I believe that students and teachers alike have a *right to dialogue and reflection*, which is the basis for a healthy learning environment. As a teacher and mentor, this leads me to seek opportunities to form interpersonal bonds with students and mentees and to encourage their active responsibility for their education. I see deeply engaging students both as good pedagogy and as an act of inclusion and justice. Here, I describe my pedagogical strategies, experiences that shaped them, and my future teaching plans as an Assistant Professor.

TEACHING AND MENTORING EXPERIENCE

As a PhD student at the University of Washington (UW), I was a teaching assistant (TA) for two classes in the Information School—Introduction to Data Science with Jevin West and Interactive Data Visualization with Yea-Seul Kim. With another graduate student, I co-led the Computer Science department's graduate-level Human-Computer Interaction (HCI) Seminar under the supervision of James Fogarty and Jeffrey Heer. I also had the honor of mentoring a handful of talented students and junior colleagues both by recruiting them to collaborate on my research and by helping them with their own projects. These experiences informed the strategies and imperatives that guide my teaching.

Put declarative knowledge into practice. Learning by doing makes abstract concepts concrete and actionable. It also creates opportunities for critical dialogue [1] and reflection in action [2] which give space to students' voices in the classroom and promote more expert-like intimacy with course material. To help students connect ideas to applications, I include activities in every lecture I prepare. For example, when I gave a lecture on visualization design and toolkits for Introduction to Data Science, I asked students to apply the ideas we discussed through an activity where we critiqued and redesigned a series of example data visualizations. Critique creates opportunities for students to connect design knowledge about what makes a good visualization with their own perspectives and experiences, fostering mutual learning and accountability with the instructor. I used a similar approach when giving guest lectures on human color vision, perceptual research in visualization, and uncertainty visualization in the Computer Science department and Information School's upper-division courses on Interactive Data Visualization.

Structure content around learning objectives. Learning objectives create a contract between instructors and students that I find creates healthy systems of mutual accountability. Scaffolding ideas the instructor finds important can help students track their responsibilities and identify blind spots in the curriculum to be addressed in discussions. For example, when I TAed for Interactive Data Visualization, Yea-Seul and I gave brief quizzes as a low-stakes formative assessment of which learning objectives needed more discussion. Similarly, learning objectives served as a form of accountability in my mentoring. By asking mentees what they want to get out of our work together and explaining my own research goals, I approached each mentoring opportunity from a place of mutual understanding of our shared objectives.

Meet students where they're at. Students understand new material through their existing network of beliefs and ideas, so it helps to establish a foundation of common knowledge before introducing new ideas. When I TAed for Interactive Data Visualization, Amy Ko advised me not to take my expert knowledge for granted and to teach students in ways that are commensurate with their zone of proximal development [3]. The instructor, Yea-Seul, and I put this idea into practice by briefly reviewing foundational knowledge with students at the beginning of each lecture. This strategy might have been even more effective if we had asked students to lead these recaps and take ownership of the material. Later, when I co-led HCI seminar, I deliberately tried to foster a culture of peer graduate students in different sub-disciplines of HCI relying on each other's expertise to unpack the core scholarly debates behind each paper we discussed.

Encourage one-on-one interactions. One-on-one interactions enable me to help students break down the problems they struggle with as individuals, which in my experience leads to increased student engagement and ownership of learning. Although one-on-one interaction is difficult to scale, it worked well when TAed for Introduction to Data Science, a class of about 120 students with three instructional staff. The course was a flipped classroom where students worked through learning modules on a gamified web platform at home and then did problem sets and tests during class time and in office hours. My office hours filled with students, who would work at a conference table surrounded by whiteboards while I floated around offering

individualized help. In course evaluations and emails, students told me how this one-on-one instruction helped them to grasp concepts they were struggling with, learn from their mistakes, and apply the knowledge and skills we built together in future endeavors.

Pay it forward. The essence of academic mentorship is an unbroken chain of acts of kindness and good will. During my first project of graduate school, I mentored an undergraduate research assistant, Francis Nguyen, an Informatics major at the UW. Francis and I worked together with my advisor, Jessica Hullman, to design a series of experiments that were published at IEEE VIS. I introduced Francis to experimental design and the kinds of psychometric models that are prevalent in visualization research. In turn, Francis taught me about Javascript and helped me develop my first web application. Francis spent another year working with our lab before starting his PhD program in Computer Science at University of British Columbia. Later, I passed on what Francis taught me about web development to Priyanka Nanayakkara, a PhD student at Northwestern who was learning to use Javascript and D3 to create a differential privacy application. Similarly, I passed on what Matthew Kay taught me about Bayesian statistics to Phoebe Moh, a PhD student at University of Maryland working on her first experiment. After some one-on-one instruction, Phoebe adapted code from one of my previous projects to use for her own paper, which won an honorable mention at IEEE VIS.

FUTURE PLANS

As an Assistant Professor, I will contribute to the department's data science curriculum. In part, this will entail teaching core undergraduate courses such as: **Introduction to Data Science** covering fundamentals in statistics and programming in the command line, python, and R; **Introduction to Web Development** building skills with HTML, CSS, and Javascript frameworks; and **Interactive Data Visualization** showing how to design, create, and critique graphics for data analysis and communication.

I would also like to develop advanced courses that push students to think like scientists. While data science instruction tends to focus on APIs and toolkits, it gives less attention to the failure modes of statistical models, the often tacit assumptions analysts make about data, and the ways in which observation and analysis are not "objective" but laden with beliefs and values. As advanced electives, I would like to offer courses on: **Bayesian Statistics** covering sampling based inference, Monte Carlo methods, hierarchical regression models, and mixtures; and **Experimental Design** geared toward teaching students in computing to think deeply about data collection. Additionally, I would like to lead seminars on special topics in computing research such as **Interactive Systems**, **Uncertainty and Risk**, **Cognitive Science for Technologists**, and **Interpretable Machine Learning**. These advanced courses would fill in gaps in student knowledge and skills, driven by student demand for both critical perspectives on technology and deep technical savvy.

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