Teaching Statement

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My teaching objectives

My objectives as a teacher are to foster critical thinking, improve students' problem solving capabilities, facilitate the acquisition of life-long learning skills, and prepare students to function effectively in an information economy. I always strive to keep myself aware of the social and technological pressures to be more responsive to students' needs and more concerned about how well students are prepared. Teaching is not just transmitting information to students. I strongly believe that teaching is an art, and a person should master it in such a way that it will not only convey knowledge to students but also involve and make them partners in this learning journey. I also believe that assessment is at the heart of education. My assessment is designed in such a way to assess a broader range of student abilities, e.g. problem solving, critical thinking, effective communication, working in groups, and learning in depth. In addition, I believe that students should be involved in the assessment process and be able to monitor their own performance, for instance by understanding the criteria used in the assessment. My objective is also to assess not only what students know but also what they can do, and make sure that my assessments reflect the desired learning outcomes and have a beneficial effect on the learning process.

The following is a list of selected strategies and approaches that characterize my teaching.

- *Attitude*: I place a tremendous effort on being open, enthusiastic, helpful, and available for questions and discussion during and outside regular contact times (i.e. lectures, office hours, online meetings, and emails).
- *Feedback*: Each time I teach a course, I collect as much feedback as possible from my many discussions with students and learning outcomes evaluations. I also conduct a self-prepared evaluation three times per semester, one evaluation per month. These evaluations provide me with crucial information that helps me tune the course material as the semester progresses. Hence, I keep these evaluations or better called feedback mechanisms completely anonymous. Students tend to express themselves a lot better when they are sure that their identity is not being disclosed.
- *Organization*: being organized is the secret to efficiency. I strongly believe in planning beforehand the entire semester, starting from educational learning outcomes, then designing lecture topics and homeworks accordingly.
- *Information Technology*: I use Moodle to interact with students and post all course related material including syllabus, office hours, slides, reading assignments, homeworks, previous exams, etc. I also make use of Clickers, where students are given an electronic device that allows them to answer questions that I pose in class in real time. I then display the answers and start with an interactive discussion depending on the answers' statistics. This approach proved to be very useful as it adds a fun atmosphere to the learning process, encourages competition, and keeps students alert.

Switching to online

Given the COVID-19 outbreak which forced instructors to teach online, I adopted technologies such as Zoom and WebEx for synchronous lectures, office hours, and meetings. I record every lecture and post it

on Moodle. I also create polls during the lecture to enhance interaction with the students and know their level of understanding. I also diversified my assessment to include many assignments, online exams, group projects, and online interviews.

In my capacity as associate dean, I am leading the eLearning and Distance Education strategy in FAS and ensuring the academic continuity in times of crisis. I am working rigorously with my colleagues at FAS to convert key FAS courses into blended/online format and create online diplomas that would attract international audience such as Computing in Education and Modern Middle East. I am also in continuous communication with the IT Academic Services to ensure that faculty members are equipped with the technical knowledge needed to teach online. Online workshops on online teaching were conducted in addition to managing an FAS webpage that gives hints and provides resources on teaching online. These initiatives proved to be very useful when AUB switched to online learning.

My vision and activities as a computer science educator

I believe that computer science education or at the least programming skills should reach every citizen of the world. Apart from my teaching activities at the American University of Beirut (AUB), which I will discuss later in this document in more detail, I want to start with few of my major teaching initiatives that cross the borders of AUB to reach Lebanon as a whole and beyond. It all started in 2012 when I received a Computer Science for High School (CS4HS) fund from Google for the amount of $8,000 and which I used to organize train-the-trainers workshops for high school and middle school teachers in Lebanon. Around 35 teachers attended the workshops that I conducted in AUB and covered computer literacy and computer programming. We then followed up with the teachers for the next five months and made sure they were delivering the correct material to their students. Finally, in May 2013, we created a contest for the students where they showcased the projects they created during the five months using the technologies we introduced to their mentors. Hundreds of students learned new skills and benefited from this initiative.

Starting December 2016 and ongoing, I represented the computer science department and partnered with the World Food Program (WFP) and the Center for Civic Engagement and Community Service at AUB in a program called Tech for Food that aims to provide computer literacy and digital literacy to Syrian refugees and underserved Lebanese. I created the whole curriculum, hired the instructors, trained them, and followed up with them at each step of the training. In a given cycle, participants start with English sessions for a period of two weeks, followed by 6 weeks of computer and digital literacy. By the end of the cycle, around 40% of the participants are selected to participate in another 8 weeks cycle where more advanced topics are covered such as web development, application development, and logo design. Given the vast success of the program, WFP decided to open two new locations in North and South Lebanon on top of the two previous locations in Beirut and Bekaa. By the end of 2018, more than two thousand participants would have benefited from this training. Currently and even in the bad economic situation Lebanon is passing through, the program has been renewed with more focus on training the underserved Lebanese. I also pushed to update the training material to include technologies that might help the trainees get jobs, even if the pay is not high. The trainings are now tailored to graduate trainees who can create websites, open stores on social media, and do simple data analytics. All of these skills can be used to work online and earn some money to support the trainees and their families.

Staring September 2018, I started offering as a service, one hour of programming using Python to grade 10 students at a local school (International College - IC). My objective and that of the Secondary School Director at IC is to make computer science required for all IC students. The initiative that I started will hopefully pave the way for this objective to materialize, and to apply in other schools in Lebanon.

