

Kristen Brochu – Statement of Teaching Philosophy

The mediocre teacher tells. The good teacher explains. The superior teacher demonstrates. The great teacher inspires.

~ William Arthur Ward

The core of my teaching practice is based on two interwoven themes: scientific literacy and effective communication. Understanding the scientific process and applying critical thinking skills can help to inform and enrich all aspects of life, regardless of whether or not a student is a scientist. I believe that this level of scientific literacy can rarely be achieved without a command of effective science communication skills. Mastery of a concept truly emerges when students can clearly and effectively communicate that concept to others. My teaching approach focuses on helping students to develop critical thinking skills, such as formulating questions, generating ideas, integrating new knowledge into a conceptual framework, and then demonstrating their mastery of the concept through oral and written communication. I aim to model these skills for students through my teaching in order to facilitate their development from student to teacher. My teaching style is effective in both introductory courses (such as Evolution, Ecology, Invertebrate Zoology, and Insect Biology) as well as upper-level courses (such as Molecular Evolution, Phylogenetic Methods, Chemical Ecology, Science Outreach, and various advanced topics in Entomology).

I believe that learning is a process that requires clear expectations for students, context for all work performed, and the opportunity for reflection and revision. I consciously address each of these points in my courses. Explicitly outlining the learning objectives, the benefits of the exercise, and the standards of assessment, helps to ensure that students know what to expect from each assignment and to feel like they have all the tools to succeed. The learning goals I set for students are important to me, and clearly conveying these goals allows students to focus on the purpose of the coursework. I work to provide a context for both my assignments and my courses in order to help students place their work in the framework of course goals, and to connect knowledge and skills gained in the course to the broader scientific context. For example, I design writing assignments in stages, so that students are familiar with completing outlines, reviewing drafts with their peers, and revising their work before submission. Making outlines and drafts worth a small portion of the final grade, simply for handing it in, motivates students to complete these early stages, without putting too much emphasis on perfecting the content on the first attempt. Providing comments on early stages of assignments can help students to learn from their mistakes and rectify them in future stages of the assignment. Emphasizing the process of learning and having students reflect on how they improved over the course of the assignment can help students to realize the value of learning from their errors.

I am passionate not only about the subjects and skills that I teach, but also ensuring that students achieve their own learning goals. I want my students to know that I am invested in their learning. I recognize that differences among students in their personal experiences, motivations, and learning styles can affect their goals and achievements in class, so I strive to integrate multiple teaching approaches to learning, by combining dynamic lectures with in-class discussions and exercises. I integrate small group activities into my lectures as a way to increase collaborative efforts and stimulate engagement in my classes. Online discussion boards provide a useful forum outside of class for students to ask questions

(anonymously if preferred), practice peer teaching, and discuss course concepts. I have also used peer-review as a technique to encourage reflection on assignments. After reviewing classmates' work, I ask students to assess their own strengths and weaknesses by reflecting on their work and the feedback they received from their peers. I also regularly incorporate guest teachers in my courses to provide students with diverse perspectives and teaching styles.

I use primary source literature in my courses to introduce students to applications of concepts we learn in class, which helps students to understand the broader context for the material we cover. Assignments based on primary literature sources, using authentic data, exposes students to the scientific process, as well as issues of data collection and management inherent in all research. These assignments aim to synthesize concepts discussed in class. For example, in a Phylogenetic Methods course, I designed an assignment based on data in the primary literature that allowed students to create a phylogeny, classify groups, and name species. Students provided justification for their choices and explained any issues they encountered in their methodology. This exercise helped students to understand the practical difficulties associated with the methods (e.g. choosing outgroups, coding characters) as well as to identify and deal with conceptual problems (e.g. long-branch attraction, convergent evolution, taxon/gene sampling effects). I also share the results of new research done by myself and my colleagues in classes. I use discussions of primary literature to familiarize students with discipline –specific vocabulary and to give them experience in critiquing scientific literature. Sharing scientific knowledge with students and the public is incredibly important to me, as I believe it de-mystifies the process of doing science and serves as a reminder that it is fundamentally a human process of being curious, asking questions, and seeking answers.

My teaching is an ongoing endeavour to develop the best techniques to improve student learning, so I evaluate learning using both summative and formative assessments. For example, in an Entomology class, I designed photo identification quizzes and provided students with both known and unknown specimens for identification. These in-class assessments provided students with additional methods to study the material and test their own knowledge, ultimately enhancing their understanding. Course evaluations reflected this outcome, e.g., “Kristen was a really great TA, and went out of her way to prepare materials to help us (ie [sic] the powerpoint quiz slides)” and “Kristen went above and beyond what I think were her expected TA duties. Her effort in providing extra study materials and understanding that students were sometimes struggling made a huge difference in the final grade I received in the class.” For me, teaching and research are intertwined, my work in each area informing and improving my work in the other. I continuously strive to improve my work as a researcher and teacher by attending workshops and learning new techniques. I reflect on the success of my teaching approaches and share these experiences with my students in order to model how learning is essential at all career stages.

The sense of exploration and empowerment that comes through self-guided discovery drives much of my enthusiasm for learning and is reflected in my research, teaching, and outreach goals. I want students to leave my classes with a deeper understanding of the scientific process, to have the skills to effectively communicate their knowledge, and the confidence to apply their skills in novel situations. This student-driven approach has helped me to focus my teaching on practical outcomes for students, which is extremely effective and greatly appreciated by the students themselves.