The Power of Self-learning

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Educational Philosophy. I believe that one should explore the significant synergies among the activities of teaching, discovery, knowledge integration, and service. My students in the classroom benefit from my research experience; my research benefits from the participation of students; my service is informed by the needs of students, faculty, and external stakeholders with whom I interact; and my broad US and global experience—including in fields that go beyond my main area of research—has allowed me to integrate knowledge from diverse disciplines to develop innovative curricula.

The principles that support my educational philosophy include connection to practice and research, self-learning, importance of the scientific method, continuous virtual presence, and historical perspective.

Connection to practice and research. I believe that in order to "create new forms of education that serve our students better and new paths of research that can help us discover solutions to the world's greatest challenges," a mission of George Mason University, one must provide an educational experience rich in practical and research considerations. I always seek to bring aspects of my research activity into the classroom, even at the undergraduate level, in order to describe the challenges of the field and the methods used by scientists and engineers to advance the state-of-the-art. I also bring to the classroom elements of my practical experience, obtained by consulting with various government and private organizations. This teaching philosophy instills a spirit of entrepreneurism in my students.

***Self-learning*.** My experience with teaching myself what I wanted to learn, such as fixing radios and TV sets when I was a teenager, had a significant impact on the way I conduct myself as a teacher and mentor my students. Most of my courses include a project or a major assignment of practical nature. As part of the project assignment, I require students to learn by themselves some of the concepts needed to perform the tasks required by the project. I find it absolutely necessary that students go through self-learning experiences to become self-learners, an important skill to have after they graduate and essential in a fast-moving area such as Computer Science. I know from my own experience that the joy of discovering new ideas is a powerful catalyst to enabling students to exercise analytical and imaginative thinking.

Importance of the scientific method. *C*onsistent with Mason's mission of "bring[ing] together a multitude of people and ideas in everything we do" and respecting "inclusion, multidisciplinary approaches, and a global perspective," I teach my students that more important than a specific research problem is learning to be a researcher, including using the scientific method to develop and validate a solution for a new problem. I work very closely with my diverse group of students from many parts of the globe to ensure they understand the research process at every step of the way.

Continuous virtual presence. A doctoral research process is often intimidating and requires discipline to keep the momentum going. This is especially true for PhD students who work full-time and have a family to take care of (the case of many Mason PhDs I graduated). For that reason, I make myself continuously available to them through virtual presence (e-mail and video calls) at crucial times for them, including evenings and weekends, when they need to discuss an idea or receive feedback on an important matter. This approach aligns with Mason's commitment to accessibility and of "proactively engag[ing] with our community."

Historical perspective. It is natural for young Computer Science students to take for granted the technological advances they have grown accustomed to. However, it is very important that these students understand how and why things evolved the way they did and how computing was done decades ago. In possession of this understanding, these students can more easily help pave the future of the field. Having the benefit of being in my profession for over 45 years, I have participated in a significant part of its history. I use that experience to provide the historical account that helps trace the links between what I teach today and what came before. These stories often constitute an eye-opener to students. The challenges of the past (e.g., programming earlier mainframes with limited amounts of memory and computing power) may be found today in small devices such as ubiquitous environmental, biological, and military sensors.