

Michael E. Cotterell's Teaching Philosophy

Computer science is more than just a field; it is a discipline. This statement emphasizes the idea that effective computer science students learn how to think and behave in alignment with the discipline. Consequently, my teaching philosophy is that instructors can use evidence-based pedagogy to facilitate effective, low-anxiety computer science education at scale so that as many students as possible can actively engage in discipline-specific activities while learning.

Reduce Barriers to Entry

Use of Affordable Course Materials as well as freely accessible, openly licensed Open Educational Resources (OERs) can help reduce barriers to entry and promote self-regulation (i.e., support positive changes to behavior in pursuit of long-term goals). In many of my courses, I've elected to replace the proprietary textbook offerings with instructor-authored OERs. These resources often include readings, tutorials, exercises, and videos that I helped author with a focus on specific sets of learning outcomes. Text-based materials are presented in a format that is accessible to screen readers and translation services. In addition to existing studies, preliminary data ascertained from my own students via surveys¹ suggest that providing students with well-structured, instructor-authored OERs saves them money, makes it easier for them to study, and reduces their anxiety.

Promote Active Learning

Regardless of whether an instructor's classroom teaching style involves a traditional lecture, flipped approach, or some combination of both, studies show that providing students with opportunities to actively engage with material positively aids in their learning. In many of my courses, regardless of level, I make time to guide students through a set of structured in-class exercises that allow them to learn and apply course content in a manner consistent with the discipline. In programming-based courses, this means they write code and use tools of the trade; in my computer ethics course, this means they actively question the impact of technology-related moral dilemmas. In many cases, the exercises can be done in small groups, which allows students to discuss different perspectives on the same material. Survey² data suggest that students believe such active learning exercises give them more confidence in their understanding of the material and lead them to ask better questions.

Increase Peer Interaction

By leveraging the success of students who have already completed a course, instructors can provide powerful experiential learning opportunities for former students and peer-based learning opportunities for current students, especially in active learning classroom environments. As director of the Computer Science Undergraduate Assistant program at UGA, I help instructors hire, train, and utilize undergraduate Peer Learning Assistants (PLAs) who help with in-class active learning exercises and answering student questions. Their assistance makes it easier to manage many active learning exercises in class sizes as large as 100 students. Additionally, the PLAs hold office hours and weekly, entirely PLA-lead, review sessions. Survey^{1,2} data suggest that students appreciate being able to ask their peers questions about course content and that, given the opportunity, they would take more classes in the future with PLAs.

¹UGA IRB ID#PROJECT00000786. "Reducing State Anxiety in CSE with Active OERs and Peer-based AL"

²UGA IRB ID#STUDY00006734. "Impact of Active Learning in CS"