Philosophy

I believe in four components that contribute to effective teaching: learning from student feedback, diversifying teaching techniques, knowing the student population, and including activities that enhance student engagement. I will explain each of these components below.

Learning from student feedback A good instructor communicates with students and use their feedback as a metric to measure the success of the teaching approach. Feedback can be received in multiple forms that include, but are not limited to, one-on-one meetings in office hours, group meetings, performance on deliverable materials, and student surveys (mid-semester and end-of-semester). In 2008, I taught an introductory CS class to biology students at King Abdul-Aziz students. I gave the students two pop-up quizzes before midterms to understand that student population and their areas of strengths and weaknesses. These two quizzes did not contribute towards the final grades, because my main purpose is to get insights that would help me prepare upcoming lectures, exams and assignments.

Diversifying the teaching techniques, deliverables, and materials Different students have different needs when it comes to learning. While some students perform better on exams, others excel in hands-on exercises and projects. Similarly, some students achieve most of their learning goals by studying from books, while other students prefer interactive lectures. Effective teaching is a combination of more than one technique, because it helps students excel in areas where they show strength, and grasp the concepts more effectively. Combining the theoretical and practical approaches to teaching helps students understand the theoretical foundation and practice applying theories to application. For example, explaining how a security network attack works on paper can be strengthened with an exercise that simulates the attack in C code using a Linux client and a server. When I designed my user study design tutorial, I planned to include segments for hands-on exercises, where participants work in groups to design a short user-study and apply the concepts they learned.

Knowing the student population Knowing the demographics of the student population benefits both the instructor and the students. An instructor can tailor a course and/or teaching methods according to their audience needs, goals and backgrounds. For example, a Human-Computer Interaction (HCI) course on research methods taught to students with a CS background may focus on enhancing knowledge and skills related to effective user study design, and applying statistics to data collected from human-subjects. However, when the same course is taught for students with a social science background, the course focus may shift from user study design and statistics to CS-related topics, such as programming, or web development. When I taught students from a biology major, I surveyed them during the first class to understand their IT background and tailor the class topics accordingly. Other student demographics may affect performance in class. For example, teaching undergraduate students is different than teaching PhD students who might have research deadlines to meet or conferences to attend. Similarly, freshman students might need detailed instructions and guidelines as they are beginning to build their college experience.

Demographics might also affect student participation. An instructor may observe some students who do not actively participate in discussions. For example, international students or students from minority groups who might feel timid to speak in public. The instructor might help by calling on the inactive students who seem shy or timid (even when their hands are not raised) or by creating group exercises where students discuss their ideas in smaller group settings. When I mentor students (graduate or undergraduate), I try to ask some questions about the student’s background and adjust my response accordingly. When I chaired the Societal Computing Seminar in the 2016/2017 academic year, I contacted students who have shown less participation and encouraged them to give talks that maps to their interests. One of the students presented an excellent tutorial and received very good feedback, and since then, the student participated more and became more active in the Societal Computing department.

Including activities that enhance student engagement This means including activities that makes use of class discussion with peers and/or instructors and hands-on exercises where students try to apply the concepts they learn in class [1]. Courses with interactive engagement has been shown to enhance problem solving abilities compared to courses that only rely on passive lecturing, standardized labs and exams [1]. Examples that enhance
Teaching Statement

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student engagement, include but are not limited to, group project/assignments, hands-on activities during lectures, assigning a class participation grade, and asking students to respond questions raised by their peers. In my teaching experience so far, I have never relied on passive lecturing in-class and I encouraged in-class discussions through thought-provoking questions and group exercises. When I delivered a lecture to the privacy, policy, law and technology class in 2012, I noticed that student participation increased in the second half of the lecture. The second half was the section that I started asking questions and encouraging discussions, where the first half of the lecture was mostly passive lecturing. Since then, I learned to plan for in-class activities to enhance students understanding of the introduced concepts.

Teaching Experience

Prior to joining the PhD program, and after completing my undergraduate computer science degree in 2003, I taught computer science courses at a private institution in Jeddah, Saudi Arabia. Programs in the institutions are intended to provide professional certificates for women. This experience was unique as I learned to teach computer networks and multi-media programming to students who have non-academic goals. Such students want to learn the concepts and use it to advance their careers or simply add a new skill to their resume. In 2008, I taught freshman level computing courses in King Abdul-Aziz University for undergraduates who were completing degrees in areas outside of CS, such as biology, liberal arts, marketing, and business administration. Through these experiences, I learned that student’s involvement in class is highly affected by their own interest and we can increase their interest if we highlight the class benefits to a personal level. For example, I explained to non-CS students how the job market appreciates IT skills and how CS courses can help them advance their future careers. I also encouraged students to use topics from their own domain of interest in the assignments and class projects, so they could experience how CS applies to their domain.

