Teaching Philosophy

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Teaching is the central tenant of all institutions of learning, and includes the formal classroom setting, practicum settings in laboratories and field trips, and individual mentoring coupled to research settings. With all of these settings, there are three fundamental aspects of instruction that I strive for. The first is to provide the opportunity to gain knowledge of fundamental concepts and background material for the subject being taught. The second is to provide real-world examples of how the subject matter is relevant to them. The third is to provide the opportunity to apply the knowledge gained to practical problems through individual work, team/group projects, and experimental practicum data collection and analysis. Attaining these goals can be a challenge, as no matter what techniques are used, no one technique will ever reach 100% of students. Every student is an individual with different levels of competence, knowledge base, motivations for taking a class, and comfort levels with various teaching styles. From my personal experience, no matter what course is taught, or at what level the course is, each group of students will be unique and have its own character based on the students populating it, and students respond positively to being treated with respect, and given the responsibility for their education. The goal of every class that I have taught has been to help students to learn about problem solving, to gain knowledge in the topic from my personal perspectives and experience, and to learn how to gain knowledge from other sources with an eye towards critical thinking and evaluation. I work to accomplish these goals through a combination of instruction tools, including lecturing, guided discussion, assigned reading, individual research projects, group learning exercises, and group research projects. The use of and weight given to those instructional tools has to be tailored to the specific courses and needs of the students, ranging from large lecture classes with introductory level learning to small upper division courses with advanced level learning. This is apparent for upper level courses such as the Environmental Studies Capstone Course I am instructing as Adjunct Faculty at University of Cincinnati. I have also observed this with every class and lab that I have taught or been a teaching assistant for while earning my M.S. at Washington State University and my Ph.D. at Arizona State University, including teaching as a primary instructor (teaching organic chemistry labs, introductory geology labs, and geological hazards) or acting as a teaching assistant for lecture classes (introductory geology lecture, geochemistry, and astrobiology, among others).

The challenge I enjoy most is finding the best means for reaching the students who are struggling, while balancing that with catalyzing greater competency and understanding for the more advanced students. To this end, I have found that being flexible with how a subject is taught, starting with a foundation of providing the information and theory behind a subject while being ready to think on the fly to explain difficult topics by a variety of methods and from different perspectives, serves best for meeting those challenges. This may range from engaging students myself, to having students interact with one-another. That being said, I do not believe that a teacher best serves the needs of a student making them feel good or shielding them from the challenges and rigors of learning. Rather, the instructor is there to catalyze learning by

providing a safe and encouraging learning environment that helps students feel engaged and active participants with ownership and responsibility over their learning process. These concepts are particularly important to apply to mentoring and teaching outside of the formal classroom, especially for undergraduate and graduate student research as well as community outreach.

Active learning is a concept that came to the forefront in education in the 1980s and was popularized in the 1990s by *Active Learning: Creating Excitement in the Classroom*, an ASHE-ERIC Higher Education Report by Charles Bonwell and James Eison published in 1991. In that report, Bonwell and Eison boil down active learning, defining it as "anything that involves students in doing things and thinking about the things they are doing." However, while research has consistently shown-what every elementary school teacher has always known-that active learning provides the best opportunities for students to gain a deeper and more lasting understanding of material, the norm today (some 25 years later) for the classroom setting is still the 'sage on the stage' style of lecture. Insights from the Bonwell and Eison report showed that the largest resistance to change falls on the instructor, siting a prevailing perception that lecturing is often synonymous with teaching. Adding to the momentum of this entrenched dogma is lack of experience with active learning techniques, a nearly complete lack of teaching training for future college lecturers, an inadequacy of resources and support for improving teaching at the R1 level, and the overall pressure placed on bringing in research moneys and producing peer-reviewed journals such that instructors do not have the time and energy needed to experiment with and invest in new teaching techniques. While change cannot be accomplished overnight, I feel that with the support and encouragement of administration, instructors can explore ways of integrating components of active learning into their courses. As success and familiarity grow with each experience, it would only become easier for instructors to further move towards integrating active learning into all aspects of teaching.

The University setting fosters many key components of research and scientific discovery, including a drive to learn, share knowledge, communicate new ideas to others, and be flexible in our understanding of the world around us. These are the components that can help to produce excellent teachers that educate future citizens, and inspire future scientists. I strive to hold myself to these ideals.