

Teaching Statement

Teaching has had a constant presence in my life for as long as I can remember. I have been teaching, formally or informally, for most of my life, to the point where it has become a habit. It was not something that I initially sought out or saw as a skill – it was just part of how I naturally interacted with many of the people around me. If I saw a friend struggling with their schoolwork, I was naturally inclined to sit down with them and ask them leading questions to help them through it. If someone walking by asked me a question about what I was working on, I was eager to talk them through the specifics of what I was doing and how I was doing it. I was instinctively drawn to opportunities where I could help guide others. However, once I became an undergraduate teaching assistant for the Allen School, I began to recognize that teaching had its own techniques, systems, and complexities, and was able to appreciate how many skills I had picked up by incorporating teaching into my daily life. This was when I truly began to consider the possibility of pursuing teaching professionally.

Metacognition & Individualized Learning

I was homeschooled for most of my youth. As I grew and continued to advance in my learning, I worked through several subjects (especially mathematics) on my own, teaching myself without explicit instruction. This led me to develop a strong sense of metacognition and awareness of how I learned best, as I had to seek out alternative explanations when the textbook's guidance fell short. Only later did I realize that I had subconsciously built up this awareness, and how much it had contributed to my success in higher education and beyond.

Not only is it important to teach students the necessary curriculum, but also to teach them *how* to learn. I strongly believe that many students in higher education would benefit from developing stronger metacognitive skills. Many classes offer a plethora of resources with the intention of supporting students who need to complement lectures with additional studying. These resources typically offer explanations and practice that is different from what students are shown in lecture, with the intent of supporting a variety of learning styles. In my experience as a TA for CSE 142, many students aren't taught how to use these resources effectively. I found this to be especially true with new college students when I taught the CSE 190Y course (primarily composed of Startup Program students). The Startup Program is targeted toward Direct Admits to the Allen School "who have limited programming experiences and/or are from low-income, first-generation and underserved communities." Because they haven't been taught how to use these resources, many students believe that if they continue to stare at the same explanation or diagram for long enough, they will eventually understand it. Instead, I believe that engaging in metacognition and understanding what helps them learn best would improve their overall learning experience *and* efficiency.

A key aspect of our roles as teachers, most apparent in individual student interactions, is to detect when an example or explanation isn't working for a student, and offer an alternative one (or several, if the first one doesn't work). When I worked as a private math tutor for several years, meeting weekly with students to help them understand their lessons and coursework, this became a muscle I flexed often. The ability to individualize instruction to a student is often considered to be an indication of a good teacher. I believe this to be true, and furthermore, I believe that we have an even more ambitious responsibility as instructors in higher education: We need to teach students how to *recognize* when they need an alternative explanation or format of learning, so that they can advocate for themselves. **When interacting with students, I periodically ask them to check their understanding. If they are struggling, I suggest alternate approaches or next steps, and ask if focusing on another example or a smaller part of the solution would be helpful.** I cannot presume to know what explanation or approach will work best for every student, so I leave space and prompt them to tell me what will work for their learning style.

At the beginning of a quarter, my “syllabus day” references metacognition and emphasizes how important it is for students to take responsibility for their own learning. Due to the diversity of students in our classrooms, it is not possible to deliver a lecture in a manner that suits every single person in the room, despite our best efforts. I do my best to deliver a lecture that I believe works for *most* students. Often, I try to give a few different explanations of a concept to cover as much of the room as possible, and provide alternative explanations and resources for learning the course content to accommodate the students who need it. Throughout the quarter, **I attach reflection questions prompting metacognition to assignments**, reminding students that they should be engaging in this process regularly. Conversations at the midpoint and end of the quarter also circle back to these topics as students ask how they should study or prepare for comprehensive assessments or exams.

Student Engagement

No matter how much effort a teacher puts into providing alternate explanations, student engagement in the classroom and with coursework is a significant challenge. The most perfect explanation of a challenging concept is ineffective if half the class doesn't show up, and the rest are distracted by their phones. I cannot promise engagement of the entire class throughout the quarter, but I have developed some methods to maintain engagement and hold focus in class. When I was hired in my first professional job as a gymnastics instructor at The Little Gym, I quickly learned to prioritize student engagement in the classroom. Lack of engagement is much more apparent with a dozen 3-year-olds in a gym (where it manifests in screaming, jumping, and general chaos) than it is with a hundred or so students buried in their laptops or just ghosting the course staff. The techniques to keep the attention of toddlers took the form of silly voices, pretending to trip over objects, and saying random nonsense words. While these methods, in all honesty, would probably still be fairly effective in a UW classroom, **I instead use tactics**

such as coming up with silly scenarios for examples, intentionally inserting bugs into my code while live coding, and incorporating frequent opportunities for student input. In addition, **I include short activities (e.g., polls) for students to check their understanding of new concepts and reasoning skills through the structure of Think, Pair, Share.**

