Statement of Teaching

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I started as a Teaching Assistant (TA) while in the final year of my undergraduate studies and eventually became a Lecturer (Probationary) at the University of Moratuwa (UoM), Sri Lanka. I continued this position for 20 months until I joined the Colorado State University (CSU), USA for graduate studies. At CSU, I was a TA for two undergraduate and one graduate level modules, where I occasionally substitute my supervisor. I also followed GRAD792 Seminar on College Teaching and obtained the College Teaching Certificate from the Institute for Learning and Teaching at the CSU. Then I returned to the UoM in Dec. 2012 and resumed duties as a Senior Lecturer. Between 2013 - 2014 also delivered several modules from the University of the West of England, UK and University of Greenwich, UK at two private institutes in Sri Lanka. In 2014, I participated in a 3-week seminar on Chinese Education System held in China. These experiences have given me a broader perspective on higher education practices around the World. In addition to the undergraduate and graduate teaching, I also have experience in teaching professionals, military, and school teachers.

Teaching Philosophy

I believe that teaching is both an art and a science that needs to be mastered and practiced continuously not only because Computer Science and Engineering (CSE) is a rapidly changing field, but also due to ever-varying expectations of the students. Most contemporary students see an undergraduate degree in CSE as not an end, but a means to an end. Therefore, it is essential to recognize that not all students are equally motivated, where some students are in the class to learn while others focus on somehow getting passed so that they can take a follow-up class or apply for a specific job. However, I see *facilitating and nurturing each student's latent desire to learn* as the primary role of a teacher and preparing them for exams as secondary. Graduates in CSE are expected to get their hands dirty, work in a team, effectively communicate, and self-learn from day one. Thus, my role as a facilitator goes beyond imparting subject knowledge and includes helping students to master hands-on skills (e.g., design, development, and debugging), soft skills, and inspiring them to take charge of their professional and personal development. I believe *assessment for learning* is effective over *assessment of learning*. Therefore, by ensuring that the lectures, assignments, labs, projects, and quizzes are engaging, suitably challenging, and match the interests of each student, we can facilitate the learning in both groups of students. This could be further strengthened by taking efforts to regularly understand the backgrounds, interests, and noticing verbal and nonverbal feedback of students. Also, following the university's role of credentialing/certifying students, I better prepare my students for exams by sharing tips on necessary exam skills. Furthermore, I have a moral responsibility to help develop engineers with inquiring minds that are ethical, socially responsible, and politically aware of the consequences of their actions, as an engineer has a direct impact on thousands of lives.

Teaching Style

My teaching style is a combination of the following principles, which I believe are essential for a successful experience to both the students and teacher:

Top-down delivery – Technology that students' experience daily are miles ahead compared to the basics that we try to teach in class. Therefore, students lose interest in fundamentals and tend to focus on abstract concepts. Tendency to use some REST API, library, or machine learning technique without realizing what happens behind is a classic example of this. Even the recent textbooks and the classes based on those follow the bottom-up strategy of first covering all the basics and then later putting things together to show the big picture. Whereas my classes have been more effective when I take a top-down approach where the latest developments are recognized first, and then they are dismantled, one-level at a time. I eventually reach one basic

concept at a time and spend more time on it. Spending time on basics is still essential, as it is the only invariant, not the jobs students will undertake nor the tools to do those jobs. However, my labs always follow the bottom-up approach as it is how we build things. This mix gives students an appreciation of the basics and how those basics connect to form high-level abstractions. This approach has been extremely effective in my first-year Computer Architecture class. I break the abstraction of a computer into modules, and modules to the level of digital logic in the classes. I match it with a series of 10 labs where students gradually build a 4-bit, 4-instruction nano-processor on an FPGA using only the schematics and hierarchical design. Moreover, this approach is effective in teaching engineering principles such as abstraction, hierarchical design, and building using standard components. During several internal surveys, this module has been recognized as the most liked and most remembered module by first and final year students, respectively. Inspired by this feedback, I am now working on a textbook that presents the material in a top-down manner.

