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"It is the supreme art of the teacher to awaken joy
in creative expression and knowledge."
—Albert Einstein

Teaching has always been a central part of my life. As a child, rather than study or read alone, I videotaped countless hours of science experiments and history lessons in hopes of helping my younger cousin in school. Then at eleven I started writing small computer programs and dreamed of creating educational games. Those dreams became reality in high school when I created an online 3D virtual world where students worked together from different locations to improve their math skills. This project won a 1st place at the National Junior Science and Humanities Symposium and a trip to speak about it at a junior science conference in London.

I have always approached teaching with the attitude that it is a part of human nature to enjoy learning for the sake of learning. This approach is optimistic, possibly even idealistic, but it is what drives me to be at my best in the classroom. Unfortunately, this approach is also considerably difficult in an introductory engineering curriculum where class sizes easily reach over two hundred. I see similar parallels in the public elementary school where I tutor in which teachers often seem burdened by such a high student-to-teacher ratio. Numeric grades are usually the most efficient way to measure student performance in such cases, but we run the risk of students' associating education with something extrinsic to discovery by itself.

But in order to foster discovery, students must see a goal that prompts them to reach deeper than superficial rewards such as grades. Every teacher has had to answer some form of the question "Why do we have to learn this?" or "Are we really ever going to use this?" One of my favorite examples comes from my teaching of a calculus II recitation in which a student commented, "Imaginary numbers aren't useful in real life. They're just imaginary." The question completely took me off guard because at the time I was taking a digital signal processing course in which complex numbers are essentially the foundation of the discipline. I stopped the Taylor polynomials lecture I was giving and started explaining a fundamental identity of signal processing and imaginary numbers—Euler's formula—, how it could be derived using Taylor polynomials, and that if imaginary numbers did not exist, neither would devices such as cell phones and radios to name a few.

When I decided to become a teaching assistant, I chose mathematics because it is both the most fundamental and most abstract discipline engineering students encounter. Finding the right contexts in which to frame its abstract concepts can be challenging, especially in a large freshman class with students having diverse backgrounds and interests. As a student myself, I have found that working in a research lab has augmented my classroom experience by allowing me to place new topics into a context or conceptual framework with which I am familiar. Upperclassmen who have taken advantage of research and internship opportunities have this ability, but freshmen often do not. And, it is freshmen who run the risk of becoming frustrated and discouraged early on in a rigorous engineering program if they cannot see a purpose for what they are doing.

Seeing the need for tools to help instructors create engaging content for students, I started writing mathematics distance education software, which I named *Endeavor,* based on my high school science project. For instructors and teaching assistants like myself, it provides the flexibility necessary to custom-fit its existing content to their own curricula as well as to build new modules as needed through an easy-to-use programming language I created and a graphical editor I am currently working on. For students in the calculus classes I teach, my program enhances learning by allowing students to tweak problem parameters to see changes in solutions. I hope that this software will be used to create lessons that allow students to manipulate concepts applied in various engineering contexts so that they can better understand the purpose behind the theorems and topics they are learning.

Creating this software has been one of my most challenging activities even when compared with rigorous academics at Georgia Tech and multiple research projects. A typical week might include more than twenty hours working into the early morning to create additional features so my students could review for upcoming tests. One new feature will establish a learning network by monitoring student progress and allowing a student who is having difficulty to connect automatically to another who is proficient with the concept. This feature not only helps struggling students but also allows skilled students to strengthen their abilities by teaching the material.

My research interests and career plans follow my goal to enhance learning and education in general. My second semester I started working in Dr. Steven Potter's neuroengineering lab studying mechanisms behind learning and memory. And last summer, I began additional work at Children's Healthcare of Atlanta using software to measure brain tissue atrophy from MRI scans of children with epilepsy. I plan a career in medicine through which I hope not only to help patients with neurodegenerative disease but also to use what I learn about the brain and cognition to create more efficient teaching tools. Seeing educational shortcomings in disadvantaged neighborhoods where I tutor has further strengthened my resolve in building software to foster collaborative efforts that will one day break down the barriers between rural and urban, public and private, and developed and third world education by allowing students across multiple universities and secondary schools in diverse countries to promote each other's learning.