

The opportunity of being an educator to teach, mentor, and collaborate with students is a strong motivation for me to pursue academia. My teaching philosophy is to encourage open exploration with a critical mindset in an environment full of support. My goal is to help students become independent thinkers and researchers who have substantial knowledge and skills and are open-minded and curious. Building on my interdisciplinary training in psychology and computer science, I took a constructivist approach by simulating students' curiosity through contextualization, developing students' resilience to failures through iteration, and encouraging collaboration with peer feedback.

Teaching

I have acquired diverse teaching experiences during my graduate studies as a teaching assistant. This includes User Interface Design, Data Visualization, and Data Structures and Algorithms. Those courses involve both undergraduate and graduate students. I also created an online educational platform for spatial visualization training and developed it into an official course, Spatial Visualization, listed at the College of Engineering. Those experiences consolidated my teaching skills and shaped my teaching philosophy.

Stimulate curiosity. The first step to encourage open exploration is to stimulate students' curiosity. Students who are curious about the field will learn and explore independently even after the class. I stimulate students' curiosity through contextualization. For example, when I was a teaching assistant for Data Visualization, I mentored students for course projects, including data dashboard and narrative visualization. When students came to me to discuss their project ideas, I asked them to first reflect on what data are important to them in their daily lives, how they deal with data in their learning or working environments, and data visualizations that they have seen in the past. By contextualizing their own experiences, we then brainstorm on what relevant problems could be solved through data visualization techniques. During the discussion, students showed more interest in visualizing data and started to ask more questions about the topic even beyond course materials. My approach helped students to produce led to many interesting and meaningful projects and most importantly helps students build interest in the subject matter. Their interests will eventually help them better digest knowledge and acquire new skills far beyond the course subject. It is the first step towards life-long learning. Through the course feedback, many students I mentored mentioned that they feel what they learned in the class had a real-life impact on how they view their own data, and they will continue to explore data visualization techniques and use them to aid their future learning and working.

Build resilience to failures. I helped students to build resilience to failures in the process of learning. Although failures are common in the learning processing, the frustration may deter students from exploring further in the field. Helping students build confidence during learning is part of my effort to make computer science a more welcoming place for everyone. My approach is to frame learning as an iterative process where identifying and correcting errors is essential. In Data Structure and Algorithm class, I led discussion sessions with over one hundred students. In my teaching, I purposely created difficult questions to make students prone to mistakes. I strongly encouraged students to independently identify mistakes and share it with their classmates. I put a strong emphasis on how those mistakes could contribute to a better solution. Gradually, I noticed that students were more willing to discuss their bugs with peers and complain less when it occurs.

In another class I developed, the course objective is to train first-year engineering students' spatial visualization skills, a strong predictor of STEM retention. With the goal of building resilience in mind, I created a web-based sketcher to help students learn sketching skills, a core technique in training spatial visualization skills. The sketcher took an iterative approach by providing feedback with different levels of error granular-

ity. From general to specific, it encourages students to make multiple attempts and learn from their mistakes. Students love the tool and commented how it teaches them to improve their answers by identifying mistakes. The resilience to failures not only reduces frustrations in the learning process but also builds confidence for open exploration.

Cultivate collaboration. As group work plays a more pivotal role in the future workplace, I help students to develop team skills in their learning. I believe collaborations could empower individuals to step out of their comfort zone and explore the unknown space with an augmented skill set. My approach to teaching students team skills is through group projects and peer feedback. Student teaming is a challenge in the learning environment. First, in a class, students may not know each other well before finding their own team. The team assignment may not always produce effective teams. Second, due to different team experiences or skill sets, not all team members have equal opportunities to contribute to the team project. When I was a teaching assistant for User Interface Design, I led design sessions and mentored students' group projects. In my sessions, I taught students how to write constructive feedback and instruct them to frequently write feedback to each other. Through peer feedback between teams, students could gather diverse opinions and get exposed to novel ideas. Peer feedback within the team also aids team cohesiveness and effectiveness within teams. It could help team members get to know each other and identify team problems early. The feedback could also help me to understand how the team functions and whether intervention is required. At the end of the class, my students told me that they had their best team experience in this class, even though they teamed with strangers. In my future teaching, I plan to further explore novel technologies, such as collaborative virtual reality or AI teammates, to further cultivate effective collaboration.

Mentoring

During my graduate studies, I was lucky to mentor seven undergraduate students and three junior graduate students with diverse backgrounds and interests. I found it is extremely rewarding to see the students develop research interests, learn new technical skills, transfer research to real-world systems, and most importantly, grow into independent researchers who can confidently explore the knowledge boundary.

I once mentored four undergraduate students over the summer of 2017 to create novel spatial visualization training experiences with games. I focused on creating an open, collaborative environment that allows each student to develop a sense of ownership while closely working with each other. By discovering each student's interests and strengths, I matched them with well-scope tasks that are both exciting to explore and achievable. I guided them through literature review, game design, development, and real-world evaluation. In my mentoring, I specifically focused on communication. Students could find me anytime if they need help, and I often checked in with them both individually and as a group to ask if they encountered any challenges. In the end, together, we published a paper at IUI 2017 and released our game 'Cubicle' to over two hundred students who are interested in spatial visualization. To my delight, all of them entered graduate school to explore a wide variety of topics in HCI, and two of them decided to pursue a Ph.D in computer science.

As a mentor, I aimed to help students grow into independent researchers with confidence and a critical mindset. I want my students feel comfortable to critique today and explore the future. Besides technical and research skills, I want to help students develop communication and collaboration skills. I want to pass what I learned and experienced from my graduate studies to students who eager push the boundaries of our knowledge - I look forward to seeing their success.