teaching statement | jane l. e

My elementary school self already knew I wanted to teach when I grew up—to this day I remember the admiration I felt for my fourth grade teacher. I aim to be an educator who inspires and encourages students in the way that she did me. I've been lucky to have opportunities to start making this kind of impact through teaching and mentorship. My goal is to empower my students (and teaching team) by giving them ownership of their learning. As my research also aims to support developing expertise, I employ research-driven practices in my teaching: **(1) supporting self-directed learning** [1], **(2) encouraging reflection-based iteration** [2], and **(3) promoting critical thinking** [3].

TEACHING

Last quarter, I taught UCSD's COGS 120: Interaction Design—an upper-level undergraduate course with 224 students. This course focuses on fundamental concepts in Human Computer Interaction (HCI) through a research lens. Students are encouraged to adopt a critical mindset in identifying interesting problems in HCI and in applying an HCI lens for evaluating technology. Here are some quotes from student messages and evaluations:

> "*So far I've been loving how encouraging, positive and open the class is! I love your energy and appreciate how thoroughly you answer all questions. Thanks for making class so interesting + fun :))*" and "*I just want to let you know you're doing amazing!! Your lectures have so much thought and effort put behind them, and I hope you know it doesn't go unnoticed.*"

While at Stanford for my PhD, I TAed for three courses across HCI and systems in the Computer Science department which exposed me varied class structures: a 200+ student introductory HCI course taught by James Landay, where I was head TA of a team of ~10 TAs (CS 147); a 40 student introductory hardware-based systems from the ground up course (mostly freshmen) taught by Pat Hanrahan, Phil Levis, and Dawson Engler, with a team of 4 TAs (CS 107E); and finally a 4-week introductory HCI summer intensive (9am–5pm) in China with 15 students from Stanford and Beijing taught by James Landay and Ge Wang, with me as the sole TA (SCPKU). These teaching assistantships gave me a range of practical and methodological insights on how to teach. I will describe three that I have adopted in my own teaching.

Support Self-Directed Learning. To allow students to have ownership over their learning, I focused on giving students flexibility in how they choose to engage—options in how they attend lectures, assignments with choices to select from (e.g., reading options), breadth topics selected by vote, self-selected project topics, etc. To support different styles of learning, students are given a few small weekly assignments that promote applying concepts from the class in different contexts—through responding to readings, relating to their own experiences, etc. These weekly assignments reduce the overall pressure of the larger course assignments and give students lower stakes opportunities to showcase learning in different ways. Early student feedback reflected appreciation of the freedom:

> "*there seems to be a lot of assignments but I like how most of them are low pressure in terms of their grade impact… we'll be able to be exposed to a lot of new ideas which is exciting!*" and "*out of the professors I have had, you are up there because of how much you care. Most of us are used to having the same tone of 'you have to do this,' while you make us want to think about HCI overall. You are a big inspiration… all while making the course interesting, and being thoughtful of your students.*"

Based on student feedback from prior iterations of COGS 120, I reintroduced a project component. Somewhat unlike the traditional HCI course projects, our project focuses on the earlier formative aspects of the design process. Students step through brainstorming a set of ideas [4] and finding relevant existing work in research or industry, pick and iterate on a direction, propose primary and alternative methods, and execute on that method and report results. To support the students through this process, we dedicate discussion time to getting feedback from the teaching team throughout the process. I attend discussions, but have the graduate and undergraduate TAs lead as opportunities for them to practice giving feedback. My core goals with the project are two-fold: (1) encourage students to be intentional about their topics through thinking deeply both about visions they hope to contribute to, and methods they are excited to pursue, and (2) allow students to have unique insights that they are proud to share (e.g., to teach interviewers something new in describing their work).

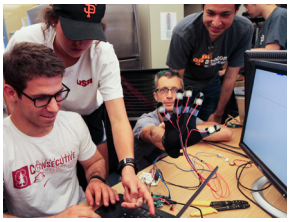
Encourage Reflection-Based Iteration. To support their self-directed learning, I encourage students to regularly reflect both on course materials and on how the course is going for them. I present the class both as a learning opportunity for them, as well as for me and the rest of the teaching team. From the first lecture, I communicated that we're open to reflecting and iterating on the course design based on their feedback to design a class that best supports their learning. I instantiated an anonymous feedback form where students provide specific, justified, and actionable feedback (also to practice providing constructive feedback [5]). This form has helped me learn what is or is not working for students. It has also promoted an environment where students actively consider consequences of proposed changes in the class—in lecture, we collaboratively considered the timeline of a proposed extension based on the impact on opportunities for feedback for later steps in the project; we also discussed the pros and cons of adjusting upcoming lecture materials.