While at AUB, and on the mentoring and advising fronts, I served as a freshmen advisor for around 80 students in 2011 and 2012. Even after finishing my duty as a freshmen advisor, students still come to my office for advice. In Fall 2011-12, I served as a computer science undergraduate advisor for around 50 students. I also served as a computer science graduate advisor for around 35 students every year from 2013 till 2019. I maintain a close and professional relationship with the students; I hear their concerns, give them advice, and try to help as much as I can. I also write students at least 20 recommendation letters per year for their future jobs and/or graduate studies applications.

Course and Curriculum Development

On the course and curriculum development fronts, I have introduced major curriculum changes to the undergraduate and graduate computer science curriculum at AUB. Part of these updates compliment my duties as the department chairperson. Major updates include the introduction of a new MS program in computer science that is courses-based, the introduction of a Data Science minor, the introduction of a Game Development minor, the introduction of six new graduate courses, the introduction of 6 new undergraduate courses, the alignment of all the courses with each other where one course ends and the other continues rather than repeats the material, the linking of the theoretical courses with the applied courses, and the offering of many service courses to other departments at AUB.

While at AUB, I taught 10 different courses as follows: EECE 433: Database Systems, EECE 450: Computer Networks, CMPS 101: Introduction to Computer Science, CMPS 200: Introduction to Programming, CMPS 207: Programming for Digital Art, CMPS 212: Intermediate Programming with Data Structures, CMPS 284: Computer Networks, CMPS 274/374: Compiler Construction, CMPS297Q/CMPS396Y: Computer Security, and CMPS 299: Software Graduation Project. Contributions include:

- Introduced CMPS 207 in 2016 in collaboration with the Media Studies department. The course became required for Media Studies and Graphic Design students and is offered as a general education course for the rest of AUB students. The course covers web development and Python and is very well received by the students and their respective departments.
- Created a version of CMPS 200 (programming in Python) to be offered to all science departments in AUB, in replacement of a broader course on computer literacy. The proof of concept course was offered in Fall 2018-19 and was a success. If this approach succeeded in its next offering, the science departments might adopt this course as part of their requirements.
- Taught CMPS 101 when it was first offered in Spring 2010-11. I prepared the Labs and designed the course in such a way to make it completely hands-on where the offered material will benefit the students throughout their study and after graduation regardless of their major.
- Taught CMPS 274/374 (Compiler Construction) after many years of not being offered. I taught it in Fall 2011-2012 with a new flavor balancing between the theory and the hands-on concepts with a bit more on the practical side. Many interesting projects were developed including a domain specific language for android phones, and a compiler for the microprocessors used to control elevators.

- Updated the hands-on component of CMPS297Q/CMPS396Y (Computer Security) by introducing many labs related to ethical hacking.
- Revamped CMPS 200 and CMPS 212 by strengthening the material and focusing on enhancing the hands-on programing experience. All exams are now programming exams in the Lab and one assignment is given every week
- Updated CMPS 284 by introducing various Labs to allow students to understand how communication really happens. All students were involved in projects on the Android platform.
- Introduced and conducted a 10 days programming crash course. The course was tailored for students with programming weaknesses in CMPS 200.

Student supervision and advising

I served as the MS thesis advisor for 15 computer science students, and co-supervised 13 MS and 3 Ph.D. students in other majors at AUB. I normally hold one meeting per week for every student. During the meeting we discuss the technical work, critique it, and propose tasks to be investigated during the upcoming week. This process continued until the students' graduation. I was able to publish refereed conferences and journals with almost all the students I supervised and co-supervised.

In CMPS 299 (Software Graduation Project), I supervised in Fall 2017-18 seven capstone projects. One capstone project, called Phishing Attacks and Prevention, won the Murex Best Innovative Project Award for the amount of $3,000. During the project execution, the students launched a phishing attack on AUB community and were able to gather some statistics indicating that around 40% of AUB community are vulnerable to such attacks. *The IT department at AUB was informed about the attack beforehand and no sensitive data was gathered.* The group also developed a mechanism to prevent phishing attacks from happening. The results were shared with the IT department at AUB, which promised to take further action in this regard.

Personal development and Future Direction

In an effort to meet my teaching objectives and continuously enhance my teaching abilities, I always participate in educational workshops to enhance and sharpen my skills. Sample workshops I participated in include "Master Class for Teaching Online" (offered by ASU in Sept. 2020), "Thinking Based Learning", "Didactic Instructional Models with Notebook Software", and "Clickers". Among the most satisfying experiences for me as a teacher was the ability to evolve my teaching experience from novice to recipient of the highest teaching award at Western Michigan University: the Teaching Effectiveness Award. While at AUB, my average Instructor Course Evaluations (ICE) scores of all courses taught is 4.2 (5.0 is the max score). The average of the "*Overall rating of the instructor's teaching effectiveness*" is 4.3. These scores highlight the effectiveness of my teaching, which are well beyond the faculty and AUB average scores.

My ultimate objective and in fact my dream is to get to a time when computer science is taught in Lebanese schools starting at early age. Why not teach 3 to 4 hours of computer science to students age 6 and above. There already exists many computer science curricula that target kids and beyond. If we ever achieve this, I believe we will secure a bright future to our kids and country. A more conservative dream which is not beyond my reach, is to work towards requiring every student in AUB to take a computer science course or more. On the personal level, I want to enhance my skills in creating online courses and proceed with creating a course or more on advanced programming and problem solving topics. Hence these topics are not normally offered among a regular computer science curriculum.