

Get to Know Ed Zaccaro, giftED18 presenter and creator of the Challenge Math curriculum

How did you get your start in working with gifted students in math and science?

Approximately 25 years ago I had a conference with my youngest child's first-grade teacher about the level of math instruction that was taking place. Daniel already knew the material that would be covered that year and I was concerned that he would start to dislike math and school due to boredom. At the time, I often referred to myself as an "appropriately obnoxious" parent. I also was a teacher and knew that the job wasn't easy, but at the same time, I wanted the instruction to fit Daniel's ability level. After a lengthy discussion, Daniel's teacher asked me if I could come in once or twice a week and work with several students who were advanced in mathematics. I accepted the challenge and it changed my life. At the time, I was teaching high school students who had been expelled from our city's alternative school. Even though I loved working with these students, after working with mathematically gifted students who hungered for knowledge and challenge, it was very difficult to switch gears and return to teaching students who lacked the level of motivation my first-grade gifted students possessed.

I was unable to find material that was suitable for the advanced students I taught, so I developed my own curriculum, which led to the publication of several books for mathematically gifted students.

Tell us about a student who has impacted you.

I was doing a workshop with a group of about 20 mathematically gifted fifth-grade students. I was a visiting teacher and had not worked with any of the students previously. At the end of the hour-long class, I gave the group a very difficult problem based on the day's lesson. It was a 4-step problem that usually takes advanced students approximately 5-10 minutes to solve. Seconds after I gave the problem, a girl in the back raised her hand and gave an answer. I didn't have the answer key in front of me, but I was pretty sure her answer wasn't correct because the answer came 5 seconds after the problem was given.

Before I checked the answer sheet to see if she was correct, I told her it might be the right answer, but it usually takes a lot longer to solve. When I opened the answer folder, I found out that she was indeed correct. I waited until everyone else had time to work on the problem before I asked her how she was able to do a 4-step problem in 5 seconds. She responded with a very clever one-step solution that I had not thought of—and I had been doing this problem for 10 years! I gave her a Genius Award (a picture of Einstein with her name written underneath) and told her how impressive her thinking was.

The next day, the girl's teacher called me because he wanted me to know how the Genius Award had impacted his young mathematically gifted student. The teacher had just finished talking on the phone with this young girl's father, who told him that the girl came home and told her father that this award was "*the best thing that has ever happened to me.*" This one experience brought home to me the importance of acknowledging mathematical brilliance in children. We acknowledge brilliance in

athletes and musicians, but brilliant mathematicians are rarely given the feedback that their skill is valued and important.

You often reference real-world events when talking about math—something most teachers and students wouldn't associate with the subject. Why do you think using real-life examples is important in a subject like math?

One of the key ingredients in developing excellence in mathematics is passion. How many students would go on to excel in athletics if they were forced to practice only drills and never had the opportunity to put those skills to use in a game? How many students would go on to excel in music if they only did scales and never played music that inspired them? How many students would go on to excel in literature or reading if the only material they read was boring with no connection to their life? I believe that this is the reason very few students excel in mathematics—it is rarely taught in a way that allows students to see real world uses of the skills that are being learned. Children must be shown the high interest, important uses of math such as the following:

- 1) How a simple math problem would have prevented a tug-of-war tragedy at a middle school in Pennsylvania.
- 2) How a misplaced decimal point almost killed two college students
- 3) How a simple algebra equation could have saved a bookstore over \$10,000

Through my years of teaching mathematics, I have learned that one of the keys to good mathematics instruction is to balance basic skills and high interest math—each alone is not sufficient. In addition, because math instruction can be dry and boring, I try to add humor whenever I teach students or present at math workshops.

If you could talk math or science with any figure in history, who would it be and why?

Richard P. Feynman (1918–1988) was a Nobel Prize winning physicist and teacher who was one of the most celebrated and revered scientists of modern times. It is very difficult to express in a

paragraph the beauty and uniqueness of Dr. Feynman's approach to the wonders of the world around us—he was truly one of a kind. Dr. Feynman's passion for math and science was evident every time he spoke on an academic topic and most importantly, he was the rare genius who could take a very complex topic and explain it to the average mind. Some of Dr. Feynman's famous quotes show how insightful and interesting he was:

“The first principle is that you must not fool yourself—and you are the easiest person to fool.”

“You can know the name of that bird in all the languages of the world, but when you're finished, you'll know absolutely nothing whatever about the bird. You'll only know about humans in different places, and what they call the bird . . . I learned very early the difference between knowing the name of something and knowing something.”

“From my knowledge of the world that I see around me, I think that it is much more likely that the reports of flying saucers are the results of the known irrational characteristics of terrestrial intelligence than of the unknown rational efforts of extra-terrestrial intelligence.”

(This is a Richard Feynman quote about reports of flying saucers and the likelihood that they are visitors from outer space.)