

Teaching Statement

R. Adam Molnar

While thinking about defining my teaching philosophy, I recalled a conversation I had with an evangelist. It's an unusual job, and I wondered how he qualified success. Interestingly, he replied that he doesn't focus on numbers such as church attendance and conversions. Instead, he focuses on removing the barriers to faith, by explaining concepts in ways appropriate to his audience. The choice to believe, or not believe, is beyond his control. My goal when teaching statistics is a lot like the preacher's – remove the barriers to understanding.

At times, I even feel like an evangelist, when I'm promoting statistics to students enrolled just for a requirement. Tailoring examples to the audience helps. When I'm working with economics or MBA students, I scour the Economist and tell stories from my corporate consulting work. I introduce negative autocorrelation with budget estimates, over and over and over again. In classes with psychologists and social workers, my illustrations come from human studies. I introduce negative autocorrelation through a social game. First, a player is asked to “randomly” pick red or black. Then, I ask the student to “randomly” choose red or black again. The probability of black given the first choice was red should be 50%, but it's not – people switch around 65% of the time. Each group understands their story.

Another way instructors are like modern missionaries is force; I can't compel students to learn, do homework, or like probability. I want my students to become interested, and I appreciate when a student forwards a link to a CNN article or asks a follow-up question about correlation and Likert scales (which measure agreement with a proposition). I often mention follow-ups in class to encourage them, though not everyone will go beyond. For everyone, my job is to provide an excellent environment, with context (topics and examples, like above), incentive, and activity.

As instructors, we spend copious hours on homeworks, exams, projects, and point distributions, the incentives in the environment. That's not unimportant; because “what gets incented gets done”, I try to choose smart homework and projects and make fair tests. For instance, finding appropriate projects for first courses can be difficult. The past two summers, I've had my students count and analyze city bus waiting times. A few other professors liked the idea, and it's a decent dataset, so I submitted a description for review to the Datasets and Stories section of the Journal of Statistics Education.

However, like rules in religion, project choice can only go so far. The big issue remains how to present topics to fit the audience and keep the students engaged. There are plenty of resources available. But graduate classes in statistics are generally presented under the lecture model of “Definition – Theorem – Example – Homework”. Researchers tend towards individual formal structure. It's not surprising that classes wind up the same way, oriented around oration. For five years, I've assisted in the introduction to teaching for new graduate statistics students. Sometimes this includes an exercise designed for small groups, like

conducting and interpreting a t-test. About half the new students have never worked a group exercise before. There hasn't been much involvement.

To keep my students involved, I use a variety of activities, depending on the students in the class. Generalizing somewhat, economics undergrads and data mining MBA students like structure, so I write more formal PowerPoint outlines. Business students freely jump in and interrupt, so I don't ask them many direct questions and I hold relatively few group discussions. Social scientists, on the other hand, often tell me that they fear asking questions and being labeled "the stupid one". I adjust by making more directed inquiries and using small groups. To encourage participation, I sometimes repeat private questions in class with a positive comment such as "I got this good question earlier this week about ...".

A new challenge this term is the large lecture. My prior lecture sections have never exceeded 30 students; this quarter I have almost 60. I feel like a preacher moving from a chapel to a pulpit; I have to change tactics. For instance, I'm relying much more on "despotic democracy." To explain, I ask a question with a few possible answers. "Is design 1 or design 2 statistically better?" I ask "Who says 1? Who says 2?" Hands go up, and I sometimes ask for someone on each side to comment. I usually toss in a third humorous option – "Who's not sure but wants coffee?" which helps confused or unsure students participate. The term "despotic democracy" comes from the outcome. After the survey, I, as despot, override the vote and supply the best statistical choice, explaining the concepts and numbers.

From a numerical perspective, the reviews of my teaching are good, good enough to win a prize last year as one of the top 3 graduate students in physical sciences. The evangelist's goal is larger. Have I toppled all the barriers to understanding? Likely not. I'll continue on my path of self-improvement, and keep working to make statistics education more appropriate.