Teaching Statement

The journey of a Computer Science student is one that I have come to recognize as one of the most transformative life experiences - early perceptions are challenged, an exciting world connecting theory with application is explored, the beginnings of tomorrow's innovations are sparked. Ultimately, students come out having developed a fascinating network of connections between their coursework and their own life experiences and interests.

As a CS educator, I strive to provide a foundation of the key concepts, algorithms, and technologies to help students build a versatile CS toolkit that will endure in a rapidly-evolving field. Supporting exploration with interdisciplinary exposure, I guide growth and specialization. I continue to learn new ways to motivate students as they identify their role as a computer scientist in today's society. And with that, I value my role as one that goes beyond just an instructor. Without the fortuitous interactions with a handful of instructors and mentors, I would not be where I am today. I strive to similarly be a long-term resource for my students and TA's throughout their own defining transformations in CS.

Starting with Expectations

A strong foundation starts with clear (and realistic) expectations between students and course staff - without expectations set early on, students may be more resistant to a new curriculum component or a particularly rigorous course. On the other hand, students often express more enthusiasm and investment in the course when expectations include a commitment to diverse content modalities an inclusive classroom environment. When setting expectations on the course structure, I not only outline the key learning objectives that will guide the course and class structure, but I also touch on my teaching philosophy to demonstrate my commitment to (and passion for) student learning and investment in their short- and long-term success.

Teaching and Learning Methods

My approach to instruction and curriculum development follows a *backwards course design*, focusing on the key learning outcomes for a course and further breaking down learning objectives for different topics or units. With the key learning objectives identified, I design teaching materials (lecture, case studies, practice exercises, homework assignments, etc.) that guide students to achieve these learning outcomes through various mediums. This approach is one that I believe provides structure and consistency through unifying themes, helping all students reach the goal outcomes while also supporting a range of learning styles.

With influences from *Bloom's Taxonomy* [1], I work to incorporate assessments that range from content recall and understanding (e.g. exams) to content synthesis and evaluation (assignments and projects). I avoid putting significant weight on one assessment method to evaluate student outcomes fairly across the class, as different students may demonstrate their understanding better in one method than another. To further support fair assessment, I avoid making assumptions about prior knowledge or individual backgrounds whenever possible, and am

supportive of accommodations for students who take longer to complete an exam. As I transition into an instructor role, I especially look forward to joining fellow educators in the Center for Teaching and Learning to continue learning and sharing innovative teaching practices.

Motivating Students in the Learning Process

A motivated student is truly a force in a classroom - they more likely to proactively ask questions, think about trade-offs, and come up with new ideas. In CS, these are all elements that lead to key innovations in the field. To motivate a classroom of students who come in with a range of prior experience and personal goals, I regularly incorporate interdisciplinary applications in lecture, assignments, and case studies, often ranging from medicine and business to arts and linguistics. When thoughtfully tied to the CS foundations being taught, students can see the broader implications of what their learning, and potentially be inspired to explore interdisciplinary roles such as research on campus.

A Case Study: Curriculum Development in Undergraduate Web Programming

My experience as Head TA and instructor has been most representative of my approach to curriculum design, updating the learning objectives and material significantly from the course's initial offering in 2009. Rather than framing the course as teaching 4-5 languages, I actively focus on the theme of client-server relationships across the full-stack, integrating essential foundations to HTTP and networking, asynchronous programming, web accessibility, security, and data storage trade-offs. In 2018, I broke down the curriculum into 5 "Modules", chosen to support learning outcomes that prepare students for understanding the connections throughout the stack and the trade-offs of certain design and implementation decisions students will run into at different layers (e.g. client- and server-side verification).

I also take great care in making sure this course fits in a CS curriculum. At its core, the client-server relationship naturally introduces considerations of various design decisions and trade-offs thematic to other CS courses, such as efficiency, scalability, and modularity, which I regularly highlight throughout the curriculum. The course is still naturally application-heavy, and presents students an opportunity to develop programming skills with immediate application to real-world context. Cognizant that many students want to learn the newest frameworks and libraries, I introduced "Creative Projects" as a Head TA in 2017. Students use these to apply what they are learning to a problem they are personally invested in, get qualitative feedback from their TA's to apply in higher-stakes HW assignments, and finish the class with work they can publish. The challenge of balancing the theory and application of full-stack web development within 10-11 weeks has been one I have thoroughly enjoyed and has provided invaluable experience in shaping my approach to instruction and curriculum design.

Connections to the Real-World

I am very passionate about embedding accessibility, security, and ethics into the curriculum (for brevity, I will refer to this as E-ASE). Over the summer offering of CSE 154, a pre-quarter student survey indicated a common interest in accessibility. Having recently worked as a course scribe for a blind CS grad student, I had become more aware of the small changes a developer can

make to greatly improve assistive technologies. The student introduced me to a Chrome extension which uses DOM-parsing with a screen reader API - I found it an opportune tool to not only review the DOM, but also show students the impact of their choices (e.g. semantic HTML5) can have for different users. I demonstrated this extension over summer during a dedicated lecture on accessibility, and received positive responses about the lecture in mid-quarter feedback. In my last two attendances at SIGCSE, I have seen many schools working on different ways to embed one or all of these topics, especially under constrained curriculum requirements. With an interest in CS education research as part of my teaching position, E-ASE is one of the areas I am particularly interested in contributing to.

Roles Beyond the Classroom

As an educator, I see my role not only as a source of knowledge, but also as a resource for students to explore the material further, discover connections, and motivate them as future developers, collaborators, and innovators. I value my role as an approachable source of support, and advocate for diversity, and genuinely invested in their individual success. I strive to be a resource and mentor for my TA's, providing opportunities to contribute to different parts of the course they are most interested. In the community, I seek opportunities to get involved in diversity in STEM and provide mentorship for students considering teaching or research. I hope to serve as an advisor for the many students and TA's I get to work with and guide through their own transformative journey in CS.

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[1] Bloom, B. S.; Engelhart, M. D.; Furst, E. J.; Hill, W. H.; Krathwohl, D. R. (1956). Taxonomy of educational objectives: The classification of educational goals. Handbook I: Cognitive domain. New York: David McKay Company.