

## DOING AND BEING

With tassels dangling in my field of view and diploma in hand, I walked across the manicured high school lawn. After the graduation ceremonies and cheering had ended, Mr. Parent, my AP English teacher, pulled me aside and handed me a letter. This man helped me love literature through his passionate exhortations, but more than that, the respect he showed me – as he did every one of his students – generated in me a profound respect for him. He believed that every student has an inherent capacity and desire to learn anything, and through his demanding classes, he worked to tap into that. So when he imparted knowledge, I listened. Inside the envelope were words of encouragement for my future: “Teaching is not a matter of *doing* but of *being*.” Clearly he had heard me when I said I wanted to teach, and this was his sage advice. For years, I had sat in a desk and watched teachers *do*—preparing lesson plans, grading papers, meeting with students. Teaching is a matter of being? I chalked his advice up to one of Mr. Parent’s poetic turns of phrase. It would take years and experiences in a number of classrooms before I could fully appreciate the full weight of his words: *being* a teacher means being an important part of your students’ lives, as he was in mine.

In June 2003, I graduated from the Massachusetts Institute of Technology with two S.B. degrees in mathematics and science, technology, and society. Although Mr. Parent’s English class was my inspiration to become a teacher, mathematics was my passion. Some of my favorite nights in high school and college were spent trying to wrestle with a particularly stubborn problem. The unsolved puzzle could quickly become agonizing, but plodding forward almost always rewarded me with a sense of accomplishment and pride. In addition to pure mathematics, many of my courses required a profound understanding of physics principles—classical mechanics, electricity and magnetism, circuits and electronics, principles of applied math, as well as courses on the history of physics. For over two years, I worked as a research assistant for a professor exploring the changing uses of particle physics diagrams in the twentieth century, and my undergraduate thesis centered around a high-energy particle physical laboratory on Long Island. I am excited to share the thrilling process of discovery and my knowledge of math and physics with young adults.

While my passion for math and the history of physics deepened with each new class, my desire to teach remained strong. In my senior year, I entered MIT’s Teacher Education Program. I observed a number of different classrooms from September to December and taught solo in my own classroom from January to June. While assisting in various other math classes, teaching two pre-calculus classes in an urban high school with a diverse population challenged me—and helped me grow—as a person and as an educator.

I will never forget a lesson I designed in my first month teaching pre-calculus, on inverse trigonometric functions like  $\sin^{-1}(x)$ . We had just wrapped up a successful week on trig functions, during which my students came to understand the meaning and various applications of these functions, as well as how to graph them. I felt confident that this lesson would be easy for them. I couldn’t have been more wrong. Early in the class, the quizzical looks on my students’ faces started to appear, then multiply. The more questions they asked, the more my stomach churned and my chest tightened. They weren’t getting it. I reviewed trig functions and how to use their graphing calculators again, in a desperate attempt to clear things up, but their frustration only increased. Before class ended, I asked my students to write down what they learned and what questions remained, and I walked home defeated.

That evening, after taking a deep breath and reading through the students’ notes, I saw where I had gone wrong. It wasn’t the trigonometry which eluded them; it was the concepts of functions and inverses. Those concepts were introduced in the beginning of the school year—and forgotten in the intervening months. The next day, I re-introduced the material incorporating my insights from the previous night. I also gave them a handout I had prepared showing them how to use their calculators. The class was a huge success—the students breathed a sigh

of relief that they understood the material, and I breathed a sigh of relief that I could meet them where they were and walk *with* them in our pursuit for understanding. My students and I were on the same team. I started to see glimpses of what Mr. Parent had tried to communicate years earlier. Designing and executing a great lesson plan is important, but it isn't enough. Teaching well demands an emotional and personal investment on the part of the teacher. When it came to my students, their frustrations became my frustrations, and their successes became my successes. I soon learned that *being* a teacher is hard, rewarding work.

Soon after the high school year came to a close, my days at MIT were over. Clutching my degrees and walking across Killian Court, I had reached another crossroads. I was a teacher at heart—but my time at MIT made me wonder about teaching at the college level. Additionally, my time spent investigating the history of physics opened exciting new vistas of understanding and inquiry. Learning how scientific developments come to be in the world, understanding how they interact with us and society-at-large, strengthened my love for math and physics. A few months later, thanks partly to a National Science Foundation fellowship, I was in sunny Los Angeles pursuing an advanced degree in the history of science. At UCLA I took a rigorous course load and in 2005 received my masters in history. My scholarly research focused on education—by studying the interconnected developments in the rise of the modern high school and university and the discipline of American physics.

While in graduate school, I voluntarily deferred my NSF fellowship to lead discussion sections in three introductory history of science classes. Here too I led discussions with the philosophy that my students and I were part of a team, but this time instead of vectors and the law of sines, we were trying to uncover the parallels between thermodynamics and Darwinism, or debate the effects of media portrayals of global warming. Students enrolled in these classes came from all different disciplines, and it was challenging to bring them to a common meeting ground. Literature students, for instance, were often foiled by the technical physics documents, while mechanical engineers had trouble grasping the same documents' historical significance. After my experience teaching pre-calculus, I knew I could talk until I was blue in the face, but if my students didn't understand, I wasn't *being* a teacher—I would merely be *doing* teaching, and badly. To overcome this divide, I initiated new methods, such as forming groups with students from across the academic aisle, which proved successful. The skills I developed in these classes, such as leading lively discussions, honing student communication skills, and coaching students to think analytically, were added to the repertoire I already acquired. Midway through each of the courses, I asked for anonymous feedback from all of my students. I took their praise in stride and their suggestions into consideration. For me, being a teacher requires continuously demanding improvement, not just from students, but from myself as well. By the end of the three classes, my desire to teach—for thinking on my toes, seeing the glint of understanding in my students' eyes, challenging young minds—was fixed.

Over the next year and a half, I began my dissertation research. But dusting off nineteenth century textbooks and combing university archives was isolating. Research wasn't interactive. And I realized that pursuing a career in the history of science would ultimately lead to a professorship in a research university, where scholarly research is inordinately privileged over teaching. Although the joy that arises from learning is great—it was largely this joy that brought me to graduate school—it is the joy of teaching that brings me back to high school.

My experiences in Cambridge and Los Angeles forged the type of teacher I am. I believe that teaching requires constant adaptation based on student learning. Underlying this sentiment is my firm belief in the inherent capacity and desire of students to learn. I hold high, clearly-defined expectations for my students, but I provide them with the tools and helping hands to meet them. I teach enthusiastically on every topic, with the belief that enthusiasm is infectious. And I show that math and science are not merely textbook activities, but relevant to the surrounding world. From my time spent with these young men and women, Mr. Parent's sage advice finally made sense. Teaching well truly was about *being*. Being flexible, a strong communicator, attentive to student learning, available for help, compassionate, organized, and dependable. In other words, striving to be for my students what Mr. Parent was for me.