Jeff Kinne
Teaching Philosophy

My experiences in teaching began with my undergraduate education at Xavier University, a university emphasizing the liberal arts, excellent teaching, and a strong sense of community in the classroom. From this foundation my teaching philosophy matured at UW-Madison through teaching experiences, participation in workshops on pedagogy, and involvement in round-table discussions on teaching strategies.

My first teaching experiences at UW-Madison were as a teaching assistant: first for a sophomore-level course for engineering majors that introduced programming and problem solving using Matlab and Maple, and second for the graduate-level complexity theory course. More recently, I had the pleasure of teaching the Discrete Mathematics course for computer science majors and sharing lecturing duties for the graduate complexity theory course.

What follows are examples from these experiences to explain and support my teaching philosophy and a discussion of advising, mentoring, and outreach – professorial roles other than classroom teaching that I feel strongly about and began to practice at UW-Madison.

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.

Classroom Style I strive to create an environment where students collaborate and actively participate. As such, I use a question-and-answer format for lecturing but rarely lecture for long continuous stretches. I often break the class into small groups to digest new material, with a subset of the students presenting their findings to the class. I use a friendly demeanor with students and make use of icebreakers to begin a course, both of which increase collaborative learning by helping the students to be more comfortable with each other and myself.

Assessment and Evaluation Both the students and I benefit greatly from frequent feedback on our progress in the course. We can thus address any problems before they snowball – the students by adjusting study habits or seeking additional help if having difficulty, and myself by adjusting teaching methods or organization. For the Discrete Mathematics course, I wrote online daily quizzes to give the students feedback and keep them on task. I received feedback from students through bi-weekly anonymous course surveys and from colleagues through discussions and classroom observations. Among other adjustments based on the survey results, I decreased the level of difficulty of the daily quizzes to provide a barometer of their understanding of the day's material while not overburdening them with more work than they could handle. As a result of the dynamic improvements to the course, the students performed better on assignments as the course progressed and were more enthusiastic. An indication of the latter were very high ratings for "recommend instructor" and "recommend course" on the final course evaluations. Many students listed the daily quizzes as integral to their success in the course.

Course Content Beyond effective teaching of a given course, we must decide what particular material to include and how to teach it. For the Discrete Mathematics course, I implemented a number of changes to the curriculum based on discussions with colleagues and an examination of the course's place within the program. For example, I increased the time spent on program correctness and runtime analysis so computer science students would be exposed to these fundamental concepts in multiple courses. For how to communicate content, I favor a "project based" approach that uses

examples and projects that are truly relevant in the real world (for example, contributing to open source software for a class project). It is also important to incorporate professional skills such as working in groups, giving presentations, and self-evaluation in each course throughout a program. This focus on broader skills in addition to the particular content for each course is a part of the "liberal arts mindset" which I experienced at Xavier and is an important part of my teaching philosophy.

Organization A course is more than simply a series of lectures, with many other responsibilities to keep track of both for the instructor and the students. In the engineering course this was facilitated by placing *all* course materials and organization online including course text, lectures (using eTEACH software), weekly quizzes, lab exercises, etc. I took this approach in the Discrete Mathematics course as well, placing as much of the course infrastructure online as possible; the syllabus, course schedule, course layout, assignments, and exam review materials remain available from my website. Having a highly organized course helps the students to handle their out-of-class workload with reduced stress and anxiety.

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, I will 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 includes helping the student to get involved in research, an internship, or a coop depending on the interests of the student. After all, the best way to learn science is to *do* science.

As a peer mentor for the more junior students in the theory of computing group at UW-Madison, I worked to help new students delve into research and feel comfortable within the group and the department. To achieve these goals, I initiated a student reading group and weekly lunch. As a result, the theory students have become more connected and collaborative both socially and with regards to research.

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 the "crisis in computing" of decreased enrollments in computer science since the peak during the dot-com boom. 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 K12 education system and industry can do their part, we at the collegiate level should lead the effort.

As a beginning to my contribution, I gave a number of guest lectures to computer science and mathematics classes in local high schools, presenting engaging and intuitive concepts such as encryption and error-correcting codes that are pervasive in our modern society. In the future I hope to establish wider-reaching programs and encourage involvement from other faculty and students. For example, a "Computer Science Day" featuring lectures, demonstrations, and activities could be held either on campus or at the K12 schools, potentially during the new "Computer Science Education Week" created by the United States Congress.

Concluding Remarks Some of my ultimate goals are to be an excellent teacher, advisor, mentor, and spokesman for computer science. I know that excellence in teaching is more of a journey than a destination; my final principle of teaching and all areas of life is to always seek self-improvement and continue the journey towards excellence.