

Teaching Philosophy Statement

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The purpose of teaching is to engrain the fundamental principles of the topic in the students, so they are remembered years later. An instructor's philosophy affects how successful a course is. My philosophy has five components: expectation spectrum, application focus, hands-on, individualization, and outreach.

Expectation Spectrum. Students at different levels in their collegiate careers have different capabilities and correspondingly different requirements from their instructors. Principally, the structure of the assignments used should progress as students mature. My approach to introductory level courses uses many short homework assignments and very detailed, scripted labs. At the other end of the spectrum, senior level classes are approached using fewer, but longer and more complex assignments and labs. This is not to say that instructor involvement is curtailed at higher levels. Instead, it reflects the fact that students' competence increases they progress.

Application Focus. The focus of a course determines what material is taught, which should ideally be material that students will utilize later on. For this reason, I feel the focus of most courses, especially at the undergraduate level, should be on ensuring students leave the course able to apply the tools discussed to their own projects. This requires an application-oriented approach. Deriving the tools discussed from first principles is correspondingly not the main priority. For undergraduates especially, more useful breadth can be gained by foregoing this type of depth.

Hands-On. I think hands-on learning should be used wherever possible. Labs and assignments focused on making things work should make up major components of the course. The practical nature of such hands-on activities emphasizes the fundamentals, and engrains them in such a way that students will be less likely to forget them.

Individualization. I have found that as a student, I was always more driven to learn when allowed to work on individualized class projects. Large, semester-long projects which students develop themselves are very useful because they give students ownership over the learning experience, as well as allow them to apply classroom concepts to problems that interest them personally. The setup I like has the student create a written proposal early in the semester, a progress report halfway through the semester, and a final report with a presentation in front of the class at the end of the semester. The project the student creates should involve implementing concepts from class and applying them to a domain of the student's choice. These individualized projects are nice because they allow students to gain experience developing, presenting, and, if necessary, defending their own work.

Outreach. Diversity in the field of computer science is abysmal. Women and minorities are not entering into the field proportional to their populations in the nation as a whole. The subject matter is not too hard for these parties. Instead, computers seem to be incorrectly perceived as mystical and incomprehensible. Unfortunately, evidence shows that a student's opinion about computer science is set well before he or she reaches college age. This is why the Technology Day Camp at the University of Minnesota, which I co-led in 2008, was developed. The goal of the camp is to engage underprivileged female and minority middle school students and spend the week with them doing robotics and computer science projects. In this way, we hope to demystify the field to these kids at an early age. While this kind of outreach does not directly apply to the collegiate classroom, it is necessary if the field is to be maintained and strengthened.

Overall, my philosophy of teaching has five main components. Expectation spectrum refers to how expectations rise as students progress. Application focus favors breadth in a topic over unnecessary depth. Hands-on utilizes practical assignments and labs to engrain fundamental concepts. Individualization involves students taking ownership over large class projects and tailoring them to their own interests. Finally, outreach pursues outside engagement to reach populations that would not otherwise consider a career in computer science. An instructor's philosophy has an impact on how well students learn the material, and I believe the five components discussed here lead to successful learning.