TEACHING PHILOSOPHY– Joel Sharbrough

The province of educators resides, not in being arbiters of information, but in guiding others to synthesize information into understanding, to use practical wisdom to evaluate choices amid complex variables, and to develop creative solutions for difficult problems. Information is now literally at our fingertips, understanding, wisdom, and creativity are more essential than ever. As an award-winning teaching assistant, my teaching philosophy reflects these perennial virtues: guiding students to understanding through connection, wisdom through experience, and creativity through questioning.

One of the primary challenges that students face is in compiling the diverse array of facts at their disposal into a coherent understanding. Biology is a massive and complex field, and students are easily overwhelmed in their attempts to compile and integrate information. To help students overcome this challenge, I use broad ideas to build connections between disparate facts. Intuitively, this mental "scaffolding" is well suited to the natural sciences (see e.g., Bliss et al. 1996), in which biological mechanisms form the bridges connecting biological entities. In my classroom, the mechanisms of organismal physiology (e.g., cellular respiration, photosynthesis) are first understood through the lenses of their origin and evolution. In this way, students can come to understand disparate concepts, including mechanisms of inheritance, the Central Dogma of Molecular Biology, epistasis, and the endosymbiotic origin of mitochondria and chloroplasts to name a few.

My graduate school mentor, Dr. Maurine Neiman often remarks, "nature is inherently messy". This belief is exemplified in the countless experiments demonstrating that empirical evaluation supersedes even the most elegant of hypotheses. The reliance of Biology upon both ideas and data means that students that lack practical experience in their discipline necessarily have a shallow foundation upon which their understanding is built. John Dewey, in *Experience and Education*, wrote, "[T]here is an intimate and necessary relation between the processes of actual experience and education" (p. 20). Allowing students the opportunity to collect their own data and describe their own findings represents an essential first foray into the scientific community. In this way, students learn which strategies yield the best (and, perhaps more importantly, the worst!) results for generating new knowledge. I plan to guide a coordinated undergraduate research project regarding some fundamental mechanism of biology, the results of which will be submitted to peer-reviewed journals.

Our uniquely human ability to develop creative solutions to difficult problems represents one of the most important missions that educators must undertake. One method by which I establish a culture of creativity is through a process known as "wait time" (see e.g., Tobin 1980). During these wit times, the creative motors underlying learning have time to churn away freely as students have a chance to create and critique solutions. Over the course of a semester, students unconsciously become adept at creating and critiquing methods of inquiry based on merits rather than on an instructor's authority.

Courses at SEU that I am prepared to teach:

General Biology I and II; Animal Behavior; Human Physiology; Human Anatomy; Vertebrate Biology; Comparative Vertebrate Anatomy; Evolution; Human Genetics

Courses at SEU that I would be excited to design:

Mitochondrial Biology & Evolution; Biology of Energy; Bioinformatics; Genome Biology; Evolution of Sexual Reproduction

Literature Cited

1. Bliss J, Askew M, Macrae S. 1996. Effective teaching and learning: Scaffolding revisited. *Oxford Review of Education*, 22:37-61.
2. Dewey, J. (1938). Experience and education. Kappa Delta Pi. Pg 20.
3. Tobin KG. 1980. The effect of an extended teacher wait-time on science achievement. *Journal of Research in Science Teaching*, 17:469-475.