

Teaching Statement

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I have been actively teaching for the last 10 years as an instructor, teaching assistant, and teaching faculty across several universities in Bangladesh and UMass Amherst in Massachusetts, USA. During my tenure as a faculty, I have designed and taught 6 undergraduate-level computer science courses. Throughout my teaching career, I have maintained a top 10% rank across the universities I taught at. I have also been nominated four times for the Teaching Assistantship award at UMass Amherst. My desire to pursue a career in academia is deeply rooted in the philosophy of sharing knowledge with others. I believe that knowledge not shared is knowledge lost. Teaching is a profession that enables the manifestation of this philosophy to the fullest. The expressions of epiphany on students' faces when I manage to transfer a new piece of knowledge to them fuel my motivation for teaching. The following statement is based on my teaching experiences and philosophies.

Teaching Experience

Dhaka, Bangladesh (2013 - 2017). My teaching career started as a teaching faculty at the University of Liberal Arts Bangladesh in 2013. During my one-year-long tenure, I taught fundamental computer science courses such as Data Structures and Software Engineering to sophomores and juniors. In 2015, I joined the University of Dhaka — the most prestigious and largest university in Bangladesh — as a teaching faculty in Computer Science and Engineering. For three years, I taught Operating Systems and distributed operating systems to junior and senior students in 60- to 80-student classes. I also instructed several lab courses, including Introduction to Programming, Data Structures, and Introduction to Human-Computer Interaction (HCI) where I taught them fundamentals of programming concepts and HCI methods including field study methods, prototyping, and qualitative data analysis. During my tenure, I remodeled the archaic Operating Systems curriculum to go beyond theoretical concepts and incorporated practical applications in my lectures and course content. I also introduced a new set of assignments where the students modified and created their own versions of core operating system components, including schedulers, memory managers, and file systems on top of a Linux distribution. For many students, this was their first experience with Unix/Linux systems. I adjusted the curriculum to incorporate fundamental knowledge of core operating system concepts which led to more optimized and efficient coding practices in my students' later years of education. Many of my students mentioned how taking my class motivated them to explore and adopt multiple operating systems in their workflow.

Amherst, Massachusetts, USA (2018 - Present). I started my Ph.D. at the University of Massachusetts Amherst (UMass) in 2017. Across five years at UMass, I have worked as a Teaching Assistant (TA) for several courses, including an introduction to HCI and advanced methods in HCI. As a TA, I dedicated myself to helping students understand and make progress in their curriculum. I hold double the required time for office hours because I feel only two hours a week is insufficient for large classes. For my efforts as a TA, I have been nominated for the Outstanding Teaching Assistant award four years in a row. I have also instructed introduction to HCI in Fall 2021 in a 100-student class. The class consisted of students majoring in Computer Science, Informatics, Physiology, Design, and Economics. In this course, I incorporated a copious amount of real-world examples in my lectures when covering fundamental concepts of HCI, including design principles, mental and conceptual models, field study, prototyping, user study design, qualitative and quantitative analysis, and visual design. I introduced students to current industry and research standards for each topic and highlighted the importance of going beyond software engineering paradigms to incorporate human-centered design principles for research and product development. During this class, I took a hands-on active learning approach by dividing the class into two components — a lecture to establish the fundamentals with various real-world examples and in-class activities where the students applied what they learned during the lecture in practical scenarios. I designed the course content and deliverables around a semester-long group project where the students delivered a functional prototype that addressed real-world problems. Some of these projects laid the foundations for future published works as well as commercial products on Android Play and Apple Store. As an instructor, I hold a 93rd percentile record, which is among the top-performing instructors at UMass Amherst.

