

Teaching Statement

Teaching Philosophy

As a graduate student I was fortunate enough to be part of the University of Maryland's Human-Computer Interaction Lab, which at the time was the top-ranked destination in my area of study. At an event soon after I graduated, the most senior scholar, Ben Shneiderman, gave a short speech reflecting on several decades of experiences. One thing he said stuck with me; he said he did not regard his greatest accomplishments or legacy to be his widely read books, or research papers, or the large grants and many awards he received. He thought his greatest legacy and pride were the students he taught and mentored. I took Dr. Shneiderman's message to heart and approach the growth and advancement of the students with whom I come into contact, mostly through courses, as my most important responsibility as a professor while also being aware it will also be the greatest source of rewards.

Keeping these thoughts in mind, when I plan a course, I start planning not from the content I need to teach, but from where students are coming from, and what their challenges and opportunities are with respect to the course. Most of the students in my courses have been informatics students. They are students interested in computing, but who also have interests in other fields, and who are often not confident about their technical ability. Teaching informatics also brings the responsibility of instilling ethical practices given the ubiquity of computing in our society. An added challenge is that computing constantly changes, meaning that students need to learn to not only master content, but be ready for a lifetime of self-directed learning. These students will also have great opportunities to contribute to a diverse set of fields and it is important for courses to give them a taste of these opportunities.

In introductory courses in particular, but also in any course that students perceive as demanding, I make it a point to help students feel calm and relaxed while avoiding anxiety. I make sure students know of my interest in their success, my availability to help, and my trust that they can do well if they dedicate time to the class. I also like to add a bit of humor to lighten the mood.

In every course, I prioritize sparking students' interest in the subject. I am fortunate to be personally interested in many fields outside computing, which enables me to identify ways of introducing content that I am excited about and that enable students to connect course material with their own interests. For example, when I taught CS:2110, a second programming course for Informatics students, I introduced programming concepts by applying them to politics, economics, demography, poetry, sports, and humor. In advanced courses, I always include projects that the students can shape based on their interests.

A challenge whenever teaching students who arrive at courses with different backgrounds is to ensure all can benefit from the course. To address students who are more likely to struggle, as soon as I identify them, I provide remedial assignments as well as additional support outside the classroom. I have had multiple students go from getting an F in their first test to getting an A in their final exam. My goal is to help these students build confidence and self-efficacy. On the other end of the spectrum, I work to make certain that more advanced students do not get bored by providing examples and assignments that leave the doors open for additional work.

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For all students, I emphasize at least some level of independent learning, supported by me. In introductory courses it may include recommendations for additional resources to supplement what we cover in class, which I bring up both in class and during office hours, while in more advanced courses I guide students to independent learning related to their take on course projects.

In the classroom I use active learning approaches, balancing lecturing with in-class collaborative activities and discussions. My goal is for students to learn not only from my presentations and demonstrations, but from experience, and for them to quickly put into practice what they learn. In addition, I promote critical thinking skills during discussions. One way I do this is by bringing up news items on controversial issues related to the material we are covering in class. These discussions enable me to also address ethical issues in my profession, exposing students to real-world choices software developers have to make that have a direct impact on people's wellbeing.

In my non-introductory courses, I make sure that collaboration, creativity, and students' interests play a significant role in their experience. These courses include projects in which I either require or encourage students to work in groups. In addition, in courses in which they are paired with other students they may not know I organize class activities where learning is combined with team building. These activities bring as a side benefit the development of friendships, which can further motivate student interest and class participation. In these projects I either give general topics for projects or leave it completely up to the students to propose a project. The goal with this approach is to engage students' creativity and to the degree possible, enable students to incorporate their interests into their learning experience.

In following these approaches my goal is to provide students with experiences that help them grow as confident, creative, collaborative, ethical professionals, and prepare them for a lifetime of learning and contributions to society.

Teaching Accomplishments

My teaching accomplishments include course and curriculum development, providing professional training to graduate students, offering tutorials at conferences, and writing a book that has been used in courses at multiple institutions.

I have either developed or significantly revamped every course I have taught. More specifically, I developed three new departmental courses: CS:2520-Human-Computer Interaction, CS:4500-Research Methods in Human-Computer Interaction, and a topics course on Child-Computer Interaction (CS:4980). In addition, I completely redeveloped CS:1020-Principles of Computing and significantly overhauled CS:3910-Informatics Project and CS:2110-Programming for Informatics. I have received consistently high student evaluations across all courses.

In 2020, I led a team of faculty in Computer Science to redesign the curriculum of the Informatics undergraduate program, identifying learning objectives and mapping them to the newly designed core courses for the major, which will be effective as of the Fall of 2021. I was motivated to do so after teaching CS:2110-Programming for Informatics, which is a prerequisite to most of the core courses for the major. I realized that our existing curriculum was disjoint and did not enable students to sustain learning gains. The new curriculum is based on a clearly

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specified set of learning objectives and ensures better course sequencing, the gradual building of technical competencies, and consistent experiences and expectations for students.

Since 2015, I have organized and delivered professional development training for Informatics graduate students, including presentations on academic writing, using individual development plans, and hosting invited talks from Iowa faculty.

I have offered tutorials on Child-Computer Interaction at two recent ACM Interaction Design and Children conferences and two other prior conferences (IDC 2014 and Interaccion 2015). These are international conferences and the tutorials had attendees from several countries.

I am also the author of the book titled *Child-Computer Interaction*, now in its second edition, on which I based the CS:4980-Topics in Computer Science course I taught in the Fall of 2018. The book has also been used at other universities to teach courses, such as the University of Washington.

Future Plans

Besides continuing my work on course development, professional development for graduate students, and continuous improvement of the informatics undergraduate curriculum, I plan to add contributions by working on the Informatics graduate program curriculum, conducting outreach on informatics education, and making computing education inviting to a more diverse group of students.

I am in the process of implementing an overhaul of the Informatics graduate program's curriculum. I led a group of faculty in realigning the Master's program with our undergraduate Informatics program, as well as simplifying and making more flexible the PhD program. The implementation of these changes began in the Fall of 2021. I also set up a 4+1 program to enable our best Informatics undergraduate students to add a Master's degree with an extra year of work.

To complement these efforts in the informatics curricula I plan to work on an outreach plan to educate stakeholders around the university, as well as prospective students and their families, on informatics education. Given the wide diversity of approaches to informatics around the country, such an effort may not only have a positive impact on recruitment, but also in influencing informatics education overall.

Looking farther into the future, I would like to get involved in curricular development with a focus on motivating a broader, more diverse group of students to study computer science or informatics. As part of working on our broadening participation in computing efforts, I am assessing which groups of students are not doing well in our introductory courses, and which are choosing to pursue other majors after passing our introductory courses. I plan to leverage my experience with introductory courses, in particular in introducing computing concepts through topics of interest to students, providing support for students who arrive with less relevant experience, and fostering a welcoming learning community. There may be opportunities to leverage lessons learned and apply them to high school courses, for example, broadening participation for younger students.