

Dr. Green's Teaching Philosophy

I view education as a relationship among teachers, students, and administration that can be represented by a triangle, with teachers at one vertex, students at another and the administrators at the third. Each vertex of this triangle has a job, and when these jobs are fulfilled properly, learning takes place effectively, deeply and meaningfully. When these do not operate together, learning falls into the educational equivalent of the famed Bermuda triangle. The jobs are simple to state, but difficult to achieve and maintain balance among. Students, simply, are here to learn as much as they can about the content, about the world, and about themselves. Teachers are here to create opportunities for students to learn. They do this by providing materials, activities, goals, and feedback so that students can assess themselves and evaluate their progress. Administrators are here to ensure that faculty members have the resources to provide high-quality learning opportunities and to make sure that the students are receiving such learning opportunities.

To explain how I fill my role as a teacher in this triangle, we can first look at what I expect students to do in order to fill their role as learners. I expect them to be in class, to make use of the materials (texts, activities, assignments, and projects) to gain understanding of the content. I do not accept being busy as an excuse to not stay on top of course material. I stress that success in my courses will require about 6 hours per week of work, and I work hard to design my classes so that this is true. It means that some students think I require too much work from them, but I believe that without constant work and reflection, no growth or learning can occur. During class, I expect students to engage in the content by asking questions, working examples, and participating in group activities. I do not accept passive participation, and I work hard to make myself available outside of class to help students. I also expect that students will learn from their work in my classes; I spend a great deal of time providing them feedback to help them improve. If they pay attention to this feedback, they can be more successful.

In order to fulfill my role of providing appropriate opportunities for learning, I design each class around the model presented in *Understanding by Design* (Wiggins & McTighe, 2005). This backwards-design model starts by identifying the essential goals and learning objectives for a course or unit of study, then carefully considering which of these are essential for student learning, which are good for students to know, and which would be nice for students to be familiar with. Then the process involves determination of what students need to demonstrate in order to provide the instructor with evidence of what they know, understand and can do. Only then does the process look at the lesson-planning stage to determine the classroom and other activities necessary to help students achieve success on these assessments. These levels of knowledge (need to know, nice to know, good to be familiar with) also help determine the grades I assign. I attempt to base my grading in the learning goals so that a student who demonstrates consistent ability to understand and apply everything identified as “essential” earns a grade between a C+ and B-. If a student demonstrates mastery of this content and goes above and beyond this into the other levels of performance, the student's grade is increased. This has resulted in a lot of student complaints during the semester, especially in MSTI 215. Students feel that “working hard” and “doing the minimum expected work” constitutes a grade of at least a B or B+. Some feel entitled to higher grades. But I base grades on performance. I do not know how to evaluate “effort” except by the results of that effort, regardless of what some students have suggested.

When I refer to “assessments” I mean much more than tests. I believe there are too many important learning goals that cannot be effectively evaluated on an exam. Thus, I try to balance exams with other work that allows me to assess student learning on these goals through projects, presentations, group work and participation. My choice of assessments depends in large part upon the audience and the content. For example, in designing MATH 170 Introduction to Mathematical Modeling, I felt that a true modeling experience was needed, but that there was no way to have all components of modeling appear on an in-class exam; such an exam would need to be heavily sequenced and would require leading students by the nose to ensure that a mistake at an early stage didn't doom them completely. Instead, I designed a modeling project that allowed them to demonstrate and apply the different concepts and tools of the course while also learning how to work as a team and how break a large, ill-defined problem down for analysis. The memo problems I use in MSTI 130 are another example of such assessments.