Teaching Philosophy

My teaching experiences helped me to form three key principles toward teaching. (1) **Flexibility.** There is no singular approach for teaching students with different backgrounds, skill levels, and requirements. It is critical to be flexible in designing and delivering lectures, communicating and grading, and setting expectations in the class. My approach to flexibility involves designing course content that can be distributed into easy,

medium, and hard problems so that it is accessible enough for students to get started and gradually improve but challenging enough for students who want to push themselves. (2) **Foundation.** It is vital to establish core theories, principles, methods, and practices to help students develop reasoning capabilities essential for advanced and independent learning. Informatics, computer science, and Human-Computer Interactions (HCI) are fast-paced fields and without foundation knowledge, it is easy to get off-track and focus only on the latest advancement without knowing the problems these methods overcome. At the same time, theory needs to be complemented with practical applications to educate students on how to expand on foundational knowledge to develop new ideas applicable in the real world. During my lectures, I begin with a real-world problem, highlight the pain points, describe the theoretical components, and then provide several alternative solutions or approaches to mitigate the problem. (3) **Feedback.** Grading and evaluation are essential metrics for learning and constitute a major part of teaching. However, one of the critical components of the learning process is to learn from mistakes. Mistakes are an opportunity to clarify misconceptions and explain a concept better. Instead of simply penalizing students for errors or mentioning that they have made a mistake, it is far more effective to explain what is mistake, what are the alternatives to approach a correct solution, and the reasoning behind them. Without explanations, knowledge sharing is halted, as the students might not know how to recover from their mistakes. While evaluating students, I follow a feedback-based approach where every point reduction is associated with an explanation that goes beyond rubrics to help students overcome their mistakes.

Teaching Plan

As a faculty member, I plan to teach both undergraduate- and graduate-level courses. For undergraduate-level courses, I will focus on building fundamental concepts in Human-Computer Interaction. Specifically, I am interested in teaching introductory courses in HCI, information visualization, social computing, and fundamentals of data science. For graduate-level courses, I would like to teach advanced methods aligned with my research goals, including Advanced Methods in HCI, Design Thinking, and Human-Centered Design. I also want to design new interdisciplinary courses that combine multiple fields of research both at the undergraduate and graduate levels. For instance, I intend to design and develop a graduate-level course for social computing and computer-mediated collaborative work. In these courses, I will teach how to use state-of-the-art methods and technologies in HCI, natural language processing (NLP), applied machine learning, and information visualization to build practical and accessible solutions to complex socio-technical problems. I will design all these courses to have semester-long hands-on projects to enable students to build foundational knowledge, connect theory with practice, foster creativity, and apply fundamental ideas to tangible functional outcomes.

Advising Strategy

Graduate Students. As an advisor, my goal is to help graduate students to mature as independent interdisciplinary researchers. To that end, I will foster a diverse, inclusive, and collaborative environment where students can explore research problems across multiple domains. I am devoted to having a caring and nurturing environment for students to achieve their personal goals while maintaining their well-being. Following my teaching philosophy, I will practice flexibility and adjust to students' needs during my advisement. I will train them on research practices and offer weekly one-on-one interactions to discuss their research progress and offer support and guidance. At the same time, I will promote students' independence by providing empowering them to take ownership of their research and lead their projects. Otherwise, I will work with them to identify and approach problems that they would be interested in working on. From experience, I understand that students' requirements, practices, and research philosophies can change drastically as they continue to grow as researchers. I will facilitate these changes and continue to support their growth as independent researchers.

Undergraduate Students. Based on my experiences, advising undergraduate students is fundamentally different from advising graduate students. Despite being extremely enthusiastic about research, undergraduate students often have significantly more course loads. Furthermore, they often go through the process of learning foundational concepts in several areas while being engaged in their particular area of research interest. As an advisor, I will assign undergraduate students specific tasks based on their interests and skill level with room for exploration if they are comfortable with that. I will take a more hands-off approach to train them in the fundamental methods of research by following the learning by practicing approach. Based on my experience, weekly meetings to allow undergraduates to discuss their progress and highlight their contributions will boost their morale. I will also connect them with graduate students so that they have access to additional mentorship, guidance, and perspectives to build their own research ideas and philosophies. My goal is to not only train undergraduate students in research methods but also to spark their interest to consider research as a career.