Teaching Isn't Rocket Science. It's Harder.

To solve engineering problems, you use your brain. Solving classroom problems uses your whole being.

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Easier than teaching algebra.

In 2007, when I was 22, I took a position as an aerospace engineer working on the design of NASA's next-generation spacecraft. It was my dream job. I had just received a degree in mechanical engineering, and the only career ambition I could articulate was to work on something space-related. On my first days of work, I was awestruck by the drawings of Apollo-like spacecraft structures, by the conversations about how the heat shield would deflect when the craft landed in water and how much g-force astronauts could withstand. I couldn't believe I wasn't just watching a documentary on the space industry—I was inside it.

I was extremely motivated during my first year of work. I got in earlier and stayed later than most, and I tried to learn everything I could from my more experienced colleagues. The work wasn't easy. Our team was trying to re-engineer, with modern technology, something that was

designed in the ’60s. As a design engineer, I had to integrate the efforts of several different groups that often didn’t talk to each other or even get along very well. My deadlines haunted me like a thousand nightmares. Over the course of the next few years, though, I received awards and exceptional performance reviews, and I gained the respect of my colleagues, some of whom had been in the business for about as long as I had been alive.

Because I’ve worked as an aerospace engineer and later as a teacher through Teach for America—this is my second year of teaching 11th grade math and robotics at Sierra High School in Colorado Springs—I find the public perception of both careers to be fascinating. When I tell people that I worked on the design of a NASA spacecraft, their mouths drop and their eyes pop, and their minds are no doubt filled with images of men in white lab coats running between rocket engines and blackboards filled with equations of untold complexity. Most people will give aerospace engineers tremendous respect, without having any idea what they actually do.

But no one can fully understand how difficult teaching in America’s highest-need communities is until he or she personally experiences it. When I solved engineering problems, I had to use my brain. When I solve teaching problems, I use my entire being—everything I have. A typical engineering task involves sending an email to a colleague about a potential design solution. A typical teacher task involves explaining for the fourth time how to get the variable out of the exponent while two students put their heads down, three students start texting, two girls in the back start talking, and one student provokes another from across the classroom.

As a teacher, I must prioritize the problems of getting the distracted students refocused and stabilizing the cross-classroom conflict before it escalates into a shouting match or worse, all the while making sure the learning of the other 25 students in the room doesn’t come to a complete halt. I also must address these problems in a consistent, respectful way that best serves the needs of the students, because if I don’t, the problems will increase in number and become more difficult to solve.

As an engineer, I dealt with very complex design problems, but before I decided how to solve them, I had a chance to think, research, and reflect for hours, days, or even weeks. I also had many opportunities to consult colleagues for advice before making any decisions. As a teacher, I have seconds to decide how to solve several problems at once, for hours at a time, without any real break, and with no other adults in the room to support them. There are days of teaching that make a day in the office seem like a vacation.

One of the biggest misconceptions about teaching is that it is a single job. Teaching is actually two jobs. The first job is the one that teachers are familiar with; people who have not taught can pretend it doesn’t exist. The tasks involved in this first job include lesson planning, grading, calling parents, writing emails, filling out paperwork, going to meetings, attending training, tutoring, and occasionally sponsoring a club or coaching a sport. The time allotted to teachers for this work is usually one hour per workday. But these tasks alone could easily fill a traditional 40-hour work week.

The second job is the teaching part of teaching, which would more aptly be called the performance. Every day, a teacher takes the stage to conduct a symphony of human

development. A teacher must simultaneously explain the content correctly, make the material interesting, ensure that students are staying on task and understanding the material, and be ready to deal with the curve balls that will be thrown at her every 15 seconds—without flinching—for five hours. If, for some reason, she is not able to inspire, educate, and relate to 30 students at once, she has to be ready to get them back on track, because no matter what students say or do to detract from the lesson, they want structure, they want to learn, and they want to be prepared for life.

I experience more failure every five minutes of teaching than I experienced in an entire week as an engineer. Giving a presentation to NASA about how the thermal protection system of a spacecraft is connected to its primary structure is a cakewalk compared to getting 30 teenagers excited about logarithms. A difficult moment in engineering involves a customer in a big meeting pointing out a design problem that I hadn't considered. The customer's concerns can be eased with a carefully crafted statement along the lines of, "You're right. We'll look into it." A difficult moment in teaching involves a student—one who has a history of being bullied and having suicidal thoughts—telling me that she is pregnant 30 seconds before class starts. What carefully crafted statement will help her?

Moments of success seem to come less often as a teacher, but when they do arrive, they can make up for all the failures: the excitement on a student's face when she understands a concept after lots of struggle; the feeling of exhilaration when all the energy in the room is directed toward the day's lesson; the shared laughter between teacher and student at a joke that only they understand. Sometimes successes doesn't strike until later, as when I found out that a two-minute presentation I gave on petroleum engineering changed the career path of one of my students. In each second of her chaotic day, a teacher has a chance to transform the lives of young people for the better. How many aerospace engineers can say that?

In teaching, a person can be extremely competent, work relentlessly, and still fail miserably. Especially in the first year or two on the job, success can seem impossible. For people who have been so successful up to that point in their lives—failure is a difficult thing to face, especially when that failure involves young people not being able to realize their full potential in life.

Because of all this, sometimes teachers in high-need communities think about leaving for other professions. As someone who quit his job designing a NASA spacecraft during a severe recession without any clear plan, I understand the power of doing what feels right to you—you have that choice, that privilege. Just don't forget about the ones who don't have much in the way of choices and privileges. Don't forget about the ones that don't get to choose what school they go to. Who don't get to choose who their teachers are. Who don't get to choose how the students around them act. Who don't get to choose what kind of environment they were born into. Don't forget about them. They'll be there Monday morning.