Sheri Sheppard Personal Statement

Anna and Zach finished lunch and are on their way to week three of ENGR 14: Introduction to Solid Mechanics, along with 98 other students. Now sophomores, they are excited and a little scared about being in their first real engineering course. Anna has long wanted to be a civil engineer and now she can start the material key to her future work, but she questions, “Will I actually be good at this type of work?” Zach is uncertain if he wants to be an engineering major, and if so, what type?

They enter a classroom with movable tables and chairs, join their pod of 25 students, and begin asking classmates, the professor, and their pod TA questions about the bridge project. Over the next 105 minutes, students will complete a concept inventory quiz, hear a mini-lecture on free-body diagrams, work with a partner to solve free-body-diagram exercises at various stages of completion (getting feedback from the teaching team along the way), complete a hands-on exercise with Jenga blocks involving calculations and experimentation, and update their teaching-team coach on two possible designs for the bridge project. So goes a typical day in ENGR14, where the professor no longer lectures for long periods of time and the TA team teaches right alongside.

But not a typical day 28 years ago, when my primary goal was for students to learn fundamental engineering concepts and to practice applying concepts in weekly, prescribed problem sets. This was a comfortable way to teach. It was how I was taught, and there was a certain neatness, predictability and orderliness to it. But it did little to motivate students beyond getting the right answers and certainly didn’t get them “jazzed” by the material and the possibilities it opened.

BIG LESSON #1: Learning about Learning. A lecture/problem set course can only take engineering learning so far. A powerful motivator for me was tapping into existing educational expertise and, later, learning through my own educational research about how we attract and retain students to engineering, how design and analytic thinking mature, and how the efficacy of hands-on learning can be measured. Students need to see and work with concepts in different and coordinated ways (e.g., in words, pictures and diagrams, with hardware, as mathematical or computer models) because they learn in different ways and are motivated by different things. Bringing various modes of learning into class also has the benefit of students rolling up their sleeves to explore, try, measure, and question; it “ups” the energy in the room!

BIG LESSON #2: Learning about the Roles of Engineering Professionals. My time as Senior Scholar at the Carnegie Foundation for the Advancement of Teaching called into question and expanded my notions of professionalism, vocation, and calling. Challenged by my Foundation colleagues to think about roles of “engineer” that go beyond physics-based analysis, I realized that the sophomore level, when students make significant commitments to a major and possible career path, was just the place to begin “trying on” the complex, creative, and ethically-charged nature of engineering. I wanted students to learn in ways that challenged them to reflect upon: Is this work I enjoy? How does this type of work play out in various professional settings? Is this work where I can make a difference in the world?

The basic philosophy in ENGR14—putting skills and concepts “into play” in semi-authentic, if not authentic situations, and actively questioning how those skills might be a part of their future studies and work—also plays out in my mentoring efforts with undergraduate researchers and the next generation of teachers, be they graduate students, postdocs, new assistant professors, or future K-12 teachers. This mentoring happens at Stanford and beyond, through my lab’s research activities, teaching-related workshops and courses that I lead or co-lead, my writings (papers, books and book chapters) and presentations, and university and national committee work.