We further encourage reflection on their understanding of course materials. In the introductory systems class I TAed, we provided students with code review alongside correctness feedback; students could reflect on feedback to iterate on and resubmit assignments. Inspired by this, I introduced quiz resubmissions—students can resubmit quiz answers with written reflections on why they believe their new answer is correct and what caused the initial misunderstanding.

Promote Critical Thinking. Through my experiences with research, I realized the importance of thinking critically not just about the topic, but about the method. I also felt like this was a gap in my training prior to graduate school and prior to exposure to design thinking—where I was finally allowed a perspective shift from "I'm terrible at using this software" to "maybe this software could be better designed to support a user like myself." Thus I aimed to promote this type of critical thinking throughout my course. For each method taught, students were also presented with potential critiques and limitations—e.g., limitations of usability studies [6] or empathy-based practices [7]. Their two individual assignments are focused on applying a critical lens through finding examples in their daily life that satisfy or violate certain design concepts.

PROPOSED COURSES

I look forward to teaching a variety of undergraduate and graduate courses. Having been traditionally CS trained and pursued a software engineering career prior to returning to the PhD, being exposed to design during the first year of my PhD was incredibly empowering. I hope to **introduce CS students to HCI early on in their academic journey** either integrated into any introductory CS class or as individual HCI courses both technical, implementation-focused and conceptually-driven HCI courses, such as introduction to HCI, prototyping interactive systems, interaction design fundamentals, HCI research.



Demo session of students' final projects in CS107E built through bare metal programming on the Raspberry Pi

I would also be excited to **integrate physical components into traditional CS or design training**—this could be either through hardware or through fabrication tools. I have repeatedly seen how empowering students with both the technical and design skills to execute on projects with physical output resulted in incredible pride and ownership. I believe I have the interdisciplinary teaching background across systems, HCI, and art to create such courses effectively.

At the graduate level, I'd be excited to teach courses on **advanced topics in HCI**, applying an interdisciplinary lens on HCI and computation through education and cognitive principles, such as human-AI for developing expertise, human-centered AI explanations (through bridging domain concepts and algorithms), HCI for creativity and education, human-AI collaboration.

MENTORSHIP

I have had opportunities to mentor 17 students in high school, undergraduate, MS, and PhD across Computer Science, Cognitive Science, and Art. The most rewarding part of my career has been working with my mentees and seeing them grow as researchers, while also growing alongside them as a mentor. It is my primary motivation for pursuing a faculty position—I aspire to develop lifelong relationships with my mentees like those I have with my PhD advisors.

As in my teaching, with my mentees, I similarly aim to promote a sense of ownership both in their learning and of their contributions to the research. Thus, my mentorship starts as early as the interview process. To gauge their individual goals in pursuing a research internship—I start by asking candidates about their ideal career paths and skills they hope to learn to better tailor their experiences. Then as much as possible, I work on tasks side-by-side with my interns—pair programming, designing in Figma, coding qualitative data, even collaboratively reading papers and taking notes in Miro. Especially for research skills that are new to them, this allows us to think aloud together as they learn the process. I then encourage them to present the progress at project meetings to give them a sense of ownership over their contributions. Many of my undergraduate interns are completely new to HCI research at the start, and yet are able to develop enough understanding and ownership of the project to contribute to the project in many ways—implementing system features, designing interactions, positioning relative to related work, proposing data analysis methodologies, even independently running user studies and writing core sections of the paper.

One of my first mentees at UCSD (who is applying for PhD programs), Mingyi Li, was first drawn to HCI research through my first guest lecture at COGS 120 (the course I am now teaching). Initially intending to focus on coding, she has since learned to run and design user studies, gained experience in quantitative and qualitative data analysis, and contributed to the writing of two papers. One of my proudest moments as a mentor was when she was selected to be one of few undergraduate interns at Microsoft Research, where she led her own research project. As we continue to work together both on research and on teaching the course, I'm seeing her take on mentorship roles in onboarding new interns, as well as to students in my class as a teaching assistant, and is providing thoughtful feedback on their project ideas.

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