Teaching Statement

Jane Hsieh

Teaching Experience & Philosophy

During my undergrad, I served as a teaching assistant for three courses, where I grew in a variety of TA (including lecturing) roles in a liberal arts setting. In grad school, I was the sole TA for Introduction to Software Construction (07-120) – an invite-only course targeted to improve retention of those concurrently enrolled in a core CS major pre-requisite – and two iterations of Introduction to Human AI Interaction (05-618), where I created syllabi, prepared and delivered new lectures, atop managing homeworks. I continuously seek opportunities to hone my teaching and mentoring, such as by taking courses in CS Pedagogy (CMU), Language Pedagogy (Oberlin) and Graduate Student Mentor Training.

As a teacher, I strive to create approachable settings for students to apply, internalize and deliberate on knowledge with sufficient context for application and space for creativity. Digitally and in the classroom, I provide resources to steer students toward active learning and collaborative feedback so they can build self-efficacy to form opinions and decisions of their own as they navigate a fast-shifting labor market.

Active and Applied Learning

> *Knowledge is not a copy of reality [...] To know an object is to act on it [...] to transform the object, and to understand the process of this transformation, and as a consequence to understand the way the object is constructed [3]*

As researchers and knowledge producers, we are experts in creating and delivering accurate and up-to-date course material, yet student engagement with course content rely primarily on relevance and their perceived subjective value. To incentivize hands-on engagement with content-heavy lectures, I integrated (1) relevant pre-class readings and discussions to help students develop their own perspectives as well as (2) collaborative, in-class wrap-up activities that encourage active application of lecture material through divergent and explorative thinking. As an example, students in the first iteration of HAII thoroughly immersed themselves in the Black Mirror Writers' Room[1] — an in-class activity to speculate on the harms of future technologies. But despite their investment reflecting on ethics and societal impacts of AI, I worried how this critical lens might foster a fear of advancements. Thus during course redesign, I included a complementary "*Light Mirror*" exercise during course redesign where students develop second-episode plots – directing them to look beyond the problem space and practice devising, developing and critiquing their own (alternative) solutions before implementation. To encourage more in-depth student engagement, I plan to incorporate in the future exercises that require more critical and reflective thinking, such as socratic deliberations and debates.

Collaborative, Creative and Constructive Peer Feedback

> *The* "deep secret" *of collaborative learning seems to lie in the cognitive processes through which humans progressively build a shared understanding* [4]

In addition to course content, *how* students engage with material in the classroom also influences engagement and retention. One way to expand creative ideas and approaches is to structure collaborative spaces and activities where students can imitate, critique and build off of each others' understandings – such activities also imitate real-world development contexts more faithfully, where interdisciplinary team members carry varying and shifting objectives [5].

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[1] Based on method introduced by Casey Fiesler

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Collaboration is easier said than done, especially among students of different backgrounds. Even among small group environments such as in office hours, individual students might take unique approaches of their own, making it necessary to personalize teaching and mentorship with customized scaffolding. As an undergrad TA and office hours holder for Oberlin's introductory algorithm course, I observed how collaborative students (those who helped others reach the last piece of a problem/puzzle) received not only the satisfaction of successfully giving peer support, they also understood the challenge and embedded concepts better – because the act of solving from another's perspective helped them gain fuller scope and understanding. In addition to creating physical spaces for student collaboration, I also make sure to prepare each course I manage with digital spaces (*e.g.* Piazza, Slack) for asynchronous collaboration, so that students can exchange support without the frictions of physical or temporal distance.

Endgame: Learning from Students as Intellectual Equals

> *To work toward a just world – a world where all have equal access to opportunity – means, as a start, opening up heart and mind to the perspectives of others. We must be able to hear each other and to respect and learn from what we hear [1]*

I believe the ultimate goal of education is to provide students with sufficient resources so they can begin to teach us knowledge about new changes in a fast-evolving world. For instance, one collective sentiment I sensed from students (in Spring 2023) was an intense fear of job displacement by AI-driven advances, which conflicts with their rational goals to develop fluency in more fundamental programming and algorithmic skills. The CS education I received emphasized theoretical and practical algorithmic literacy, but hearing such student concerns that seemed to genuinely impact their self-efficacy, I made sure to introduce contextualizing material in following lectures about the past, present, and potential futures of computing that can help students navigate increasingly digital and AI-augmented worlds.

