TEACHING STATEMENT | ANNE SPENCER ROSS

All students, regardless of identity or background, can learn and succeed in computer science. Student diversity benefits all students and fosters innovation. Yet, computer science lacks representation across gender, disability, and race [1]. I strive to create inclusive, student-centered learning environments where all students can contribute and draw value. I continue to evolve my teaching through self-reflection and open dialogue with students.

Teaching Experience

Computer science draws students with a range of education and career goals. I work to integrate those goals into my course learning objectives. I aim to teach students technical computing skills, human-centered-design, and a critical lens for applying technology to real-world problems.

I have taught **graduate** and **undergraduate** students in **seminars, lectures,** and **project-based** courses. I have developed lectures on human-centered design and accessibility, guided students in design processes, and prompted open-ended research thinking. For example, I was a teaching assistant for an introduction to human-computer interaction course. In that project-based course, I co-designed weekly lectures and activities to teach students the stages of design (e.g., ideation, storyboarding, prototyping, testing) and helped guide students in developing their projects. At the end of the quarter, each group wrote a report and presented their artifacts and design process. Lectures give students a shared foundational knowledge to approach problems; student-driven projects allow students to put that knowledge into practice in personally meaningful ways. I plan to combine lectures with student-initiated projects in my future course design.

I take an inclusive approach to course design, especially focused on students with non-technical backgrounds or disabilities. For example, I led a two-day research activity for eight undergraduate women with disabilities. One component I planned was a brainstorming activity. Many existing brainstorming activities aim to expand creativity in design thinking by producing many designs under time constraints. This high-pressure activity can be a barrier to learning for students with high anxiety (such as the workshop students). Creating a more accessible activity, I **interspersed individual and collaborative brainstorming, led reflections on barriers to ideation, emphasized the value of all ideas, and guided breaks from the activity.** All students created and shared multiple designs and gave feedback that they felt supported in contributing. Moving forward, I will adapt learning activities in my courses to make the learning objectives achievable for all students. Inclusivity-driven teaching facilitates better education experiences for everyone.

Combining technical skills with critical thinking is core to educating the next generation of information professionals. I **include discussions of technology's power for good and ethical implications within my courses**. The value of these discussions was reflected by an undergraduate computer science student in my cross-departmental "Disability, Race, and Technology" seminar. As we discussed the role of, and biases in, machine learning applied to housing, incarceration, and healthcare, the student announced he had no idea that machine learning was being used in these settings and challenged why he had not learned about this topic in his core computer science classes. Students are excited about the impact they can make with technology; as an educator, it is my goal to give them the multi-disciplinary context and skillset to mindfully create that impact.

Reducing Barrier to Entry

Computing can be an intimidating field especially for students who lack technical literacy – the ability to access, decode, and then act on technical information. In my teaching**, I identify implicit knowledge assumptions and make base concepts approachable**.

For example, I took a graduate-level quantitative research methods course where the professor implicitly assumed a base level of technical literacy when he introduced the R software environment to teach statistical concepts. In-class questions revealed students were confused by R syntax and base technical concepts like differentiating between scripts and the output from those scripts. This confusion impacted their ability to learn the statistical concepts. When the professor attempted to explain R, his use of technical terms (e.g., "script" and "array syntax") did not match the technical literacy of some students. To alleviate this barrier, I created and facilitated "Intro to R Studio" tutorial sessions to orient students to the R Studio interface and develop foundational skills (e.g., what a script is and how to run it). Subsequent course instructors requested my tutorial material to share with their students. I will apply this cognizance of technical literacy as I teach technical and research courses.

Accessible Practices

Communication is at the core of discussion-based learning. **I use multi-modal communication techniques, structured discussion protocols, and variable-sized groups** to create discussions where all students can draw value and contribute. Engaging with the disability community, researching the experiences of neurodiverse students in higher education [2], and studying best practices for inclusive education inform my approach.

Moderated discussions minimize interruptions, provide opportunities for less vocal speakers, and allow students to follow the conversation more easily. One technique I use is having students take a few minutes to answer discussion questions through typing in a shared notes document before having a verbal discussion. This allows students to have a moment to collect their thoughts and allows me to call on a wider range of students that may not speak up in traditional settings. These protocols have been valuable for all students; the number of students contributing to discussions has increased and vocal students have become more mindful of not dominating conversations. I will apply similar techniques in future discussion-based courses to elicit student feedback, enable student engagement, and promote learning for all.

If inclusion techniques create tensions between different student needs, **I facilitate respectful dialogue between students** to address these tensions. For example, in a seminar, I provided a verbal visual description of myself to make my appearance accessible to students who did not have access to visual information (e.g., were blind). Modeled off presentations I had attended in the disability community, my description included my race/skin tone and gender. We noted that this practice may be pressuring students with minoritized identities to draw attention to themselves or that students were struggling to find language to describe themselves (e.g., white versus white-presenting). We used a class session to reflect on this access practice. Students discussed tensions such as not knowing how best to describe their race/skin tone (e.g., "I do not identify as white, but am perceived as white") or how articulating their gender forced them to disclose information they did not wish to share (e.g., "I am currently exploring my gender so I must either state a gender I'm not completely comfortable with or disclose I am questioning my gender"). Students reflected on access to visual information and how identity situates how we engage with topics and each other. The class collectively created a list of attributes that were most valuable to articulate (e.g., name) and attributes to choose from to elaborate their description if desired (e.g., skin tone, video conferencing background). As an instructor, I will continue to create environments in which students can engage in challenging introspection and critical discussion, together creating more inclusive learning environments that meets the diverse needs of the group.

Evolving My Teaching Practices

Creating accessible and equitable learning environments is a collaboration between myself, as the instructor, and my students. I explicitly establish this collaborative intention with my students. For example, at the beginning of seminars, I explain the discussion protocol, its goal, and solicit student feedback. Through these announcements, I create an awareness within the class about different learning

styles, prompt reflection from students on their own needs, and open channels for iterative feedback. Cultivating a culture of voicing needs and adapting practices has allowed my seminars to evolve through changes in seminar sizes, student needs, and mode of interaction (e.g., moving from in-person to virtual discussions). I will continue to use feedback mechanisms such as self-reflection, class discussions, individual feedback, and student surveys to maintain accessible learning environments.

Future Teaching Plans

I am excited to teach introductory and advanced human-computer interaction. I am also well-prepared to teach courses in programming and research methods. I especially look forward to creating a course on population-scale, ecosystem approaches to accessible technology for underserved groups.

References

1. National Science Foundation, National Center for Science, and Engineering Statistics. 2019. Women, Minorities, and Persons with Disabilities in Science and Engineering. https://www.nsf.gov/statistics/wmpd
2. Annuska Zolyomi, **Anne Spencer Ross**, Arpita Bhattacharya, Lauren Milne, and Sean A. Munson. 2018. Values, identity, and social translucence: Neurodiverse student teams in higher education. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '18).