Jeff Kinne   Teaching Philosophy

My views on teaching have been shaped by being a part of different types of institutions. As a student at Xavier University, I experienced the benefits of a liberal arts setting. As a graduate student at the University of Wisconsin-Madison, I was part of a cutting-edge research community. Now I am a faculty member at Indiana State University – which is in between those two extremes. Throughout my academic career I have always thought that teaching is the coolest job around – I get to stay in school forever, inspire others, and be part of other people's breakthrough moments.

My time at Indiana State has only served to confirm this view. The role of teacher comes with great joy but also with great responsibility to do our best for the students. What follows are the most important principles of my teaching philosophy aimed at "doing my best" and a discussion of advising, mentoring, and outreach – professorial roles other than classroom teaching that are important to me.

Many of these principles have developed as a result of the opportunity I have had to teach a wide variety of courses – both in terms of subject area and in terms of the level of the students. Rather than only wanting to teach theoretical courses, or only systems/applied courses, I have taught a wide range, by my own choosing. In the process, I have become passionate that at least some theory/analysis and systems/programming belong in *every* computer science course: e.g., using some programming assignments in courses such as theory of computation or discrete math, and including some proofs/analysis in courses such as databases or graphics. To keep this teaching statement focused, for the remainder of this statement I do not discuss such content issues, but instead focus mostly on teaching strategies and philosophy.

Teaching Principles   The primary goal for students completing a degree in the sciences, beyond mastery of course content in each course, is to retain the core principles and develop problem-solving skills they will need to confront diverse challenges in the real world. The following are the key principles that guide my teaching to meet these goals.

Passion for Learning   I believe all people have a passion for learning the things that are interesting to them, and students who are interested in the subject are much more likely to succeed. The two key overriding principles of my teaching philosophy are to (i) provide an environment that challenges the students and allows them to grow intellectually, and (ii) seek ways to encourage passion for the subject and avoid those things that would get in the way of this passion. Each of my remaining "teaching principles" are simply ways to try and achieve either or both of these overriding principles.

Purposeful Work   I try to keep the motivations for material close to the surface, both during lecture and with homework problems. I also try to regularly give students glimpses of the big picture and how the course material fits within their wider education. For example, students in the first programming course have responded very well to talking at a high level about the halting problem, P versus NP, and randomized algorithms – and they have less of a chance of being mystified by these topics when they see them later!

Mechanics of a Course   Managing the mechanics of a course is crucial. Under this category I place the following: giving enough and the right kinds of assignments for students to make mistakes and learn from those mistakes, including a major project and presentation in most courses, using examples during lecture, stopping lecture often for students to discuss with a neighbor the concept just learned (or one less recently learned), providing frequent and useful feedback to students to head off issues early, and taking feedback from the students on my own teaching and classroom

management. All of these are very important, at least to how *I* teach. A teacher who is charismatic and brilliant but does not manage the mechanics of a course right will fail to reach his/her potential as a teacher.

Differentiation   One of the main challenges of most classrooms is how to deal with differences in abilities and backgrounds – how to challenge the stronger students while not alienating or confusing the weaker students. I am still trying to find ways to figure this problem out, and I probably always will be. Nonetheless, I have honed in on a number of techniques that have worked well. I try to have some weeks that are more challenging and other weeks that allow more time for review and in-class work. I incorporate challenging extra credit questions to offer differentiation in assignments. The use of projects has been my most effective means of managing differing student abilities. Projects are wonderful in that they allow the faster students to blossom and the slower students time to master the basics, while also giving each student ownership of the course!

Course Content and Curricula   Much as managing the mechanics of a course is critical, so managing a degree program and how courses flow into each other is key to getting the most out of our students. Curricula design and management may not be the "cool" part of being a professor, but they are important nonetheless. I regularly coordinate and discuss these issues with colleagues at my institution, and pick the brains of those at other institutions when I get a chance.

Professional and Communication Skills   After completing a degree, a student should have developed their professional and communication skills in addition to mastering content knowledge and skills. Students will practice and develop these skills in each of my courses – giving presentations to the class, evaluating themselves and peers, writing project reports, working in groups, and discussing their progress with me outside of class time.

Other Roles   The responsibilities of a professor extend beyond the classroom. In addition to striving for excellence in the classroom, my priorities include the following.

Advising and Mentoring   In the role of advisor and mentor, we guide students through a program and on a path to a career. In addition to assisting in such areas as choosing which courses to take, advising and mentoring include helping the student to get involved in research, an internship, or a co-op depending on the interests of the student. After all, the best way to learn science is to *do* science. I try to incorporate many of the same principles of teaching into advising and mentoring – passion for the subject, thinking about the big picture, and relishing rather than avoiding a challenge.

Outreach   I am very interested in spreading the joy of knowledge not only to computer science students but to anyone who is willing to listen! Outreach programs are particularly relevant in relation to a current shortage of qualified compute scientists in the workforce. Exposing the public to the fundamental concepts, fascinating tales throughout history, and current challenges of computer science can be a crucial component in attracting more interest in our field. Although the K-12 education system and industry can do their part, we at the collegiate level should lead the effort. We should seek outreach and mentoring opportunities in the K-12 schools to do our part.

Concluding Remarks   One wonderful part of teaching is that I am not alone in these endeavors – I learn every day different strategies or approaches to take from both colleagues and the students themselves. I look forward to continuing the journey of teaching and learning in the future, always searching for improvement in myself and encouraging the same passion for computer science and learning in others.