

Teaching Philosophy

Over the course of my collegiate career I have had many great teachers. Although the expertise and interests of these teachers varied, three key features united their teaching styles: (1) using multiple teaching methods, (2) providing hands on experience so that students become both knowledgeable and capable, and (3) a willingness and enthusiasm for helping students learn. Because I have observed the effectiveness of these traits, I have made them the foundation of my teaching philosophy.

Using multiple teaching methods greatly enhances student learning, because students learn in different ways. In my teaching style I incorporate written materials for read/write learners, graphs and figures for visual learners, oral explanations for aural learners, and psychomotor examples for kinesthetic learners when appropriate. Taking students on field trips is an important component of this teaching, as many concepts and approaches in biology cannot be understood until they are observed in the field. Use of multiple teaching styles necessitates using several evaluation criteria, which is why in my classes I provide students with a myriad of ways to earn their grade, including tests, discussion, homework, research/review papers, and presentations. I am also a proponent of using different outlets to relay information to students, from traditional classroom interactions to online teaching tools. I believe a diverse array of teaching strategies and student evaluations are important for student success, and are most effective when students can learn by doing.

The field of biology is not only about comprehension, but also application. Too often students finish a biology course with an understanding of the subject matter, but an inability to actually apply that subject matter meaningfully. To help remedy this situation I provide students the skills necessary to not only understand a process, but to also implement that process. This is accomplished via both teaching style and evaluation. For example, when teaching the concept of island biogeography as lab instructor for Freshwater Ecology I used a variety of classroom and field-based methods. I began by giving students introductory material via lectures and reading assignments, which was followed by taking students on field excursions to sample macroinvertebrates from rocks (islands) of various sizes. I then showed students how to identify macroinvertebrates, and how to manage and analyze the data collected with several computer programs. With this accumulated knowledge the students were then required to synthesize their findings and provide a write-up of their results describing how macroinvertebrates species

richness changes with rock (island) size. Evaluation of this project thus measured the students' abilities at multiple levels, and provided understanding and experience in subjects (sampling techniques, computer software and data analysis, scientific writing) that will be important in other classes and in their careers. I always felt that I learned the most from classes that used this type of hands on format, and recent cognitive and pedagogical research supports this belief (Dresner et al. 2014). This research shows that students who take classes designed with a field component achieve greater cognitive understanding compared to those that do not (Dresner et al. 2014). Giving students the ability to understand and implement is vital to student success, and is most easily achieved when the teacher is enthusiastic about helping students learn.

When teaching a class I try to make every effort possible to help students learn. This includes being well-prepared to teach the subject matter, helping students outside of class, and presenting the material with enthusiasm. My enthusiasm for teaching stems from the satisfaction I receive from seeing students advance in their professional careers by getting into graduate school or getting a job using the skills and information that I have taught them. This enthusiasm in helping students learn has been appreciated by many of my former students, as reflected in their comments on my teaching style (see below) and scores from my previous teaching evaluations (Table 1). I taught a diverse array of introductory (Organismic Biology) and upper level biology classes (Fish Ecology, Physiology of Animal Adaptations, Freshwater Ecology) while I was a graduate student, and across all of these classes my overall effectiveness as a teacher has consistently been rated high (mean = 4.2; range = 3.9 - 4.6) on a scale ranging from very low (score = 1) to very high (score = 5). I believe enthusiasm for the subject matter and an eagerness to help students learn are major reasons for my consistently effective teaching. With the numerous threats currently facing our biological world effective teaching is more important now than ever, which is why I implement the above characteristics to be an effective biology teacher.

Student comments from teaching evaluations (photocopies available upon request)

Fish Ecology Fall 2013

- *I thoroughly appreciated the effort professor Whitney gave when helping me outside of class. Especially on a Sunday. Wonderful @ email communication.*

Organismic Biology Spring 2013

- *James did a good job at answering our questions and making sure we understood.*
- *James- Always is willing to answer questions. Very helpful.*

Physiology of Animal Adaptations Fall 2012

- *Helpful T.A.; would walk around tables and offer help if needed. Seems to be knowledgeable about many subjects in biology.*
- *Helpful and knowledgeable. Always willing to find out an answer for questions he couldn't answer himself. Friendly and approachable.*

Organismic Biology Spring 2010

- *James was very good at explaining information. He definitely had a good understanding at what was emphasized in this class.*

Organismic Biology Spring 2009

- *James was always very helpful. If I had a question he wasn't sure of the answer he would always get back to me with the right answer.*

Table 1. Results from teaching evaluations summarizing student responses to statements regarding my overall effectiveness as a teacher.

Class	# of Students Reporting	Effectiveness as a Teacher ^a
Fish Ecology (Fall 2013)	6	4.3
Organismic Biology (Spring 2013)	28	4.4
Physiology of Animal Adaptations (Fall 2012)	27	4.0
Organismic Biology (Spring 2011)	26	4.6
Freshwater Ecology (Fall 2010)	10	4.1
Organismic Biology (Spring 2010)	33	3.9
Fish Ecology (Fall 2009)	8	4.4
Organismic Biology (Spring 2009)	22	4.2

^aScores: 1 = very low; 2 = low; 3 = medium; 4 = high; 5 = very high

References

Dresner, M., C. de Rivera, K.K. Fuccillo, and H. Chang. 2014. Improving higher-order thinking and knowledge retention in environmental science teaching. *BioScience* 64: 40-48.