

Teaching Statement

At the end of a semester in my class, my students should understand key concepts and the utility of the subject I have taught. I hope they will also gain a broader appreciation of the earth and the environment we share. But, comprehension and appreciation of the subject are not my only learning goals. Of nearly equal importance to me is that my students have the opportunity to learn and practice writing and presentation skills. These goals apply equally well to graduate and undergraduate students involved in my research. I try to help students develop the skills to solve problems in a course or in research while developing the critical skills of written and oral communication that will serve them in any future career.

My philosophy in the classroom is to create an open, relaxed environment to encourage student participation as much as possible. During lectures, I like to ask questions and present problems for the class to solve in order to engage the students' interest. I find that opening a question and answer dialogue makes the students more comfortable speaking up if they're confused, and helps stimulate their thinking about the subject. During most classes, I like to have my students work on an in class exercise. In a remote sensing or environmental GIS class, this mainly involves looking at maps and thinking about how to use the information in that map to answer a set of questions. For example, in a GIS class, I have students work in groups to identify data on a map that could be represented in either raster or vector format. The students then decide which data format would be most useful for solving a problem like where to build a new development, or how to get from point A to point B. This helps the class to think critically about spatial relationships, and makes an easy transition to further learning during labs.

Computer lab work is of critical importance to understanding and analyzing spatial data. I design labs so that students are walked through an example of the skill or dataset I want them to understand. Then, I ask students to answer open ended questions about a new dataset which draws on the knowledge gained in the current and previous labs. I believe in learning by doing and practicing. Labs are designed to build on previous labs and require students to repeatedly address important concepts using the different skills they acquire throughout the course. Learning to address the same problem in multiple different ways reinforces the idea that there may be many paths to a solution.

Learning by practicing also applies to written assignments. The ability to communicate effectively in writing is one of the most important skills a student can learn. In working one-on-one with students at Brown's writing center, I always emphasized organization as the key to effective written communication. The IMRD (Introduction, Methods, Results, Discussion) format of science writing provides a framework for this organization, and I expect students to use it for lab reports and final papers. In a classroom setting, I provide a writing rubric to remind students of the appropriate content for each section. I try to work with individual students on their writing as much as possible because I find that they respond well to active comments and suggestions. Some assignments are also done iteratively to give students a chance to revise their work based on my comments and peer comments.

I also give students the opportunity to practice oral communication skills. One of my favorite classes as an undergraduate involved a series of presentations using different formats including chalkboard, overheads, and PowerPoint. After that class, I was much more comfortable and confident speaking in front of an audience. Although the format of some courses does not allow for so many student presentations, I try to help my students become comfortable speaking in front of their peers by asking them to summarize their results following

in-class exercises throughout the semester. If the class is small enough, I also ask the students to give a short presentation at the end of the semester. For example, in a GIS class, I first give an example 10-minute talk so that students have a good idea of how to organize a presentation. Students then give 10-minute conference style talks to their peers about a research project they've worked on in class during the semester. This gives them a chance to practice speaking in front of others as well as a chance to share their research with the rest of the class.

When advising student research, I try to start the research with a question firmly in place. For example, in 2005, I advised an undergraduate thesis involving Landsat data encompassing the Lava Lake Management Area in Idaho. Our question was "How does start of season vary within sagebrush ecosystems?" Because this was a semester long project, we formulated a series of steps needed to answer that question and a timeline of when those steps would be accomplished. Ultimately, my collaboration with this student will become part of my own research on the broader subject of "How do changes in grazing management affect short term ecosystem response in Idaho?" That student is now employed by an environmental organization in the Bay area, and I hope the research and communication skills he practiced while working on his thesis will serve him well.

For a Master's or PhD student, the scope and number of research questions changes accordingly. I initially approach graduate student research in a similar way to undergraduate research, by working with the student to define a manageable research question and plan the steps needed to tackle it in the context of broader research interests. I expect to play an active role in my students' research at the start of a project, and hope they will define and pursue questions that interest them later on. I believe that being able to frame a research question independent of your PhD advisor is an important skill for a scientist. I hope that my students will learn to follow their own path, within the scope of my research interests, during their final years as a PhD candidate. During their graduate work, I will ask my students to participate in grant writing and encourage them to draft manuscripts early and often because I believe that quality writing is an essential skill that is best learned through practice and revision.

In my teaching, I work to help students learn how to think about a problem by framing the question they want to solve and identifying the steps required to solve it. I give them many opportunities to work on their writing skills, pushing them to present arguments clearly and in a well organized format. Finally, I help them to design an effective presentation and become comfortable talking about their work in front of a group. The combination of these skills will further the students' expertise in environmental studies as well as help them develop the skills necessary for their future careers in academia or elsewhere.