

## Constant Experimentation - My Teaching Philosophy - John Chilton

I believe passionately in a scholarly approach to teaching. That is to say, I view teaching as a research problem. It is impossible to teach the perfect course, but each term this is my research goal and constant pursuit. My approach to this problem is to take the best of what has worked in the past and constantly experiment with new ideas.

Like any other research, the experiments (changes in pedagogy or content) can and should often be inspired by scholarly literature, peers, and experts in the field. I have found my own experience as a learner and the intuition I have developed as a teacher are poor indicators of the potential success or failure of a particular course experiment. As result, I have learned to give deference to the education research of others, and I am willing to try anything as an instructor. Before I had the experience of teaching in a traditional classroom (as opposed to a lab), I had attended various workshops and presentations extolling the virtues of active learning. My intuition was that computer science (CS) students were overwhelmingly introverts and would be very put off by having to work with their classmates, and while it might work for others it was not for my students. The first semester I taught in front of a classroom, I used a few peer learning activities, and was very surprised to detect none of the hostility I expected. Despite my initial biases, I have come around 180 degrees on active learning in CS curricula. I have become much more aggressive about including opportunities for active learning in my classes. I limit my lecturing to 5-8 minute chunks interspersed among active and peer learning activities. I teach recitation sections where my job is to review material. Nonetheless, very limited lecturing and teaching mainly via activities would be my goals for presenting new material, as well. There is little material in any given CS course to be memorized; everything one would hope to teach requires students to think about the material at a higher level. Regardless of the brilliance of my examples or the clarity of my descriptions, simply presenting material is not a good way to facilitate student learning of the desired concepts at the required level.

Like any other research, objectives and evaluation are important parts of teaching experiments. I try to not make decisions in an ad hoc manner. I believe as an instructor I should have clear objectives and the choices I make should be designed to meet these objectives. I likewise believe in evaluation which is constant and is focused on assessing whether these choices meet their objectives. Designing courses and lectures in this manner requires significant work, but in the long run I believe the data obtained is invaluable. It allows for clear assessment of what is working and what needs improvement.

I believe teaching experiments should be disseminated as would any other research. Attending and presenting at teaching conferences are important parts of the process of teaching to me. I have presented both teaching about specific CS concepts to CS instructors and about pedagogy to a general audience of college educators. I hope to continue to present my teaching throughout my career as an educator.

Finally, I believe experimenting should not stop at the classroom door. CS programs face large problems that instructors should address, such as low enrollment of women and declining enrollment overall. Research suggests by high school many women have already decided not be engineers or scientists, so I believe it is important for instructors

to speak to middle school audiences whenever possible and demonstrate that despite the stereotypes computer science is exciting. There are also some (limited) ways to address this problem in the classroom, namely creating an environment that prevents women (or anyone else) from quitting the CS course and program, and presenting exciting material in introductory courses aimed more general audiences in an attempt to pull in students from other majors and those undecided. I have been involved in researching these problems, and as an instructor I would continue investigating them.

I stated that this process of experimentation is constant. This makes teaching so much more exciting than conventional research to me. Unlike more traditional research topics, the best teaching strategy for a given course is going to vary based on the skills and weaknesses of the instructor and of the students, and these are two factors that are constantly changing. Ultimately, this need to adapt further necessitates constant experimentation, revision of objectives, and evaluation.