

Teaching Statement

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Every student deserves to learn.

It is all too easy, when a student fails to grasp a concept, to blame the student. But to do so is to ignore the fundamental responsibility of a teacher. Teaching is not the passive dissemination of information, but an active partnership. All students are capable of learning, but not all students learn the same way. As long as the student is making an effort to learn, the teacher must make an effort to find the path to comprehension. It is never acceptable to give up on a student. Instead, both the teacher and the student have to work to find the methods of teaching and modes of learning that enable success.

Although it is difficult to accommodate different modes of learning in a large lecture setting, when creating lectures I try to communicate key concepts using multiple communication channels. For example, I explain verbally and show visually with a diagram. I also try to keep lectures as interactive as possible both as a means of keeping students engaged and of testing for understanding. In the more flexible recitation setting, I've had good experiences with splitting the class into small groups to work on problem sets. This setting allows students to work at their own pace and to teach each other. It also exposes them to multiple viewpoints, one of which may enable them to make the critical connection to comprehension.

Problem sets and course projects are just as critical, if not more critical, to the learning process as lectures. When I design course work I first identify what the core learning experience of the assignment should be. I then keep my focus on this core so that I don't fall into the trap of primarily designing the assignment to be especially challenging, elaborate, or even interesting. These are all worthwhile objectives, but only *in the service of the core learning objective of the assignment*.

I learned this lesson the hard way the first time I taught undergraduate compiler design. I decided that the students would implement a compiler for a subset of the C programming language that was complete enough to compile large real-world applications. I believed the students would benefit from the challenge of the project and that the project was more relevant and interesting since the final result was functional enough to be directly compared to production compilers. I was wrong. The core learning experience of the project was suppose to be learning about the design and construction of a compiler. Instead, the project ended up being primarily about engineering a large and complex software project. What I had thought were strengths in the project design ended up being obstacles and distractions from the core learning experience. Designing successful coursework is an act of craftsmanship, but the final masterpiece is not the assignment, but what the students take away from the assignment.

In my own teaching experience, I have found the greatest joy in helping struggling students one-on-one. When a student comes to me for help, I first try to establish their current level of understanding by asking them to describe the problem they are facing and how they have attempted to solve it. When building up a student's understanding of a concept, it is essential to start with

a firm foundation. I then try to lead them, step by step, from the concepts they understand to the new concept, quizzing them at each step. It is important to keep the process interactive so that the student remains engaged and is constantly providing feedback about their understanding. When a student finds a step difficult, I try different methods of explanation, often drawing diagrams or coming up with metaphors that relate abstract concepts to real life.

I remember one student who, at the beginning of the semester was a regular at office hours and would schedule one-on-one meetings where we would meticulously build up his understanding of the course material from very basic principles. In all honesty, this student sorely tested my belief that every student deserves to learn. However, by the end of the semester this student was only an infrequent visitor at office hours. Furthermore, when I ran into him the next semester I found out he had gone on to take a harder computer science course and was having a much easier time of it. This was probably one of the most rewarding moments of my teaching career since I felt that the result of my tutoring this student was more than simply helping him get a good grade in a course he was required to take. Instead, I opened the whole field of computer science to him.

I believe that computer science will be the most influential scientific field of the 21st century, but only if we succeed in opening the field to the next generation of computer scientists. I want to teach so that I can play a part in the formation of these new computer scientists. When I teach these nascent computer scientists I will strive to accommodate different modes of learning, keep focused on core learning objectives, and, above all, never give up on a student.

“A teacher affects eternity; he can never tell where his influence stops.”
—Henry Brooks Adams