Encouragement & Approachability

During my time as a gymnastics instructor, I also gained appreciation for the influence that encouragement and reassurance can have in building up confidence and a sense of belonging. Sharing Specific Positive Feedback (SPF) with our students was a key aspect of the curriculum I followed and was deeply rooted in the teaching philosophy of The Little Gym. I was reminded of the importance of encouragement again during my time as a mentor for the Microsoft Tech Resilience Mentoring Program for CS 1 and 2 students. This program focused on topics such as self efficacy, growth mindset, sense of belonging, and cognitive flexibility. Going through the curriculum with my small group of students, I gained a deeper appreciation for how essential it was to talk about these topics. Each week I would share a personal story relating to one of these ideas, present a short video on the topic, allow some time for students to sit quietly and reflect, and give space for each of them to share what resonated with them. The students in my group, along with others who participated in the mentoring program, reported that these group discussions benefitted them greatly by allowing them to share their experiences and thoughts with their peers and understand that they weren't alone in their doubts or anxieties. They were praised and encouraged to reflect on and share their experiences, and found kinship and affinity with the others who they could relate to. Many students who participated in the program reported that these activities gave them the confidence to continue pursuing computer science when they may have otherwise been dissuaded, unconvinced that they belonged in that field.

Students at UW and in the Allen School encounter many of the same apprehensions that were voiced in these mentoring program discussions. In my experience, this is particularly true for those who are underrepresented in the university, in our classes, and in the Computer Science / Software Engineering field at large such as first-generation students, women, and those belonging to racial minorities. In fact, as I went through the lesson plans and activities with my mentees, I realized that many of the topics resonated with me and my experience as an undergraduate and graduate student in the Allen School. I had not even considered pursuing Computer Science or programming until I took CSE 142. Even though I enjoyed CSE 142 and 143, I wouldn't have applied to become a TA without a short encouraging statement made by my CSE 142 TA, Erika Wolfe, as we briefly crossed paths going to and from the IPL.

Looking back, I realize that I owe a lot of where I am today to that very small gesture – an interaction that took place over the course of maybe 15 seconds. For students whose identities are underrepresented in the Allen School and in the Computer Science field in

general, I expect that many of them could also be susceptible to a small gesture or comment that pushes them in one direction or another: to pursue CS or to believe it's "not for them." As such, the interactions that instructors and advisors have with these students become even more important.

Given the varying levels of comfort that students might have with me and with CS as a subject, I intentionally make myself as approachable as possible. **I provide numerous ways to interact with students: face-to-face, using online channels, and through asynchronous and synchronous anonymous feedback.**

I brought these learnings and observations with me as I prepared for teaching CSE 190Y (the companion course to CSE 142/143 for Startup students). In my interactions with 190Y students, **I made sure to praise them when they collaborated with each other and drew connections between lessons and their projects. I applauded them when they paused to write out pseudocode before jumping straight into writing out a solution.** As the quarter continued, I saw the students open up and be more willing to provide a suggestion even if they weren't absolutely sure of the answer. I noticed them collaborating with each other more effectively and pausing to consider how they learned and studied best.

In some one-on-one conversations with students in 190Y, I heard them voice some of the same concerns that I heard from students in the Microsoft Mentoring Program: that they didn't belong in CS and that they weren't sure that they would be able to succeed. My experiences mentoring and my ability to empathize with many of those same feelings informed my guidance through these conversations. I assured students that the fact that they were struggling didn't mean that they could not be successful. **We talked through their options in terms of next steps, and I often encouraged them to speak with their assigned advisor.**

My time as an instructor for the CSE 190Y course helped me gain a new perspective on the relationship between advisors and instructors. I previously saw them as two completely separate and distinct positions whose interests overlapped occasionally. After working closely with various undergraduate advisors and Leslie Ikeda (Senior Program Manager for Diversity & Access and the Startup Program), my perspective shifted to view advisors and instructors as two parts of the same team, with the shared goal of helping students be successful.

