

Teaching Statement

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My dad taught high school algebra in the inner city of Hartford, CT, for over 40 years. His students would often start the year lacking in both preparation and motivation. And yet, time after time, many of them ultimately succeeded in algebra and beyond—some even went on to Ivy League colleges after graduation. This was due in no small part to my dad’s teaching ability. He was excellent at it. His former students would tell me as much whenever we ran into them in town. So, a few years ago, I asked my dad how to teach well. His response: *emphasize the fundamentals*. In retrospect I should have anticipated this answer. Whenever my dad taught me a mathematical concept during my youth, he would drill me on its simplest aspects so much that I would literally begin to laugh. It really seemed silly! But then I would slowly realize, to my astonishment, how much I had learned.

I have consistently used my dad’s advice as a guidepost for my teaching. It has proven to be a fairly successful blueprint. What has evolved, however, particularly over the past 2+ years during my time as a visiting assistant professor at Penn State Altoona, is *how* I put his advice into practice. Two recent (and new) experiences have had a indelible influence: teaching Precalculus, and being involved with Project NExT.

Teaching Precalculus is hard. For me at least, the simplest mathematical concepts can be the most challenging to explain. A Precalculus instructor must not only *emphasize* the fundamentals, but *teach* the fundamentals! My recent experiences in this arena have forced me to think pedagogically about issues that are often glossed over in a Calculus class, and I believe my Calculus teaching has improved as a result. As an example, consider logarithm functions, a topic I just recently completed in my current Precalculus course. Throughout the entire chapter on logarithms, I frequently asked my students “So, what does $\log_b(x)$ mean again?” and when they happily replied with the slogan “it is the exponent you can raise b by to get x ” I knew they had that intuition to rely on if they ever forgot what the graph looks like or how the logarithm laws work. In my Calculus II class we began infinite series around this same time. Determining the convergence or divergence of one particular series relied on basic knowledge of the function $\ln(x)$, and after some struggles I asked “So, what does $\ln(x)$ mean again?” My Calculus students responded with laughter, much like I would respond to my dad when I was young. But then we recalled the meaning, and with that intuition to rely on, the fate

of the series in question became clear. The laughter had subsided. The students had slowly realized that they prevailed, thanks to the fundamentals.

In 2014 I had the good fortune of being selected as a 2014-2015 Fellow of Project NExT, a program of the MAA designed to train, mentor, and inspire early-career college mathematics teachers. As a Project NExT Fellow I have attended numerous seminars on innovative classroom techniques, and I am now part of a large network of other Fellows from previous years with whom I can share experiences and exchange ideas. My involvement in Project NExT inspired me to try active learning through group work in my classes starting in Fall 2014, and the feedback from my students since then has been overwhelmingly positive. A recent example of effective group work occurred in the first week of my current Calculus II course. Our first topic was Integration by Parts (IBP), and on the second day of class (when nobody knew each other) I had my students break in to groups of 3 or 4. [The mere act of breaking into groups helped break the ice.] I then passed out a short packet to spark discussion among the groups en route to discovering and applying IBP. While walking among the groups I observed one student who understood the IBP formula well, but could not do a basic integral that arose from it. Meanwhile, her group mate was confused about IBP but recognized the basic integral from Calculus I. The synergy that followed was instantaneous—both students became more solid on the fundamentals in that moment. Through group work, I have found that *everyone* in the class is lifted up! Weaker students learn from stronger ones, and what is more, strong students become even stronger by explaining to others what they know. Group work taps into something powerful that an ordinary lecture usually cannot.

Who I am as a teacher today is the result of very fortunate circumstances. Currently, at Penn State Altoona, I am lucky to be part of a faculty that cares more about their students than any I have ever seen. As a Project NExT Fellow I have received endless pieces of valuable advice from colleagues who are all incredibly thoughtful in their approach to teaching. Before that I spent 4 years in a wonderful teaching environment at the University of Rochester, where the mathematics department has a strong teaching culture and a high percentage of undergraduates (around 8%) choosing mathematics as their major. And before any of that, of course, was my dad, who was a far better teacher than I will ever be. He passed away in 2013, just as I was about to finish my PhD. I view everything I do in the classroom is an opportunity to honor his memory. In the years to come, I look forward to *emphasizing the fundamentals* in my courses in new and exciting ways that will make my dad proud.