

Teaching Statement

I strive to engage, challenge, and inspire growth in my students. I believe that every individual with proper mentorship can achieve the unachievable. I want my students to share the passion, which I feel for computer science and become valuable collaborators in the exploration of theory, research, and practices in computer science.

My passion for computer science motivated me to pursue my doctoral education to innovate and explore new ideas, which in turn helped me to improve my teaching and mentoring skills. I am delighted while interacting with students. It is a greatly satisfying experience to see students develop and mature as individuals, excel in their professional careers and become exceptional human beings. Most of the students that I have taught over the years are now either engineers or academicians. Some of them are still in touch with me. The fact that I am able to contribute back to society giving knowledge to future generations gives me immense gratification.

Teaching Experience

I look ahead to being a professor with great excitement. I was fortunate to teach both undergraduate and graduate students and also corporate employees over the past eleven years. I have taught courses ranging from the introductory level to specialized courses in computer science and engineering. In each of these courses, I had a great deal of autonomy to give lectures and/or lead sections in addition to holding office hours, constructing exams, and grading papers. Each course presented a wonderful opportunity for me to assimilate and to improve myself as a teacher.

While a Senior lecturer at Baba Banda Singh Bahadur Engineering College (BBSBEC), India, I taught various undergraduate courses including Software Engineering, Formal Languages and Automata Theory, Relational Database Systems, Computer Networks, ATM Networks, Digital Image Processing, Programming Languages, Operating System, Digital Logic and Circuit Design, Computer Graphics, and Fundamentals of Computer and Information Technology. Latter, I also taught graduate (master's) students courses related to Language Processors and Compiler Design. I also taught employees of a 500-fortune software company, Cognizant. The courses were related to Relational Database, Networking, and C language programming.

I attended a professional training program at the Institute of International Teaching Assistants of the University of Nebraska-Lincoln in 2009. This is a program to provide training for international students to teach courses and instruct laboratory sections. I received a "high pass" in the final evaluation, reflecting my strong ability to teach in a clear and organized fashion.

As a teaching assistant at the University of Nebraska-Lincoln (UNL), I instructed and graded various courses CSCE 361: Software Engineering, CSCE 378: Human and Computer Interaction and CSCE 150E: MATLAB Programming. I taught CSCE 150E: MATLAB Programming for 3 years and developed course material for the labs. This was a course, which most engineering and science students take. This also trained me to teach interdisciplinary students. I created projects that had elements of mechanical engineering, chemistry, physics etc. depending on the students in the respective class so they could relate the course to their backgrounds. I also developed pre-tests, post-tests, assignments, quizzes and projects for the course. I like to invite my students to have a relationship with the course material. Hence, I encourage active and participatory learning whenever appropriate. I bring students into direct engagement with primary sources before turning to the various mediations of secondary literature. Simulations, debates, role-playing, thought experiments, and games are a regular part of my classes. I also encourage constructionist learning (to engage students in developing powerful ideas through active learning) into my course teaching styles.

My office hours allowed me to interact with students individually and get their feedback on various issues. For example, I learned that students wished to know the teaching material before the class. Given this experience I ensured that I uploaded my teaching slides beforehand. Another thing I learned was that grading can be a contentious issue if the grading scheme is not made clear beforehand. I like to have a pre-determined grading scheme and give positive and constructive feedback so that students have the opportunity to learn and improve their grades. Many such finer details, which may not directly be discussed in a classroom, came to my notice through individual interactions.

Philosophy

My teaching experience as an academician over these past eleven years helped me in developing and refining my teaching philosophy.

I am inspired by the challenge of improving the educational experiences for students in higher education. I have learned that the first day of the class is the most important and motivates students for the rest of the course. I like to discuss the importance of the course and how the concepts are applied, or can be applied, in the real world. I strive to be a teacher who always tries to improve the delivery for each and every topic every time in the classroom and invents new ways to engage and inspire the students. I always inspire my students to believe in the following, which I deeply believe: (1) education and knowledge are critical to success, (2) taking charge, being assertive and engaging more is important, and (3) anything is possible with creativity and determination.

Over the years, I find in my classes that students spend considerable effort establishing a mental picture, or mental model, of how the parts of a system (such as a computer program) interact. These mental models serve as simplified causal models that help the student design new systems and predict the behavior of those systems. My role as a teacher is to monitor how students are building mental models, by asking them questions about a computer program's behavior in class and on exams, and to help them repair misunderstandings. I have learned that using only one method is not sufficient to build these mental pictures. I prefer to use animated powerpoint slides and videos when appropriate. I often use diagrams and demonstrations to expose an artifact's essential causal mechanisms. For example, I typically explain the principles like the working of a CRT with a video and with an algorithm by showing a flowchart representing its behavior, and executing several demonstrations of the algorithm with small datasets. Often students adopt my diagrams and demonstrations, or create their own; this serves as feedback that the students are benefiting from this approach.

