

## Teaching Philosophy

I have thoroughly enjoyed my involvement in teaching throughout my undergraduate, graduate and postdoctoral studies and I am eager to expand my role in the educational process. I began working as a teaching assistant in the fourth year of my undergraduate degree, and continued to do so throughout my graduate studies at the University of British Columbia (UBC) as well as at Marine Biological Laboratory at Woods Hole, MA, USA. These experiences culminated in a unique opportunity to independently instruct a third year Animal Behavior class of 100 students at UBC. Recently I have also been volunteering as a Software Carpentry instructor teaching basic computer programming skills to scientists at hands-on workshops.

As a result of my experiences, I have come to believe the most important skills that an educator should focus on cultivating in their students are: (1) critical thinking, (2) creativity, and (3) self-learning. Regardless of whether students pursue further academic training, attend medical school or join industry, these skills are necessary for future success. In my teaching I have implemented several strategies for the development of these skills.

First, I recognize that there are many different learning styles. Therefore, I present new concepts in more than one format so that I may reach everyone. For example, when teaching Punnett squares in genetics I provide: (i) a visual example, (ii) a verbal and written explanation, and (iii) take a break from instruction and ask the students to draw out a Punnett square for themselves. This strategy also has the advantage that the information is reinforced by different types of input.

Second, I believe that motivation is important for successful learning, as it can energize, direct, and sustain learning. One way I use motivation to enhance learning is by providing extrinsic motivators, such as a clear marking rubric on assignments and exams. Another way I effectively use motivation is to harness the intrinsic motivation of each student through assignments where the student chooses the topic themselves as long as it falls under the umbrella of the course topic. For example, in the Animal Behavior course that I taught the students were given a written assignment where they had to choose a newspaper article that reported on a recent finding about animal behavior. After tracing the new story back to the original scientific article, students were asked to write a one page critique on the scientific article and comment on how well the newspaper article reported the findings from the scientific article.

Third, to facilitate the development of critical thinking and creativity I like to use problem-based learning (PBL) approaches. For example, in the animal behavior course I taught, the students had difficulty critically evaluating experiments and devising new experiments to test a given hypothesis. To help them grasp this challenging but important skill, I utilized a PBL approach where I presented to the class real experimental data that tested a hypothesis, and then had the students break into small groups to work together to answer questions, such as “what are the weaknesses of this experimental approach?” and “what is another experiment that you

could do to test the same hypothesis?”. I then asked several of the groups to present their answers and we discussed which answers were correct.

My teaching reviews revealed that students found this approach helped them develop the critical thinking skills required to evaluate experimental design and the creativity to propose new ones. On the teaching evaluations, students graded whether intelligent, independent thought by students was encouraged as 4.6/5, and one student commented that, “I thoroughly enjoyed the class and learned a lot from it. The instructor encouraged participation and focused on thinking critically about the science of animal behavior, unlike most other classes I've taken at UBC.” Another said, “Prof. Timbers is simply fantastic. Her interest in the field really shined through in her lectures, and really stimulated our interest on the subject. She made every effort to answer all of our questions, and when questioned on things beyond her knowledge, she would go out of her way to search for answers so we can discuss them in the preceding lecture. Exams also require critical thinking instead of pure memorization, which made writing it both challenging and rewarding!” Finally, the interest in experimental approaches to understanding animal behavior inspired one of the students taking the course, Angela Leong, to volunteer in the lab where I was performing my Ph.D.

From my experience, this PBL approach was manageable for class sizes of up to 100 students, but I appreciate that this approach may not be effective for larger classes. Recently, through my participation in an Instructional Skills Workshop I learned of many participatory and flexible learning strategies, such as iClicker, think-pair-share and value lines, that I could implement in large classes to keep students interested and engaged in learning. For example, I would use iClicker to allow students to give immediate and anonymous feedback to questions in large classes. This would allow for global participation in an efficient, yet effective manner. Such immediate interactions would help to keep students focused and engaged, as well as allow me to frequently and efficiently measure student learning.

Lastly, I recognize that many undergraduate students struggle to develop effective learning practices and skills. Not all students are aware of different pedagogical learning styles, let alone which style best suits them, or what “out of classroom” study habits are most efficient or effective. I believe that it is our job as educators to help students learn how to self-learn. This could be implemented in lower level classes by: *(i)* providing awareness to each student of their learning style through quick and simple self-assessment quizzes, and *(ii)* informing students which study methods are most effective (i.e. testing yourself repeatedly instead of simply re-reading your notes and the text book), and *(iii)* as mentioned above, integrating group work in teaching to help students build a supportive peer learning network. Incorporating these strategies at lower levels will lay a foundation of self-learning skills that students can build upon throughout their lifetime.