

Teaching Statement

Tom Denton

I have a strong commitment to teaching. My main interests around education are improving education and access to science for under-served populations and in developing ‘hybrid’ teaching models integrating human interaction with electronic resources.

In 2013 I was awarded a Fulbright scholarship, which provided me with the opportunity to spend one year working on education issues in western Kenya. During that year, I developed on-line course content, introduced hybrid teaching into the university systems, created and offered teacher trainings for secondary teachers, and coordinated math camps for secondary students. I also co-founded a new technology hub in western Kenya, which serves simultaneously as an alternative education space and business incubator.

Recognition of my teaching has led to a guest course on problem solving at the African Institute of Mathematical Sciences (AIMS) in South Africa, and an invitation to give a course on experimental mathematics at the new AIMS in Cameroon. I have also given a workshop for lecturer development at Strathmore University in Nairobi, and conducted teacher trainings through the Kenyan Ministry of Education and the Kakamega School District in western Kenya.

1 Sharing Knowledge, Building Connections

One of the most successful projects I worked on in Kenya was the founding of LakeHub, a new technology hub in Kisumu. Briefly, tech hubs are shared spaces for working and knowledge sharing. They serve a triple-purpose as a maker- or hacker-space for project work, as a venue for alternative education, and as a place to make connections with peers and businesses. As such, they bridge a serious gap between academia and industry and build technological connections between what would be discrete academic fields. While there are a number of tech hubs in Africa, LakeHub is on its way to being the first stable tech hub outside of a ‘first city.’ We started LakeHub because there are many strong but disconnected technologists in western Kenya, alongside a wide array of businesses that do not utilize any modern technology. The goal is to bring together and strengthen the tech community and jump-start innovation in rural areas, where 80% of Kenya’s population can be found. Meanwhile, young and unemployed technologists gain further skills and have opportunities to network and establish future businesses of their own.

As a LakeHub participant, I gave seminars on connections between mathematics and computer science, and helped other participants as they brainstormed projects and worked on implementing their ideas. As a founder, I guided decisions about scheduling, space, and finances to help LakeHub thrive. As of this writing, the project continues to have strong weekly attendance and is about to hire its first employee.

Future Work: I am extremely interested in exploring how the tech hub model might be effective outside of Africa. Wherever I find myself, I plan to start programs to build connections between academic disciplines, the business world, and motivated participants.

2 Inspiring Students

I am a co-founder of the Kenyan math camp at Maseno University, which has occurred annually since 2011. In August, 2013, the Maseno math camp was replicated in Ethiopia at Bahir Dar University, where I served as an advisor and teacher. These are the first math camps in East Africa and follow in the example of great math programs that have inspired generations of students in the US, Hungary and Israel. With the math camps, we seek out challenging mathematical ideas related to amazing science, and present them in a way that anyone can access. The objective is to spark student interest in mathematics and science and overcome negative feelings towards math they may have picked up in their prior school experiences. We also leave students with resources to for independent learning after the camp is over. We create in students the drive to become world-class scientists, and provide guidance and resources as students begin their journeys.

Future Work: I plan to continue aiding the development and expansion of the African math camps. There are groups in multiple countries interested in starting camps (Ghana, South Africa, Uganda), and there is ample space to expand the math camp programs to include further secondary teacher training to help teachers bring the camp perspective back to their classrooms. I am also interested in exploring summer study-abroad options for students from developed countries to participate in the camps: Involvement with math camp gives a wonderful and rare chance for science majors to interact meaningfully and positively with students in developing countries.

3 Hybrid Teaching Models

Humans and computers are good at different things, and I strongly believe we should teach accordingly. Typically, I give classes with online homework for computational problems (using WebWork), giving students fast feedback and the ability to learn from their mistakes. I also give written homework to evaluate conceptual understanding and writing in ways that computers are not (yet?) able to. (Interestingly, WebWork was revolutionary in the Kenyan university classes I worked with. Classes are huge (often over 400 students), and there are no graders available, which means that the default is nearly no evaluation. WebWork allowed a dramatic positive shift of circumstances for the students.)

For the classroom, I strive to create an interactive experience that makes strong use of the contact time between a teacher and a group of students. The classroom experience emphasizes mathematics-as-she-is-done, and exploring the relationship between heuristic understanding of mathematical concepts and the formal definitions and theorems. Classroom time is used for developing ideas and reasoning, for active problem-solving, and for exposing students to new views and current applications of the primary course material.

Future Work: As a teaching member of the faculty at your institution, I plan to continue putting these ideas into practice!