Teaching Statement

My approach as an educator is not just to instruct but to provide materials so they are convinced to think, engage, and pursue deeper knowledge. It resonates best in Socrates’ words “I cannot teach anybody anything, I can only make them think”. Especially in Computer Science where knowledge is as important as the ability to apply it, my objective is to help students build the ability think critically by creating a participatory experience.

Teaching Philosophy

My research has allowed me to learn about the various learning and cognitive styles, how people process and interpret information in different order, and how people assign varying importance to different information based on their experiences. I apply such principles from the cognitive psychology realm to my teaching approaches. Based on these, I follow these four principles when teaching:

Provide multiple learning pathways: People have unique learning processes. The same knowledge can be presented through multiple concepts, mediums, and formats. Each have their own strength of representing the knowledge, and some of them are more perceptible to one than other. I experienced this when teaching senior level algorithm to undergraduate students. Half the class understood the knapsack problem through mathematical representation and pseudocode, while the other half finally grasped the concept when I drew out some knapsacks and visually walked through how the algorithm worked. When teaching courses, I will plan and create a curriculum that uses multiple ways to explore concepts. Especially now, when classes are offered in various formats. In future classes, I will curate concepts to make the best use of the class format – in-person, online, and hybrid. I will make lecture videos with segments where students can interact [1] and leverage the benefits of flipped classroom for concepts that require hands-on work with team members [2].

Listen, connect, and adapt: The easiest way to communicate a concept is to express it in terms of what students personally connect with. I create a personal connection between students and the subject by leveraging their different backgrounds, personal interests, and motivations to learn. At the beginning of class, I include activities where students engage with each other to understand what cognitive styles they associate with using the GenderMag personality facets [3]. Understanding that everyone has different ways to process information has huge impact on the team building and performance [4]. I will adapt lectures and explanations to connect students with the concepts they can relate to. My classes commonly include students to work in groups on projects. I will design projects to help students understand how the concepts learned in class relate to their interests.

Don’t just inform, inspire: Information is very accessible in this digital era. And in such an era, the teacher’s job is not to inform about what to learn but inspire students to think about the why and how what happens, happens. My objective is to create an environment where students are convinced to think. Not just the teacher, but students can be each other’s inspirations and I am a big proponent of that. I will include discourse on implications of the concepts be an integral part of my classes. I also believe activity sessions that encourage students to apply the concepts to real world situations can inspire creative and deeper thoughts in students.

Participatory engagement and evaluation: One of my teaching ideologies is to engage students in all stages of teaching: preparing to learn materials, finding real world applications to use the knowledge, and evaluate their progress. In my classes, I will organize students to work on materials in collective groups help students to realize whether their understanding of the material is correct and adequate. While the teacher’s evaluation points out the knowledge the student is missing, self and peer assessment allows students to gauge their overall progress and estimate how much more they can produce. I will include activities (e.g., design/implementation based on real-world applications and problems) which utilize group participation on self and peer-assessment. I recognize that students benefit from feedback that is targeted [5] [6] and provided at the right time, I will design curricula to provide a high quantity of peer feedback and high-quality instructor feedback.
Overall, my aim is to make students independent critical thinkers, “A teacher is one who makes himself progressively unnecessary” as Carruthers said. My job as a teacher is to instill the ability in students to not just consume information but dissect information to evaluate its validity and think of the implications and applications. On a personal level, I want my students to learn to be compassionate individuals with a growth mindset. I often show examples of my own code errors and design failures from early student years to convey that the important part of learning is to believe we can all grow.

Mentoring and advising

I have mentored many undergraduate students out of whom Yennifer Ramirez, Thien Nam, and McKenzie Calvert became co-authors on some of my papers. I am also a mentor with the Saturday Academy’s Apprentice in Science and Engineering program, and for the last four years I have mentored many high school students through their summer internship programs. All of them worked with me on various successful research projects, some of them like Amelia Leon, Audrey Au, and Natalia Morales are also co-authors on some papers due to their significant research contributions. Students coming from different backgrounds struggle with specific issues caused by missing context, background knowledge etc. I personally engage with them and walk them through the problems they find difficult to understand using multiple approaches.

Since my research is cross-disciplinary, I often advise mentees to continually think of how various information and findings apply to their own research, regardless of the domain or concept. Any source can be an inspiration for scientific contribution; thus, I always advise students to think about positively applying any new information. In the future when mentor graduate and undergraduate students, I will emphasize students to create and deliver original ideas. I will ask students to think critically and pursue the answer to “why” when doing research.

Teaching experience

The largest class I have assisted in teaching is Algorithms 325 (upper division undergraduate course) with 280 students. Both the volume of contents and students in that class accentuated the idea of “unique learning pathways”. About half the class found explanations through mathematical concepts more effective, while the other half preferred visual walkthroughs and wrote their algorithms as essays. Fascinatingly, both groups of students had similar understanding of the discussed algorithms at the end. This experience taught me to always consider alternate pathways to explain and educate.

The bulk of my teaching experience comes from assisting professors in graduate level HCI, design, and empirical research courses. I was more involved in the classes with designing and scheduling curriculum, creating assignments/exams, and co-lecturing some topics. Graduate level courses are research heavy, and I refined my skills to inspire critical thinking in students, explain abstract concepts in terms that students relate to, and inspire them to apply knowledge from any research to their own problem space.

Courses

I am excited to develop curriculum or teach classes from existing curriculum at the intersection of human-computer interaction, data science, software tools, and AI/ML applications to software. I am prepared to teach graduate or undergraduate courses around Human-Computer Interaction like User Research in Software Development, Empirical Software Engineering, Data Mining in Software Engineering, Inclusive Software Design, User-Centered Software Design/Implementation. I can also teach courses that demonstrate applying cognitive science and AI/ML foundations to software design. Given time to prepare I can envision teaching Information Visualization, Statistical Approaches in Software Design, Software Engineering, and other Data Science courses.
References


