Teaching Statement

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Teachers have three loves: love of learning, love of learners, and the love of bringing the first two loves together.
-Scott Hayden–

Overview

I developed my passion for teaching through years of mentoring and teaching computer science concepts to students from different backgrounds. I have learned that the success rate of the student's learning experience depends heavily on the learning environment, inspiration value, and quality of teaching set by the instructor. Through classroom teaching, research mentoring, and curriculum development for non-CS students, I have learned and applied principles that promote active learning and adapt teaching to ensure students receive the best education possible. Seeing students learn and grasp subjects is a meager gratification compared to the satisfaction of seeing a passion develop for a subject like Computer Science.

Experience

Classroom Teaching

My teaching experience has been threefold. As a teaching assistant, I helped design the Engineering Honors program at Texas A&M University. The Engineering Honors Seminar course was designed for first-year college of engineering students who were admitted to the Honors program. Through invited guest talks and mentoring activities, I helped a cohort of more than 200 students each semester navigate the entry to a major process. In addition, I mentored students to identify their research interests and approach professors for undergraduate research opportunities.

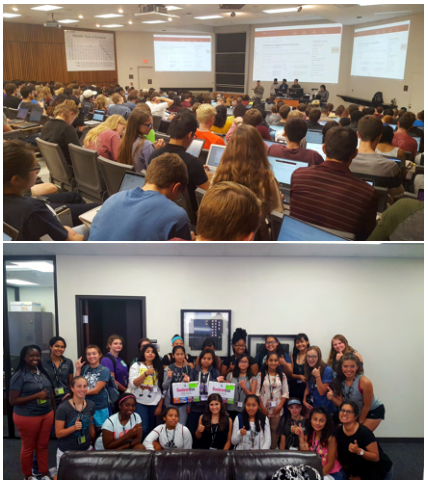

Figure 1: Face-to-face teaching experience: (a) Engineering Honors Seminar Class. (b) Middle and high school students taught in the AggieSTEM summer program.

I have collaborated with a professor in the Department of Education to teach computer science to middle and high school students through the AggieStem summer program. I taught two cohorts of thirty students each and proposed to the program organizers to use the BooleanBox, a computer engineering kit that allows students to build systems using a Raspberry Pi and learn the basics of coding by building stories with Scratch. I gave lectures on programming and ran a lab to help students develop a summer project that they presented at the end of the program.

To improve my pedagogical skills, I have received training from Texas A&M's Center for Teaching Excellence Office of Graduate and Professional Studies and fulfilled the requirements to become a Center for the Integration of Research, Teaching, and Learning (CIRTL) Associate – Fellow of the Academy for Future Faculty. I practiced teaching practices like syllabus writing and curriculum design through the training.

As the curriculum lead for College Pathways programs at AI4ALL, I develop the Discover AI and Apply AI curriculums. Discover AI's curriculum contains lectures, ethics discussions, and coding activities to help students answer the essential question of how Artificial Intelligence will impact the world. The curriculum is currently implemented in fourteen colleges across the country, and I have helped train the instructors to deliver the course with mindfulness to the student capacity. The Apply AI program is project-oriented and allows students to build, evaluate and deploy machine learning models that solve a problem of their interest.

I have designed the curriculum and created workshop materials that help students improve their technical knowledge and programming skills to successfully complete their projects. The workshops are run by volunteers from the industry, and I collaborated with them to identify opportunities to share with students how the concepts learned related to their careers.

The first offering of the College Pathways programs coincided with the outbreak of COVID-19, which challenged our team to find fast solutions to offer the course virtually. This became an opportunity for me to adapt the curriculum using online tools like the EdSTEM learning management system and Zoom to facilitate instruction.

Figure 2: Discover AI online Ethics Discussion class meeting.

Research Training and Mentoring

As highlighted in my diversity statement, I have mentored more than twenty research students from high school to Ph.D. level, ranging from orienting them into the study of path and motion planning algorithms to working with them on research projects. Notably, I have worked with students toward the publication of research findings on protein-drug interactions[ACM-BCB'20] and robot navigation [IROS'22], as well as several undergraduate thesis projects.

In addition to mentoring, I helped design a crash course for incoming research students to learn about path and motion planning algorithms and the parasol planning library. I led the course and organized other Ph.D. students in the lab to assist new students, paying more attention to undergraduate researchers who often have limited coding skills. The crash course has helped the lab onboard students in record time and empowered them to make significant research contributions within a semester or a summer program.

Figure 3: Mentoring experiences: Summer 2019 Undergraduate research students at the University of Illinois, Urbana-Champaign.

Lessons Learned and Applied Principles

Classroom Teaching

Course organization and strategies: I have learned how to apply Bloom's taxonomy to engage and challenge students at different learning stages. A combination of pre-lecture assignments, lectures, programming/homework assignments, small group activities during lectures, and online discussions, develop technical understanding and broader knowledge of our discipline.

Formal assessments: I have focused on written assessments to test information retention and theoretical understanding of a topic to help steer the student to further intellectual development, as well as projects to test the ability to apply concepts, develop necessary technical skills, like programming, technical writing skills, and possibly teamwork and collaboration.

Self-reflection and refinement: Instead of blaming the students for not learning the material, I reflect on how some component of my course organization or strategy might not work for the class and work out ways to adjust it. Each assignment has a purpose and learning outcome; if it fails or succeeds, it is my duty to the students to understand why. Surveying the classroom at important junctures of the calendar (beginning, after midterm exams, and end) helps identify what could be modified to improve their learning experience.

Research Mentoring

Defining attainable goals: Often, students' interests span multiple fields and tend to result in setting unattainable goals that overwhelm the student and hinder their progress. My role as a mentor is to learn the mentee's

interests and help define the most fitting project goal. I iteratively do this by setting a fixed time to review progress and have an opportunity to reset goals, and celebrate successes and learned lessons.

Striving for a well-rounded school experience: What happens outside of the classroom impacts the student's learning experience often more than what happens inside. As a mentor, I encourage students to share their family life and personal experiences, and propose that those important factors are taken into consideration and prioritized.

Training future mentors: Well-mentored students make the best mentors in return. I work to create opportunities for mentees to get a chance to mentor incoming students, which is beneficial in two ways: the incoming students feel more at ease to learn from their peers who have more recently walked the path. Furthermore, the student mentors reinforce their knowledge and confidence by explaining it to someone else.

Future Plans

I am ecstatic to contribute to students' academic success through teaching, research mentoring, and designing curriculums for undergraduate students. I am confident teaching any core undergraduate Computer Science course and any courses in my area of research interest, including planning, algorithms, computational biology, and artificial intelligence. In addition, I have highlighted in my research statement examples of the semester and year-long research projects tailored to undergraduate students to spark interest in research and build research scholars. I look forward to developing onboarding curriculums similar to the crash course and the Discover AI curriculums I have developed to introduce undergraduate students to research and artificial intelligence. I am excited to teach all I have learned through my years of study. Witnessing students' creativity come to life is a privilege I'm humbled to be a part of as an instructor.