able to do and how high schools typically try to deal with the problem. For example, in California, the state requires that students leaving high school should have at least one year of algebra but most high schools have their students on a college preparatory track, which requires more higher math—algebra and geometry, I believe—and three years of passing those courses so that they are ready for college. And the high schools want to say that they are preparing their kids for college and that they have a curriculum that requires students to meet the requirements for the California colleges. But many of the students they get are not ready to take those courses. And so what I find often is that students will be carrying 20 pound books and going to courses that have fancy titles, and sometimes they will even be passing—getting a pass in those courses, and yet when they take a high school exit exam like California's High School Exit Exam, they can't pass that exam. We can't say well we need students to come into our school well prepared for algebra. If they come and they are not prepared, especially in huge numbers, we have to deal with that. And that's what many of these high schools are facing, especially in high-need communities. And so it's important to have that college track available for the students who are ready and able to work in those courses, but

there also needs to be a program in place that will accommodate the needs of those math students who haven't mastered some of the basic fundamentals. And it is possible for them to learn an amazing amount in a year but there are certain requirements that have to be in place.

Well over the last five years we have been looking at how to work with students that are missing some of these critical skills for algebra and how to catch them up, teach them the missing pre-skills, and begin them into algebra, work them toward being prepared for an authentic algebra course. When kids are so desperate, we can't just do it overnight. We do need time. But then the curriculum and the instruction has to be so well organized and efficient that we can teach them things like the relationship between fractions, decimals, and percents and, as we are working in those types of problems, have the unknown appear in different places—not always at the end after the equals sign—so that they are beginning to work with unknowns and getting some of the algebraic concepts.