Teaching Statement

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Throughout my academic career I have been both a student and an instructor. My current teaching philosophy is informed by these experiences, as well as discussions with other instructors and interactions with the Carl Wieman Science Education Initiative at the University of British Columbia. It is centered on two intertwined beliefs. The first is that the foundation of successful instruction is an open and trusting environment, in which students are comfortable asking questions and making mistakes. The second is that learning is an incredibly active process — calculations are performed (or attempted!), insights are reached for, and conclusions are drawn. Putting these beliefs into practice is a challenging and exciting experience, and I would like to describe some of the ways in which I am currently implementing them when I teach mathematics.

While it is a cliche that mathematics is not a spectator sport, it remains true. This is particularly important to bear in mind at the front of a classroom, where a breathless calculation or proof leaves little time for a typical student to record the steps, let alone digest or question their validity. I structure lectures to encourage participation. In practice this takes a variety of forms, e.g., giving students time to attempt calculations, or having students guide a derivation after a discussion of the main idea.

Asking questions of students during lectures is a time-honoured way to help keep students engaged, because there is a lot that can be asked with a good question. Consider what a student faces: what question is being asked? What does an answer consist of? How can the answer be found? Active learning encompasses these multiple layers, and entails students both doing and also thinking about what they are doing. The classroom is a relatively ideal place to develop this behaviour, as by discussing well-designed questions I can be a model of expert, active learning. Moreover, I can explicitly remind students of this type of meta-reasoning when they are solving problems. My students have been quite receptive to this explicit multilayered approach. I have found the technique particularly helpful when discussing homework solutions: it helps contextualize exercises as belonging to the course, as opposed to a problem sheet.

Promoting active engagement requires a comfortable, respectful environment in which students are sure the instructor has their best interests in mind. Creating such an environment is an important interpersonal task that requires spanning a range of backgrounds and experiences, perhaps very different from my own. I have found the best way to address this is to be positive, enthusiastic, and transparent. One concrete way I build this environment is by surveying students about their interests and background early in the course. Aside from giving me relevant factual information, this helps me customize examples to match their interests as well as my own.

Each student learns in a different manner, and it takes experience for students to find what works for them. In an open classroom that welcomes questions and utilizes multiple modes of learning this process can be expedited. The multilayer engagement of active learning helps students to develop their learning style while simultaneously learning mathematics. The more I teach the more I learn how important it is to keep the promotion of active learning at the front of my mind while designing course materials, preparing lectures, and while in the classroom itself. I look forward to growing my stable of techniques that serve this purpose, and to helping students learn mathematics, as I continue teaching in the future.