

The importance of programming skills in improving health across the lifespan

As the oldest of the old continue to become an increasingly larger percentage of our population, challenges due to chronic health conditions and injuries arising from the higher incidence of falls in this population are being placed in our health care systems. It is increasingly important to develop new solutions for preventing falls and decreasing the likelihood of injury in older adults, by improving health across the lifespan. Health related improvements have the ability to profoundly influence society on a global scale. Consequently, students should be encouraged to become global citizens—able to work in multi-cultural teams, provide solutions to increasingly complex problems, and be comfortable with the computational skills they need to facilitate problem-solving.

Programming, and other computational skills play a critical role in answering the ever increasing complex problems arising in health and wellness in our local communities. In the health industry, the advent of smart devices and continuous connectivity provides an opportunity to gather personalized health data at a large scale. For health care providers, taking advantage of this additional stream of information will undoubtedly provide the opportunity for providing personalized medicine and more effectively detecting changes in health conditions. Through the exposure to programming, and other computational skills, students embarking upon careers in the allied health sciences, biomedical engineering, and medicine, can then have a common framework to communicate and address complex problems.

In order to facilitate the learning necessary for students to become innovators in allied health sciences, biomedical engineering, and medicine, I have sought to

facilitate the development of real-life problem-solving skills, fostering of critical thinking skills, and spurring of interdisciplinary teamwork. Within the past four years, since joining the faculty at the University of Illinois, I have nurtured students' analytical skills by challenging assumptions and incorporating activities that emphasize adequate problem definition. In special topics courses on Neuromechanics and on Occupational and Rehabilitation Biomechanics, I have provided capstone projects for students to pursue interdisciplinary projects that necessitate programming skills for the simulation of neuromechanical systems, and developed materials for case studies of falls in the workplace, which necessitate biomechanical modeling. In addition, as a co-instructor in the Carle-Illinois college of medicine, I have contributed to the development of cases and engineering labs aimed at introducing engineering principles and their application to health problems, so as to foster the growth of future physician-innovators.

When both the technical and non-technical skills are presented within a cohesive structure, students can then better appreciate the breadth of skills that are needed to tackle challenging problems and be better prepared to improve health across the lifespan.