Teaching Philosophy

My first teaching role at McMaster was during my master's degree year where I taught a final exam review class on economic models in health. My focus was on distilling key features of economic models in an understandable way. After a student enquired as to why these models mattered, it was a clear reminder of how, too often, in a highly technical and empirical discipline like economics, we can lose the forest for the trees. The former undergraduate in me sympathizes very much with the curiosity and confusion which is part and parcel of the early stages of a student's life. I wish to elaborate here on my views and experiences on "big picture" issues of motivating, contextualizing, and structuring technical content.

In my latest T.A. assignments last spring, where I was leading applied econometrics Stata tutorials for undergraduate and graduate econometrics students, I took advantage of opportunities to motivate content based on my own experiences. This was done differently for undergraduate versus graduate students.

For the third-year undergraduate econometrics class, I was to create simulations to illustrate core statistical concepts, starting with the central idea of a sampling distribution. In my first lecture, I took on the task of: (1) introducing the Stata interface and syntax; (2) explaining what a Monte Carlo simulation is; (3) executing and explaining a simulation of the sampling distribution of the sample mean; (4) connecting ideas of sampling variability to the OLS estimator of parameters of a linear regression model; and (5) explaining how the idea of sampling variability relates to real life decisions based on empirical information. It turned out quite well. Specifically, I think I accomplished two important objectives which, whenever possible, I would like to make key elements of my teaching style.

Objective 1: Introduce and emphasize a central concept very early at an intuitive level
Objective 2: Connect the central concept to a broad set of problems that matter to the class

In this case, the central concept was the sampling distribution. I find that Monte Carlo simulation of the sample mean is a easy way to illustrate the essence of this concept very quickly. Once this was done, I was able to return to this reference point throughout the course, repeatedly, for: properties of estimators; standard errors and confidence intervals; hypothesis testing; and so forth. I have found in my own learning that this sort of repetition - building layers onto central concepts - helps to revise and retain core knowledge.

For many students, it will also be very important, not just to be aware of central concepts, but to know, very early on, why these concepts matter to their lives. I wanted to connect the idea of a sampling distribution to real-life examples which are meaningful to undergraduates and could be conveyed in the span of a few minutes. I did this with examples I had been ruminating on for some time, on how empirically motivated expert information may often be misinterpreted by non-specialists because of a lack of understanding of the nature of sampling variability. This is because, even if we have a correctly specified model, although our estimates may be close to the true parameter values on average in repeated draws, in a single draw (i.e., real life) our estimates may be far from the truth because of randomness.

One example of this which I mentioned to a class of students was the pre-election polling prediction of Hillary Clinton beating Donald Trump in the recent U.S. election. Ex ante, Hillary was almost sure to win. Ex post, many people responded by complaining of the "inaccuracy" of polls. Though model specification could, of course, be an issue here, sampling variability alone is enough for us to be consistently wrong sometimes. This is also true when doctors advise us on treatments, or when any other experts advise us about our lives based on empirical information. The best available empirical information to live our lives by, is not necessarily the "truth". I think understanding this idea carries relevance and resonance for a large group of responsible decision makers, including undergraduate students, who may or may not pursue economics majors.

For graduate students, I had somewhat similar discussions around the problem of identification. Identification problems reflect the inability to pin down a parameter value when sampling uncertainty is not an issue (i.e., at the level of the population). Although, technically quite different from the sampling variability problem, identification problems are philosophically similar at some level, in the sense that they

reflect our attempt to understand what we don't know from empirical information. Graduate economics students quickly learn that many data and institutional contexts will only identify parameters under undesirably strong distributional or independence assumptions. There is seldom a silver bullet identification strategy.

Learning the limitations of empirical knowledge may be a cause for waning enthusiasm amongst the newly initiated (whether undergrads or grads). My perspective, and my way of handling this potential issue with students is to shift attention to the problem of decision making under uncertainty. When left to making a choice with no information versus some information, it is obvious that, despite the limitations of empirical knowledge, discarding it entirely is a poor choice. This allows me to motivate students to deal with newfound skepticism in a way that, instead of giving up on these methods, they can understand the power of becoming sophisticated consumers (and for grad students, producers) of empirical information. I can tell undergrads to learn as much as they can about the nature of empirical information as it can have a tremendous role shaping their lives in our knowledge-based and democratically-run society. With grad students, I have shared how my experiences learning about the limitations and their promise of empirical methods has been empowering, as I can now seriously engage data sources, and am not as limited as I may otherwise be, to uncritically accept the conclusions of others. I think this motivational formula works well to structure the high-level narrative of, otherwise, technical content in empirical methods courses.