JENNIFER CROSS ► TEACHING PHILOSOPHY

The computer science students of today will become the innovators and problem-solvers of tomorrow. These students need to be provided with learning opportunities which prepare them to tackle the future problems and challenges they may encounter. As an educator, my primary goal is to enable students to build the required knowledge, skills, and attitudes that will allow them to do so.

At its core, computer science depends on students learning computational thinking skills, programming skills, and methodologies for design and testing of solutions. Beyond that, computer science students must also develop the ability to select appropriate methods for solving the problems they encounter. When presented with open-ended projects, students are provided the opportunity to practice this process of choosing and applying skills.

One pitfall of open-ended projects is the potential formation of student misconceptions. Therefore, it is critical that open-ended projects are balanced with instructor-provided scaffolding. Effective scaffolding supports students in meeting the requirements of the class while guiding their approach and regulating time management. For example, in my “Mobile Robotics Project Course,” I was responsible for introducing high school seniors from underrepresented minorities to programming using RobotC. During the course, I integrated a LEGO MINDSTORMS robot project which I structured such that as the students encountered each new programming concept, that concept was immediately relevant to the next step of their project.

Evaluating open-ended projects presents another challenge. I view long-term projects as ideal opportunities to focus on providing students with the formative feedback. Well-spaced formative feedback during projects provides students with opportunities to adjust their deliverables to meet the requirements of the project prior final summative evaluation. I also firmly believe in the value of peer-feedback which provides students with more feedback opportunities, encourages reflection, and grounds self-evaluation.

As students enter the workforce, they must be ready to work effectively with diverse and interdisciplinary teams. Teams that bring together members with diverse backgrounds can generate more creative solutions to problems than homogenous teams. In my educational robotics workshops, I encourage my students to build on their personal experiences and backgrounds when contributing to team projects and group discussions. It is especially beneficial for students to be presented with the opportunity to work in interdisciplinary groups. Real-world teams often bring together computer scientists, engineers, designers, and domain specialists. As such, I'm extremely interested in teaching opportunities that allow me to work with non-major students. These teams present opportunities to teach students the critical skills necessary for conducting group projects and resolving conflicts.

As my research interests are also aligned with teaching and learning, I am constantly looking to improve my own teaching based on the latest research-supported best practices. As demonstrated through the many iterations and improvements I made to my educational robotics workshop, I continuously adjust my instructional methods to achieve improved learning outcomes and respond to student feedback. I also seek out opportunities to advance my own teaching skills. For instance, I have participated in over 20 hours of professional develop on undergraduate and graduate teaching strategies through the Carnegie Mellon Eberly Center for Teaching Excellence and Educational Innovation’s Future Faculty Program.

I look forward to teaching courses in areas such as human-computer interaction, robotics, user experience design, mechatronics/embedded systems, research methods for human-computer interaction, and capstone project classes. In addition, I hope to work on the creation of new interdisciplinary courses, in burgeoning fields such as human-robot interaction and design for education. I enjoy mentoring both undergraduate and graduate students, and my research agenda has many opportunities for student contributions in interface design, mobile app development, human-robot interaction, and embedded systems.