

"If the environment permits it, anyone can learn whatever he chooses to learn: and if the individual permits it, the environment will teach him everything it has to teach"
- Viola Spolin

Teaching requires one to deftly transform knowledge into something tangible; pulling the stuff apart, organizing it into essential components, then kneading and shaping those components into pieces that are easily accessible and a pleasure to explore. The core mission of a teacher is to transmit her passion and excitement to students. I have found that a passion to learn is the most significant predictor of success among students. Uninteresting classes are met with little enthusiasm and effort. In contrast, classes that excite students encourage them to perform far beyond the requirements. More importantly, this excitement is often lasting, providing the foundation necessary for a lifetime of creative learning, thinking and research. In fact, the ability to manipulate knowledge into more accessible forms is as essential to research as it is to teaching. My advisor was fond of saying, "If you can't a concept to an 8 year old, you don't understand it."

Class Room

The best instructors have only a limited ability to teach students anything. Rather, instructors motivate students to teach themselves. This ability, to be a self-directed learner, is especially important for today's students. Graduates must be prepared to function in a diverse and rapidly transforming field, which requires the ability to grasp new ideas and master new tools without the guiding hand of an instructor. It is important that a student learns how to learn, as a general and continuing principle. Students without this ability will be handicapped as they find their skill set becoming rapidly outdated as the field evolves around them. Lifelong learning is a characteristic which is important in all facets of our lives. A teacher is offered a unique position to engage students, yet should not ignore their responsibility to teach students the spirit of personal inquisitiveness that leads to being engaged in the absence of a teacher. I believe that a course taught with an emphasis on problem solving and creative thinking abilities can challenge students and show them that they are capable of tackling a course of any level. In pursuit of this, my approach to introducing new topics in computer science is to first demonstrate how the current problem can be fit into a useful abstraction, then show the students how this abstraction can be manipulated, and finally illustrate additional problems to which the abstract concept can be applied. I often employ intuitive visualizations of theoretical concepts described in class.

For example, a graphical windowing system can be represented as a linked list, and a multiply linked list can represent a three dimensional scene. This technique helps students understand the relevance of what they learn in the classroom. My lectures are very interactive by encouraging students to think, talk, and actively participate rather than passively listening. I also extend the dialog outside the classroom by organizing student group discussions, seminars on related topics, maintaining a class mail list and asking students to send me comments through e-mail. By encouraging openness in discussion with the humbleness and humility that we are all in this organic learning process together, the class and I are able to quickly correct invalid suppositions and conceptual misunderstandings on the part of any particular student.

Mentoring

Mentoring and advising students is one of the most important roles of a professor. My primary goal as an advisor is to prepare students for their professional lives. Students need assistance not only with technical details, but also in identifying and prioritizing goals, developing and executing research plans, and effectively communicating results. I am the industry contact mentor for the Stanford School of Design ME 310 class. I find myself in several extremely fulfilling roles of being a technical consultant, research advisor, presentation and writing coach to my graduate student group. We meet very week to discuss new ideas and design prototypes for a class project. By supporting and encouraging them, I help them gain confidence in their work and ultimately in themselves. As a mentor, instilling confidence is vital, as graduate students, whether they pursue academic careers or find jobs in industry, will be in leadership roles. The skills needed to head a research group are rarely a part of formal graduate student training. At the same time, persuading undergraduates to join that next generation of graduate students is not always an easy task. Experience can be a critical factor in a students decision to continue on to graduate school. While vast numbers of internships allow students to “test the waters” of industry, the scarcity of research opportunities hinders most students from gaining this same experience in academia. In order to obtain this critical knowledge, I teach a very hands-on ‘mobile multimedia technologies’ course where undergrads perform background research, write software, and develop computer algorithms. Students take part in writing papers for submission to conferences and journals. Students are also required to give oral presentations of their work at our lab at the Nokia Research Center.

Embrace the Intellectual Change

I believe that educational activities we engage in should extend beyond the walls of the lab to reach our communities and society. The advent of the World Wide Web has opened up new avenues for disseminating the information from our research particularly mobile technology. I currently help maintain a wiki page containing code, tutorials, web links to several mobile technologies, tools and IDEs that help the community embrace this technology more effectively. I often explore new methodologies for teaching, whether it is hands-on teaching via mobile phones, a more studio-like class for teaching information visualization or a design course for teaching functional aesthetics and user interfaces.

As a professor, I wish to establish an educational program pursuing several goals. A good education in computer science must rely on strong fundamentals in algorithms, data structure, numerical methods and complexity. My background in computer graphics has made me particularly aware of the need for such a solid foundation. When tackling a computer graphics problem, the search is as important as the final proof. It requires the exploration of simple examples, the formulation of hypotheses, the invalidation of wrong solutions, and the generalization of intuition. I strongly believe that our experience in research is fundamental to assist students in learning to explore a problem when they have no intuition of its solution. Apart from providing classes for teaching fundamentals in rendering, I seek to improve and broaden the the field of computer graphics by introducing contemporary and interdisciplinary classes pertaining to information visualization, human computer interaction (HCI), and pictorial communication. Such classes would promote interdisciplinary collaborations between the school of information, computer science, psychology and other departments creating unique blends of teaching, research, and interaction.