I believe that computer science, like a foreign language, is best learned by immersion. I encourage brainstorming sessions, group projects, and group presentations to encourage students to share and learn from others knowledge. It is my aim that students leave my classroom knowing what it means to be a collaborator. I also expect to be challenged by my students—an expectation I plan to communicate to the class early on. I encourage my students to ask questions, and I am straightforward about not having all of the answers. When I next return to the classroom, I share not only the answer that I've found, but also the process I went through to discover it. Above all else, I challenge my students to understand that I am open to their thoughts, eager to hear their opinions, and thrilled to learn with and through them. Finally, I attempt to inspire growth in my students by giving them tools to take into other disciplines and into other domains of their life. Among these tools are a sense of curiosity, open-mindedness, and a thirst for knowledge. I encourage my students to observe and begin to question the purpose and meaning of human thought, behavior, and emotions. After becoming skilled observers, I would like my students to use their tools to ask a few good questions, to creatively design a way of answering these questions, and to openly share their new knowledge with others. I believe that every student possesses unique capabilities and will succeed if given the appropriate support.

I believe in the balance between theoretical and practical approaches. The impact of a hands-on experience tends to stay for a much longer time. I also like to keep my courses flexible. For example, students can have the option of pursuing a larger project instead of doing multiple smaller ones. Given the subjective nature of evaluation of projects, I pay careful attention to the evaluation criteria and evaluate my students progressively over the semester through assignments, projects and quizzes, rather than just through tests. In more advanced courses, tests may totally be replaced with writing a research paper or a major project. As a teacher, I play a key role of inculcating curiosity in learning the various concepts and techniques and show the joys of exploring the various topics without necessarily focusing on end results. To facilitate this, I keep my classes interactive. I also introduce discussion sessions on open-ended topics (A simple example could be a discussion on how the future programming environments would look like for end users writing programs for accessing data from repositories having terabytes of data (big data)). I also like to invite guest lecturers or do a field trip for my courses whenever possible. Lastly, I ensure that my grading system doesn't penalize students for doing more exploratory work rather than results oriented work.

Teaching Plan

Based on my extensive teaching experience, I am looking forward to teaching courses to both undergraduate and graduate students, especially courses related to Software Engineering and Human Computer Interaction (HCI). I have the knowledge needed to design and teach courses about both subjects. I plan to concentrate on the design, implementation, and evaluation of techniques needed to develop software. Students will develop their projects in teams and make use of configuration management systems. They will also be encouraged to select and implement appropriate software processes for developing

their projects. For HCI courses I will concentrate on the basic elements of user interface design while emphasizing different metrics of evaluation (e.g., accessibility and usability) for designing and testing interfaces. Students will be educated to incorporate elements of design thinking, user centered designs, rapid prototyping, and principles of visual designs.

Software Engineering/ HCI/ Empirical Foundations Courses

I would like to introduce various seminar courses on advanced software engineering courses; Software Engineering meets HCI, Empirical Evaluations in Software Engineering and Global Software Development (GSD). My research experience will help me in designing these courses. Special topics like Software engineering with emphasis on HCI will be designed to integrated software engineering techniques and HCI concepts. The courses will be designed to facilitate discussions on recent research efforts and incorporate software engineering techniques into the programming environments seamlessly using principles and theories from HCI. This course will aim to bridge the gap between the two research areas. Another special topic course, Empirical Evaluation in Software Engineering, will introduce students to experimentation and experimental evaluation with a focus on software engineering. The idea is to provide sound foundations for performing experiments, evaluating methods, techniques and tools in software engineering. Another special topic course, Global Software Development, will be focused on how (globally) distributed software development takes place, what are some of the problems in these settings, and what kinds of tools are available to help development in GSD. The course will include a set of topics that are essential to both professionals who will become participants and leaders in globally-distributed projects, as well as researchers interested in studying virtual teams, distributed organizations, and global software development. In all my courses students will write and present their projects so that they can develop academic and professional communication skills, make logical arguments, and perform critical analysis.

Transformation in Software Engineering Education

I believe one of the most important things that is often missing from education curriculum is training for future jobs. Planning the curriculum so that students are confident when they step out of the university into the job market is key to student's success. Courses should be designed and taught taking into consideration the current needs of the job market along with sound foundations of the course. For example, designing the courses focusing on topics related to product development cycle, interface design and importance of coordination and communication, will be helpful for their future jobs.

Mentoring Students

My desire to engage, challenge, and inspire growth in my students is not limited to the classroom. Over the time I was at BBSBEC, I worked with over a dozen undergraduates and two graduate students as a research mentor. Both graduate students are now lecturers in colleges. My desire to collaborate with students translates into the research domain, and I enjoy working closely and mentoring them. It is my goal to share with students the awe and excitement, as well as the dedication and hard work that come along with using research tools, to ask and answer questions. While at UNL, I closely advised four undergraduate students on my research projects. One of the students is starting graduate school while the other three are still completing their undergraduate degrees. At OSU, I am fortunate to be working closely with three teams of graduate and undergraduate students. Mentoring students has improved my research and writing, as I review and present topics in different ways with a broader perspective, and to new audiences.

Conclusion

To conclude, teaching and interacting with students are among the most satisfying experiences I have had. I am driven by the long-term investment and impact teaching has on individuals that shape the future. I want to make studying an amazing educational experience for students and let them believe that they alone have the power to achieve the unachievable. I want to inculcate problem solving, creativity, design thinking, planning and collaboration as part of their rationale. Given my extensive teaching experience I feel confident in teaching and mentoring students and look forward with great excitement to continuing my academic career.