Teaching Statement

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Over the last 7 years, I have taught mathematics and computer science at the undergraduate level in a variety of settings. My pedagogical responsibilities have ranged from guiding class discussions in a flipped-classroom calculus course at the University of Toronto to delivering interactive automata theory lectures online for a course at Xidian University. I have taken part in reading groups delving into the scientific literature on math pedagogy and incorporated its findings into my own teaching. I have also been a student for many years. My experiences have guided me to a teaching philosophy that emphasizes practice while prioritizing students' quality of life.

My primary goal as a teacher is to make competent and creative problem solvers of students, and to give them the confidence to ask their own questions and push for their own discoveries. This is reflected in my teaching methodology and in my approach to assessment.

Methodology

My teaching methodology is inspired by *discovery-based learning*, which is known to be more effective than passive, lecture-based learning in undergraduate mathematics education [Lov+14]. I generally prioritize *doing* over *watching*, and spend as much of my class time as possible helping students work through examples and exercises. I also encourage students to work in groups by pushing desks together or giving them board space to collaborate whenever the space allows.

While I was an instructor at Xidian university, I learned to plan lectures around examples that clearly motivate the definitions, assumptions, and theorems I need to cover. I also learned to include sufficient time for students to work with the new material. Allowing students time to work in class gives them the opportunity to find their own knowledge gaps in a setting where they can ask questions and receive immediate feedback on their work. It also gives me more opportunities to work with students one-on-one, gauge the overall well-being of students, and assess the state of the class's knowledge on the whole.

While I was a teaching assistant at the University of Toronto, I learned to plan tutorials around group discussions and opportunities for students to discover the material for themselves. For instance, I once led a group discussion about the function $\sin(1/x)$, in which the students discovered for themselves that the correct definition of continuity is not the conclusion of the intermediate value theorem. I applied the same technique leading tutorials for a University College London course introducing computer science students to linear algebra and group theory: I was able to have my students intuit many of the basic facts we needed about matrices by simply having them apply different matrices to shapes and vectors in GeoGebra [Geo].

Assessment

One of my duties as a co-instructor for the *Automata and Coinduction* courses at GEC Academy and Xidian University was designing and grading problem sets and exams. While working within time and budget constraints, I do my best to emphasize assessment methods that focus on improving mastery rather than assigning scores. I am inspired by the idea of *mastery-based testing*, which is known to encourage students to learn from their mistakes and see assessment as a form of feedback rather than an objective measure of their intelligence [Col+19]. In the last year, I have consistently given students the opportunity to

resubmit assignment solutions after receiving some initial feedback on their work. Feedback from students is extremely positive: scores are generally much higher because most students happily take the opportunity to produce more detailed solutions, and low scores are taken less personally.

Experience

I began at the University of Victoria as a teaching assistant for Calculus I, II, and III, Precalculus, and Introduction to Logic and Proofs. Being a teaching assistant taught me how to manage a classroom, design grading rubrics, and deliver engaging lectures. Prof. Jane Butterfield and Prof. Christopher Eagle organized a math education reading group at UVic, where I as first exposed to the scientific study of math pedagogy. The scientific perspective on pedagogy was majorly helpful during my year at the University of Toronto, where I had the pleasure of assisting with Prof. Alfonso Gracia-Saz's course *Calculus!* (MAT137). Much of what I know about teaching as a science I learned from Alfonso, whose courses essentially proved to the world that a flipped classroom structure can work on a large scale [Web]. I spent my time as an instructor at GEC Academy and Xidian University and my time as a teaching assistant at University College London applying what I learned from my previous teaching mentors. In recent years, I have also learned to adapt my teaching methods to the virtual classroom setting.

Online teaching

The sudden demand for virtual teaching was an unfortunate surprise for most educators, myself included. Active discussion in virtual classrooms can be cumbersome, and it is often impossible to work with students one-on-one. Adapting active learning to the virtual setting has required a high proficiency with educational software—managing breakout rooms, posting announcements, using collaborative whiteboards, and moderating course forums have become second nature.

The increased accessibility of a virtual classroom is undeniable. I both taught for and held a leadership position in an outreach organization in London that offered mathematics courses to high school students around the city. By adopting a virtual classroom setting, we were able to offer our courses to more students, especially those who lived outside of London. I look forward to teaching in person in the future, but I am also happy to offer hybrid classroom experiences to students that require increased accessibility.

Concluding remarks

A substantial portion of my career so far has been spent thinking about pedagogy. Teaching is an important part of my academic experience, and I am excited to continue thinking about pedagogy and how to apply what I have learned in the design of new classroom experiences. I am happy teaching courses at any level, in mathematics and computer science. I also intend to return to academic outreach, especially in underrepresented communities, and am interested in playing a mentorship role to younger students interested in research.

References

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