Productive Struggle

Challenges and struggling are essential parts of learning. As teachers, part of our role is to help students navigate this discomfort. One of the most rewarding results from teaching CSE 190Y was observing the students become increasingly comfortable engaging in productive struggling. Many students, especially those who have been academically successful without much effort before entering a higher education environment, are accustomed to being praised when they pick up a new skill quickly. This is the hallmark of

being a “good student” to them, or being successful. For these students, the sense of not knowing something can immediately cause them to doubt themselves and feel discouraged. For students without a strong sense of belonging in CS, who don’t see much representation of their identities in the field, this type of discouragement can reinforce a belief that they cannot be successful in CS and that they should just relinquish any interest in the area at all. To combat this, **I create the expectation that students will encounter problems they don’t immediately know how to solve.** I encourage them to **sit with a problem on their own for a while before asking for guidance.** To my delight, as the quarter went on, I saw many CSE 190Y students subscribe to a growth mindset where they could recognize struggling and the iterative process of trying, failing, and eventually finding a solution as an artifact of learning. It was deeply rewarding to see these students change their mindset and persevere through struggling to understand a concept or solve a problem.

In helping to develop the new CSE 121/122/123 courses, I was overjoyed to see that this type of encouragement and growth mindset was built into the design of the course sequence. These policies give students the chance to learn from their mistakes and demonstrate improved mastery before the end of the quarter, even if they do not master new concepts immediately. Students taking responsibility for their own learning is integral to the structure of the courses. A fundamental struggle that I have seen students encounter is believing that sitting in a room listening to someone talk about a new topic is how they learn. In the first offering of CSE 122 this quarter, this misconception was addressed on the first day of class, and **we set the important expectation that students would not be able to leave a lecture having full mastery of a new topic.** They would need to **actively engage in solving problems and ask questions in their own time.** Only then would they build up their mastery.

Organization

An instructor must balance aspiration with pragmatics. The philosophies motivating the course design described above must be weighed against the logistical challenges of offering a course at large scale. In CSE 190Y, I had more flexibility with a smaller class to try new things and adjust course policies and assignments to align with the students’ progress. However, for courses offered at the scale of CSE 121/122/123, with several hundred students each quarter, these educational aspirations must be balanced with a realistic understanding of the limitations of large-scale courses. A single instructor cannot individualize instruction in class to every single student, so **we train our TAs to do so in smaller-scale quiz sections and teach students to advocate for themselves when something isn’t working for them.** I would love to wholeheartedly subscribe to a growth mindset and provide students with endless opportunities to demonstrate mastery of the course material, but we exist within 10-week quarters and with a finite number of grading hours. So instead we provide limited opportunities for students to show that they’ve learned from their feedback and advise them to use those opportunities wisely. The benefits of course policies like these are rendered ineffectual if they cannot be

implemented and maintained at a large scale. The Allen School's capacity is growing, and I expect that even courses with comparatively small class sizes will swell and need to scale as the years progress. This balance between beneficial course policies and the feasibility of implementing them in larger courses will be important during this time.

Moving Forward

Over the past few years, I have seen the Allen School make great strides in its commitment to diversity and inclusion. Moving forward, I want to support these efforts and expand them further by taking these principles and applying them to classes outside of just the introductory 100-level courses. While these principles are incredibly important for courses serving introductory students, they are also very valuable for upper-level Allen School students.

My main interest in teaching is introductory courses and working with introductory students. My introductory instructors had a significant impact on me, and I have very much enjoyed serving in that role on and off over the past few years. I would also like to use my industry experience working on parsers and in close conjunction with the Microsoft Visual C++ compilers team to join in the teaching and evolution of CSE 401, Introduction to Compiler Construction. I enjoyed this course immensely when I was an Allen School student, and returned to TA for the course. The act of demystifying a programming language (and for many students their first programming language, Java) helps ground students. It helps them realize that nothing that the computer does is "magic." As a Mathematics / CS double major, I remember seeing many of my fellow students struggle to write formal proofs and articulate their logical reasoning. I was able to pull from my mathematics classes to succeed in classes like CSE 311 and CSE 421, but I would like to increase appreciation for formal mathematics and their role in CS to support students wanting to pursue more theoretical pathways. I believe an optional companion course (like CSE 391 Unix Tools) focused on the fundamental building blocks of writing formal mathematical proofs would counteract some of the struggle and inexperience students feel in these more theoretical courses.

Conclusion

Teaching has been an essential aspect of my life for as long as I can remember. I have seen and experienced firsthand the influence that a good instructor can have on a student's learning and confidence, and have only been able to achieve what I have through the encouragement and teachings of the community around me. I have built upon this ingrained appreciation for education through my experiences teaching and mentoring professionally, and it has been rewarding to share this knowledge and skill with students. I look forward to introducing more students to the wonderful power and opportunities in CS and give apprehensive students the confidence to see CS as a possibility in their future.