Historically, I highlighted parallels of the current Digital Revolution to the First Industrial Revolution: showing how displaced workers were absorbed by rising manufacturing demands, just as AI currently replaces clerical tasks but opens up more creative and knowledge-based jobs. Transitioning to the present, I added lectures (during course redesign) on (1) the evolution of AI support for writing — from early spell-check tools to more mature assistance and generative tools of today as well as (2) approaches for detecting and mitigating AI failures. For futures, we introduce design methods (*e.g.* speed dating, storyboarding, co-design*)* to surface multiple possibilities. Joining institutional efforts to adapt to recent advances, I have also participated in a workshop for Adapting to Generative AI in the Classroom at CMU's Eberly Center. Moving forward, I am committed to situating students and ourselves within the material we deliver (from early on) to (1) improve perceptions of content relevance and (2) better guide students toward more grounded and practical perspectives.

Mentoring

As a mentor, I guide students to develop interpersonal and research skills, explore interests, and provide resources and direction for projects over three stages. My 13 mentees (11 undergraduate, 2 masters) from diverse backgrounds (9 different institutions) imparted me with valuable, cross-disciplinary collaborations and perspectives. Two of these mentees are now pursuing PhDs of their own at NYU and UPenn.

Defined Beginnings: To start, I outline higher-level objectives and concrete weekly milestones to clearly communicate expectations in writing. This practice (associated with the Independent Development Plan for qualitative research I developed for the Undergraduate Research Engagement Working Group)

began with my first batch of summer students in 2022. Beyond onboarding and short-term goals, I also include readings/resources to help mentees orient and contextualize their roles in prior research.

***Feedback-based Execution*:** While short-term goals help deliver individual tasks, longer-term aims (*e.g.* project objectives, career directions/ambitions) require more iterative exploration and refinement to identify. To support *research skill* development, I incrementally provide feedback on how mentees synthesize, communicate, and build upon research findings via guided milestones (e.g., literature surveys, stand-ups, and retrospective syncs). *Interpersonally*, I strongly encourage mentees to protest project directions and technical struggles as early as possible in their research, so they can garner courage and normalize asking for help. In a recent game design project where I pushed mentees to challenge my ideas, one repeatedly raised immersion as a key objective – which eventually expanded not only my understanding on the persuasive potentials of gamified interventions, but also the overall project scope.

***Guided Reflections & Future Directions*:** After their designated time with the project, 7 of 9 summer students end up continuing with us to (1) wrap up final pieces and (2) reflexively orient toward their long-term research interests. Even during the course of the project, I (1) deliberately schedule mid-summer check-ins with mentees to assess and reevaluate their expected and future contributions or focuses, and (2) deliberately schedule lighthearted end-of-week check- ups (reverse ice-breakers from work towards life) as a reminder for them to prepare weekend plans. In addition to supporting my own students in finding their future directions, I also volunteered as a co-organizer for CMU's graduate application support program to help match aspiring graduate students at more scalable levels — GASP recruits current PhD students at CMU computing to review statements for incoming applicants.

Reference

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[3] Piaget, J. (1964). *Part I: Cognitive development in children: Piaget. Development and learning.* Journal of Research in Science Teaching, 2(3), 176–186.

[4] Weiss, G., & Dillenbourg, P. (1999). What is 'multi' in multi-agent learning? In P. Dillenbourg (Ed.), *Collaborative Learning: Cognitive and Computational Approaches* (pp. 64–80).

[5] Nahar, N., Zhou, S., Lewis, G., & Kästner, C. (2022, May). Collaboration challenges in building ml-enabled systems: Communication, documentation, engineering, and process.