Match design, delivery, and assignments to subject matter – While designing daily lesson plans, I trade off quantity vs. quality based on what will be relevant in the industry and academia in the foreseeable future, based on students' ability to grasp the concepts, student expectations, and learning outcomes. For example, the focus of a large, lower-level undergraduate class is on developing essential skills, relating learning to real life, and inspiring students to take high-level classes. Whereas a small, high-level class focuses on strong fundamentals, analytical, and soft skills. Therefore, introductory modules focus more on lectures, labs, quizzes, and filed visits while higher-level modules are designed to be more interactive with student presentations, in-class discussions, games, and group assignments and projects. I use strategies such as rewarding for in-class participation, deriving some exam questions based on student-initiated discussions that are neither in the textbook nor slides (students are made aware of this at module inception), and impromptu quizzes to retain attendance. When students find it difficult to answer questions, I rephrase the question and drill down to sub-questions until we could reach the answer. My approach seems to be effective, as my classes consistently have higher attendance and better overall grades. Best examples are my final year Distributed Systems and Advanced Computer Architecture classes which are well appreciated by students despite perceived high workload. In fact, a student once said, "*While seniors recommended not to take multiple classes of yours due to high workload, it was a pleasure to take two classes, and most importantly I had nothing left to study by the time of the exam.*" Most of my classes include a writing component as both low-stakes and high-stakes writing across the curriculum is essential for the development of a competent graduate. My last peer review was ranked as "Excellent", and I regularly achieve overall quality criteria of "Good" (highest on a 3-point scale) for my modules.

Tell a story about the class – A compelling and concise story about the class is essential to motivate and stimulate the students. Thus, my story during the first class explains what will be covered in the module, what students will be able to do at the end, why it is essential, how it will fit with other modules and their careers, how to approach the subject, what are my expectations for students, motivation and objectives behind assignments, how the assignments will be graded, and what are acceptable behaviours. I continue to revisit different parts of the story throughout the semester to reiterate essential points.

Engage the students – Lectures, labs, assignments, and group projects need to match the interests and abilities of the students to keep them engaged in and out of the classroom. For example, in most cases, I allow students to come up with project ideas (under a given set of guidelines) or allow them to pick from multiple options based on their interests. Moreover, whenever appropriate, these assignments are derived from current topics and my research work. On the fly assessments such as impromptu questions, demonstrations, and quizzes have been useful in increasing the students' level of concern. Such assessments and verbal and nonverbal feedback from students have also helped me to phase the classes better. As CSE practitioners heavily use enterprise social media tools, I integrate Wikis, blogs, discussion forums, and Yammer, especially to group assignments. Use of these tools also helps me to reduce the interaction and

collaboration barriers in lecture-based classes and with junior students. I keep an open-door policy while maintaining a friendly but professional relationship, as such small things ultimately determine students' overall reaction towards the class and learning in general.

Curriculum Development

As the department's industry contact point, I have the opportunity to discuss and recognize the industry needs. Consequently, in 2015 I introduced the Business Analytics specialization and the portfolio option (as an alternative to the thesis) to the MBA in IT programme. Since then both the intake and graduation rate of the programme has gone up. Recently I proposed the department to offer an undergraduate specialization in Enterprise Systems Engineering (ESE) covering aspects of large-scale software systems, Cloud computing, Cyber Security, and DevOps practices, as the industry is lacking engineers who could design and build both virtualized hardware and software. I am now developing ESE curriculum. As this requires a broader OBE approach, I am now following the Coursera course on "Assessment in Higher Education: Professional Development for Teachers" offered by the Erasmus University Rotterdam. Further, I developed the university-wide ICT curriculum for the Eastern University of Sri Lanka, multiple CS modules for the new engineering programmes of the University of Sri Jayewardenepura and the South Eastern University of Sri Lanka, and act as the external moderator of the BSc (Hons) in IT programme of the Sri Lanka Institute of Information Technology. I have been able to initiate three MoUs with the industry to establish labs and a student workspace, and currently working on MoUs with the University of Seychelles and Edith Cowan University, Australia. I am an avid fan of open educational resources where I not only consume and but also contribute by sharing my slides and class notes on the web. For example, a few of my Computer Architecture slides are viewed over 10,000 times on SlideShare.