STATEMENT OF TEACHING PHILOSOPHY

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Below I have listed six principles important to my philosophy of education. My hope is that they give the reader an impression of me as an educator both inside and outside of the classroom. In the text that follows each principle, I give a brief explanation of why it is important and/or an example of how it has influenced my teaching.

I THE MOST POWERFUL RESOURCE IS THE EXPERIENCE OF OTHER INSTRUCTORS.

I often consult other instructors and educators when designing content, lesson plans, exams and anything else related to teaching. Some of the simplest and most effective teaching methods I have adopted have come from fellow educators. Discussing difficulties and problems with other instructors often leads to simple solutions and good advice as they have often encountered the same problems. Furthermore, it helps establish a culture and community within a department which values experience and time-tested teaching methods.

II THE BEST EDUCATORS SPREAD THEIR ENTHUSIASM TO THEIR STUDENTS.

The best educators are well versed and enthusiastic about the content they are teaching. Without a keen, competent instructor students are often left unmotivated and unchallenged. The following comments come from the course evaluation forms of a calculus class which I taught.

- “The instructor was very intelligent and enthusiastic. Honestly, it was my favorite course this quarter.”
- “The instructor was wonderful. He made calculus extremely enjoyable.”
- “Tim was a great teacher because he is so enthusiastic about calculus. This made the class a million times more engaging than it would have been otherwise.”

I work hard to provide an experience for my students which leads to comments of these types on my evaluations. Nevertheless, one student from the same course also wrote, “I think the instructor was slightly uninvolved. He would come in and lecture ... and seemed cold. I just think he needs to be more compassionate with his students.” This comment as lead me to focus on becoming a more compassionate instructor in order to spread my enthusiasm for mathematics to all of my students. On a different note, even the most passionate educators can be ineffective teachers. Successful teaching requires attention to detail and a variety of well-tested student centered teaching methods.
III Technology and media increase the effectiveness of learning.

As students and instructors become increasingly competent with new technology and new forms of media the potential for their use in teaching a successful course also increases. I have worked with online homework system providers such as Webassign and Blackboard. These systems allow students to access homework assignments and grade-books via the internet. The main advantage of these systems is that they provide the student with instant feedback on their progress by grading the assignments as soon as they are submitted. Furthermore, these systems free up valuable instructor time allowing them to focus more on course content and teaching. However, these systems still have many drawbacks including student frustration with a seemingly endless list of small bugs in the software.

As a senior graduate teaching assistant I was assigned the pilot hybrid business calculus course at the University of Denver. The course was designed to be a flipped classroom where students learn new content before class by watching prerecorded lectures online and do what was homework in the classroom under the guidance and supervision of the teacher and teaching assistant. For students with self-discipline these methods build a deep level of understanding of the course content.

Many of my courses have also used the computational knowledge engine Wolfram Alpha to help build lesson plans and lectures. Many of the tools allow for simple animations of concepts in calculus and differential equations which can enhance lectures and explanation during class and office hours. Although I have seen students abuse Wolfram Alpha, it can also be used by students to self-assess their own work and increase the effectiveness of their studies.

IV Course goals should reflect student and institution goals.

On a course evaluation of one of my classes a student described one of strengths of the course and instructor as the following: “The [instructor] tailored the class to fit our needs as students...” These types of comments show that students respond best to instruction where learning goals and outcomes are in line with student objectives.

Unaligned goals and outcomes can waste student time and lead to possibly different learning outcomes. During my experience designing and teaching a freshman seminar at the University of Denver I considered the description of the AI-Natural graduation requirement that the course fulfills. The university describes the courses satisfying this requirement as those where students will: (†) Apply formal reasoning or mathematics approaches to problem solving within mathematics and other disciplines. Although this goal is concise and clear it is simply too broad to be formally or informally assessed transparently and without bias. The description (†) however can be used to construct more concrete and detailed goals and objectives which can be easily assessed. The freshman seminar that I taught included a one week unit on the topic of fractals. Motivated by (†), I wrote the following learning goal: (‡) Given a real number between 1 and 2, the student can construct an island and show that its coastline has a box counting dimension close to the given real number. One advantage of (‡) is that it can be easily assessed and
Course goals should reflect student and institution goals. (cont)

identified in a classroom by a variety of means (whiteboard presentation, worksheet, group project, exam, oral discussion and many others) where as (†) is more difficult to clearly assess in the classroom.

Focusing heavily on constructing goals and outcomes also has negative consequences. Too much focus on writing goals can lead to a course which feels inauthentic and formulaic. To avoid these problems, learning goals and learning outcomes should reflect the interests and background of the students attending the course. This can be addressed by initially adopting flexible goals and allowing for changes based on formal and informal assessments of students progress and knowledge.

Assessment should be concretely aligned with learning goals.

Assessment which is unaligned with learning goals gives students an inaccurate portrait of their progress in achieving the goals and outcomes of the course. I once filled in for a calculus II instructor who was having medical problems. With the instructors help I taught the last two weeks of the class and proctored the final exam. After discussing the course with students it became apparent that the instructor was marking points off on grading for not placing a dot denoting multiplication between a number and a variable. For example $2x$ was unacceptable where as $2 \cdot x$ was acceptable. Although this is an extreme case it does provide an example of how misaligned assessment and goals can lead to student confusion and an inaccurate picture of student progress. In particular, the more closely aligned assessment is with learning goals the more accurately grades and assessments reflect those of the course.

Good assessment varies in both its methods and cognitive levels.

As a proponent of of Howard Gardner’s theory of multiple intelligences, I believe that students deserve to be assessed in a variety of forms. Some examples include using group work and group projects to assess at the interpersonal level, using presentations and class discussions for assessment in the visual/spatial axis and written reports for assessing progress through linguistic intelligence. Going back to the learning objective (‡) from above we can see that it is intended to be assessed at the levels of visual/spatial axis and body/kinesthetic axis of multiple intelligences. Varying learning activities and assignments along axes of multiple intelligences helps keep the methods of assessment and grade assignment unbiased and informative.

I also try to vary my assignments and classroom activities so that they reach all levels of Bloom’s taxonomy of learning objectives, especially the levels of evaluation, synthesis and analysis. (Examples of objectives and subgoals at these levels include but are not limited to objectives containing the verbs: deconstructs, differentiates, generates, modifies, organizes, interprets, justifies, relates, summarizes and supports.)
Using these principles and others it possible produce learning goals, learning outcomes and methods of assessment which are challenging unbiased and concretely aligned with one another. Notwithstanding, some methods work well with certain classes while failing to be engaging for others. My most memorable experience with this phenomena occurred fulfilling the requirements for a minor in education during my undergraduate studies. The capstone of the program is a semester long directed teaching course giving students experience applying the methods and practices learned in previous courses at the local high school. My experience included an nine week period where I helped team teach and a nine week period where I taught both a 9th grade algebra class and a honors 9th grade geometry class. The high school was located in a rural community and the algebra class reflected this demographic. On the other hand, the honors geometry class consisted mainly of the children of professors from the local science and technology university. The differences in these classes taught me that the methods and practices one uses in a course should be fluid and reflect the culture and demographics of the students in the course.