Teaching Philosophy

Science classrooms, and specifically courses in biological and anthropological evolution, are unique environments accompanied by instructional hurdles that dedicated teachers must work through in order to engage their students. Many students enter these classrooms with deficient skills in scientific methodology and mathematics, lack confidence in their abilities to perform well, and have pre-conceived notions that the topics being taught stand in opposition to their cultural and religious belief systems. In addition, many undergraduate, non-science majors view their science requirements as a necessary hoop toward graduation, and lack a global view on how an understanding of basic science concepts and principles can benefit their future. My overall goal in each course that I teach is to build a solid foundation of basic scientific knowledge and skills that will empower my students to better understand the world around them and allow them to confidently participate in decision-making processes relevant to their health and environment. To achieve these goals, I design every course with a focus on environment, engagement, and empowerment.

Environment

The learning environment is critical to student success. Students who feel heard, understood, supported, and important to the process, will work harder and perform better on any task put forth to them. This important communication starts as soon as students register for a course. I make sure to reply to every email in a timely manner, whether the email is relevant to the course or not. I start all of my email communication by thanking the student for sending their thoughts, comments, and/or questions to me. And, I try to provide encouraging, but honest, advice, even when the circumstances seem stressed or dire. Once a course begins, I make sure to provide consistent blocks of time for students to approach me for conversation or questions. For example, I arrive at least 15 minutes before each class to allow time for interaction. I also remind and encourage my students to attend my office hours throughout the semester.

A second critical component for the learning environment is to design a well-organized course with clearly defined rules, student obligations, rubrics, and goals; and, this begins with the syllabus. The syllabus should be comprehensive and every effort should be made to adhere to the syllabus throughout the semester. By providing students clearly defined rules and obligations, as well as maintaining strict adherence to those items, I build a level of trust with my students that reassures them that there will be no surprises and that they have all of the tools and information to succeed in the course. In addition, the course itself and the goals for the course need to make sense to the student. There should be a definable flow to the material so that students can interpret and recognize the progress they are making on their own. Setting the tone of the environment in the first couple weeks of the semester improves the quality of the experience for both the student and the instructor. And, providing a well-organized course with clearly defined rules and obligations, moves questions past confusion in schedules and assignments and opens a line of communication that allows for inquiry related to the subject matter.

Engagement

Student engagement is one of the most difficult goals to accomplish in any course, but without engagement it is impossible to commit students to the necessary skill-building that will be required to master the material. In each lecture, I provide an overview of the broader relevance of that day's topic to the course, provide examples from nature that give context to the principles and theories being taught, and end each lecture by showing them one area of daily life where the

knowledge gained from the lecture will be useful. For example, in a lecture focused on Mendelian genetics, I will give a historical point-of-view of the natural sciences at the time Mendel was initiating his studies cross-breeding plants, work through Punnett Squares on monohybrid and dihybrid crosses to show how Mendel reached conclusions that led to the Laws of Segregation and Independent Assortment, discuss how these findings advanced science by leading to the Modern Synthesis, relate the Modern Synthesis back to the evolutionary principles that serve as the foundation of the course, and end the lecture with a couple of examples of real-world diseases that follow a pattern of Mendelian inheritance. In this one lecture, my students are exposed to scientific philosophy and method, historical views on science, the process that advances science, a handful of beautifully designed experiments on different animal and plant systems, and the occurrence of diseases relevant to their daily lives. In addition to the lecture, they will also have participated in at least two activities to promote retention of material by way of hands-on and/or experiential learning. Teaching beyond facts and theory, providing novel and interesting examples from the natural world, and utilizing a variety of teaching methods and media, sponsors an environment ripe for engagement across a wide variety of student interests.

Empowerment

My ultimate goal for the conclusion of any course that I teach is to have my students depart the classroom with the basic tools required to pursue their own interests in science, whether those interests be scholarly or related to aspects of the political, social, and natural environment in which they live. To promote this goal and build student confidence, I spend a great deal of time working basic scientific skills into my lectures. This includes a strong focus on the following activities: 1) delineating repetitive word roots, stems, and bases, so that students recognize them when they encounter new vocabulary, 2) providing instruction on basic scientific resources like how to locate and properly cite scientific reference materials, 3) how to read, interpret and construct graphs and other visual aids used by scientists to describe data, 4) how to construct a proper scientific paper, poster, and/or presentation to communicate their ideas, and, 5) outlining the different ways they can participate in science as citizens and/or scholars. I provide the resources necessary for students to begin a process of self-directed inquiry in the sciences, and hope to build student confidence along the way.

Summary

A healthy classroom and collegiate science course will include setting an open, inclusive, and well-organized environment, engaging students in the material of the course by relating theory and method back to real-world examples and scenarios, and empowering students to become self-directed learners through acquisition of basic skills. If done properly, students will often openly participate in conversations, course metrics, and end-of-semester evaluations that allow the feedback necessary for continued improvement and enhancement of the material and activities for future students. Despite differences in student career goals, they should emerge from my classroom as more informed and prepared citizens capable of evaluating the science of their daily lives.