During class, I use whatever modality of instruction I deem appropriate to help that particular group of students learn whatever content (be it facts, procedures, or content) is the focus that class period. I consider myself a

constructivist overall, but with an important caveat: While I do believe in the mathematics reform movement's approach in general, and while I agree that active learning should be encouraged, research has shown (c.f. Willingham, D. T., 2005) that learning best occurs when matching the content and the style of teaching, rather than blindly using an approach just because it is "the in thing." Thus, my classes are a mixture of guided discovery, direct instruction, free explorations, and problem-solving activities. Often, multiple modalities will appear in a single class period. For example, in teaching MATH 221 Multivariable Calculus, I require that students read something before we discuss it in class and then work some basic exercises. During class, then, I call randomly on the students to share their work on these exercises. I then provide feedback and suggestions, alternate approaches and extensions of the problem to help everyone connect the material, check their understanding and deepen their knowledge of the content. Thus, in any given class period, students will present, I will publicly critique (gently, I think) and then some direct instruction will typically follow. This portion of the class is generally interactive, soliciting ideas and next steps from the class. Then I try to provide a chance to practice these ideas in a deeper, problem-solving setting before leaving for the day. Once a week, students complete a short (15 minute) quiz on these homework problems; this ensures that they are keeping up with the material even if they are not responsible for presenting a solution that day.

It is also important to me that I stay current on different educational applications of technology. I have worked hard to incorporate MAPLE into my sophomore-level mathematics classes (MATH 221 and 222) and into the student research projects I have supervised. To help me in this, I completed an MAA summer PREP workshop on using MAPLE in vector calculus in 2007. I have worked to incorporate blogs and discussion boards into my classes, and I incorporate spreadsheets when they are a meaningful tool. These uses of technology are often commented on in my course evaluations; in particular, the highlighted comments in section IX regarding GMST 511 often point to my integration of technology into the classroom. I also work hard to keep current on all aspects of teaching and learning; I regularly attend conference sessions devoted to teaching and learning, keep current on several journals, and attend workshops.

When I first started teaching at the college level, I made detailed plans and notes for problems to work, topics to discuss, illustrations to present, and so forth. After a few years of this, I noticed something that profoundly changed my approach to planning any particular class period: my students often had questions and insights that were important, either because they helped connect the material in some way or clarified concepts. I began listening to the students, using their questions and ideas drive the "lesson" forward. I still prepared carefully by reading, working examples out, and looking for good ways to illustrate material, but my "lesson plans" shifted from large documents (4+ pages) to a brief outline. In fact, most of my notes are now written to occupy a single PowerPoint slide, with some details added to the note section of the slide. This lets me have a broad overview of the class – its goals and major checkpoints – while including enough information for me to know what material I need for class that day, how to arrange the activities for maximum effectiveness, or key points to not leave unexplored. Now I can view an outline of an entire semester in 20-40 slides depending on the schedule of a course. This can give students a quick reference to plan their work, and it provides me an easy way to monitor and assess my plans. Each semester, these are updated based on what worked or didn't work the previous time the course ran. In the end, this has greatly improved my efficiency, and lets me adapt the order and examples to respond better to student needs, interests and abilities.

I also feel it important to maintain a positive relationship with my students. I do not try to stand apart from them or distance myself in demeanor or dress. I expect all the students to respect each other and to respect me and my authority, but I think it is good to demonstrate a sense of humor (even if my jokes are universally decried as terrible) and to be approachable. I try to be professional while also relating to them. My office is decorated with *Star Wars* toys and I try to bring in real world examples as much as possible. This has helped the students relax when they come to me for help. Many students have also come to me for advice about non-academic issues. I am honored that they feel comfortable enough to seek my advice and that they value my experience enough to seek it.

The final component of my teaching philosophy is a willingness to try new things. Whether it is an approach to teaching (student-driven presentation of homework in MATH 221), integrating a particular tool (like blogs in MSTI 215), or a format for a course (like hybrid instruction in GMST 511) I would rather try something new and learn from it than continue to repeat the same process ad infinitum. It is obvious to me that as long as I try new things, listen to my students' needs and interests, and work to remain current in all areas of my work that my classes will always be fresh and interesting.