As a PhD student at CMU, I served as a teaching assistant for two graduate-level courses: privacy engineering and privacy, policy, law and technology. I had the chance to deliver a lecture for each of these courses, and most importantly, the chance to interact directly with students during office hours to provide guidance on their projects or other required deliverables for the course. I interacted with undergraduate and graduate students (Masters and PhD levels) who possess different backgrounds, areas of interest, and diverse skill sets. For example, the privacy, policy, law and technology course included a diverse mix of computer science and public policy students.

Conference Tutorials Experience I have organized conference tutorials about grounded analysis [2, 3] and effective user study design [4]. Depending on the venue and its time-frame, the tutorials where tailored to a 1.5-hour session, a 4-hour session, and a full day 8-hour sessions. This is a different experience than teaching a college course as the audience are professional peers and PhD students who want to learn about a new concept, skill, or tool in a limited time frame. My technique was to lecture for some time and follow-up with questions to the audience to help the attendees engage, and stay interested. I also included short exercises where attendees apply what they learned immediately to better grasp the theoretical concepts. I believe these tutorials were successful based on the number of attendees that was higher compared to other co-located tutorials, in-session engagement, discussions, and the feedback that I received afterwards.

Mentoring and Outreach Experience Mentoring, community service and outreach are other forms of teaching that can enhance the education experience. During my PhD years, I had opportunities for one-on-one mentoring and group mentoring. My mentoring topics are sometimes technical, such as, concepts, tools, technical challenges, and research methods. At other times, my mentoring will include lifestyle skills related to graduate student life, such as work-life balance, time management, or conflict resolution techniques. In our requirements engineering research team led by my advisor, Dr. Travis D. Breaux, I often play a mentor role for my colleagues. For example, a student was interested in using factorial vignettes, I first asked them to read certain book chapters and research papers prior to our meeting. Then, I met the student to explain the benefits of the technique and how it can apply to the problem that they are trying to study, and continued to provide feedback as the student’s research progressed. I have also provided feedback on student presentations and practice talks to help them communicate their research more effectively, and provided advice on time management. When a student writes their first paper, for example, I give them tips on how to break the writing process into sub-tasks that they can
organize around their calendar in a way that would help them to be productive, meet the deadline, and not miss any classes, meetings or other commitments.

I served as the student representative in the department’s faculty meetings, and to improve student mentoring and to enhance peer-learning among students of the Societal Computing program, I advocated and succeeded to start a student seminar series in the department in the Fall 2016 semester. The seminar was a success for students and faculty due to the variety of topics covered that include: interdisciplinary research talks and tutorials. Furthermore, the seminar had a special session where a group of students wrote a proposal to restructure the department’s practicum course.

I organized time-management discussion sessions for Societal Computing students during the practicum course and a student seminar. I have paid special attention to mentoring female students from my department, CMU’s campus and outside CMU, being a female student myself who went through different phases of my career (in different countries). The same applies for international students as I was an international student on an F-1 Visa until I was granted my US Green Card in 2013, and most recently my US citizenship in October 2017.

**Future Vision**

I plan to apply the lessons learned through my teaching experience and my mentoring experience in my future teaching, advising, and mentoring. I generally believe in interactive teaching, rich discussions, the effect of learning from peers, and trying to accommodate student goals. My teaching will adapt and evolve to accommodate student needs, and adjust in style according to the type of technical material being taught. I also regard students as humans; we want to challenge their thinking and encourage them to excel and give their best, but without introducing extreme stress that could affect their health or work-life balance.

Due to the interdisciplinary nature of my research, I find myself able to teach a variety of topics. I can teach privacy and usable security courses as well as introductory security courses that covers topics like: crypto, network security, software security. For research methods and human computer interaction, I can teach methods courses that cover a variety of topics related to human-subjects research. For example, effective study designs, data collection and analysis methods, bias and confounding effects, statistical analysis, grounded analysis, and others. I can also teach students about the value of evaluating new scales empirically and the risk of developing new scales (or metrics) by relying on the face validity alone. This is related to my own experience creating a new scale for security adequacy in my studies where I applied recommendations from psychometrics to empirically evaluate the linguistic labels used on general population before using them in my security ratings studies[5], [6]. I believe can add a lot of insights based on my expertise in mixed qualitative and quantitative research. For example, I can enrich research methods courses with theories and foundational work from psychology and decision-sciences that will help advance the CS field. My research involves security requirements, which makes me capable of teaching requirements engineering due to my good understanding of the field.

**References:**


