

Teaching Introductory Statistics in the Social Science Departments

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The Scholar as Teacher
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Why Teach Statistics?

- Statistics as a necessary tool for modern social science research
 - Data and computing revolutions
 - Use of statistics in junior papers and senior theses
 - Close the gap between undergraduate and graduate education
- Statistics as a useful skill in post-graduate career
 - “Today’s Graduate, Just One Word: Statistics” (NYT August, 2009)
 - Banking, consulting, marketing, medicine, public policy, law, etc.
 - Leaders in many fields are expected to understand statistics
- Goals of POL 345: Quantitative Analysis and Politics
 - ① Teach basic statistical concepts and principles (lectures)
 - ② Teach basic data analysis and programming skills (precepts)
- Doing statistics rather than just understanding statistics

Main Challenges

- 1 Students lack interest in the subject matter
 - Many are taking the course to fulfill a requirement
 - Most are interested in politics rather than statistics
- 2 Many have weak mathematical aptitude and background
 - Most have not taken any math course since high school
 - Some major in politics because they don't like math
- 3 Students fall behind
 - Many think they can skip some materials and catch up later
 - Most are not used to courses with problem sets and exams

1 How Can We Motivate Students?

2 How Can We Help Students Learn Statistics?

Course Evaluation Data

- Data:
 - 3 Semesters: 2008–09 Fall/Spring, 2009–10 Fall
 - 4 Social science departments: Economics, Politics, Woodrow Wilson School, Sociology
 - Introductory statistics courses: ECO302, POL345, WWS332, SOC301

- Statistics is not everyone's favorite subject:

	Lectures	Assignments	Readings	Precepts	Overall
Statistics	3.07	3.04	3.06	3.40	2.93
All courses	3.80	3.51	3.69	3.94	3.77

- Students are not generally interested in statistics:

	Professor	Distribution Requirement	Departmental	Certificate Program	General Interest
Statistics	0%	20%	71%	3%	6%
Others	6%	12%	32%	7%	42%

Motivating Students ①: Emails from Former Students

- “I was in your POL 345 course in fall 2008 and am now working as a fellow for USAID in Lima, Peru. I’m writing a recommendation memo on the appropriateness of using Propensity Score Matching methods to measure the poverty reduction impact of one of USAID’s programs...”
- “I recently returned from London for two months of training with bank. Assessing volatility, and the skew that it exudes in certain option pairs, is strictly understood with the use of statistics. Needless to say, had I not had the background your class gave me, I would be spending a lot more time learning statistics rather than learning about trading.”
- “I graduated from Princeton last June, and took POL 345 a year ago. I was a history major, and my job now has little to do with statistics – I’m a sports reporter for a small-town newspaper. But I did find a way to employ R quite usefully...”

Motivating Students ②: Use of Interesting Examples

- POL345 is taught in the fall: Election forecasting as a problem set
- Reanalysis of data used in published social science research
 - ① Impact of minimum wage on unemployment
 - ② Social pressure and turnout experiment
 - ③ Using facial appearance to predict elections
 - ④ Labor market discrimination experiment
- Use funny examples in lectures to keep students engaged
 - Law of Large Numbers: Do beautiful people have more girls?
 - Hypothesis Test: Did Paul the Octopus and Mani the Parakeet correctly predict winners of World Cup soccer games by chance?
- A comment by a student in evaluation:

“Professor Imai tried hard to make statistics interesting.
But, statistics is boring.”

Helping Students Learn Statistics

- Help outside of classroom
 - ① More office hours by preceptors: 3 hours per week/preceptor
 - ② Open door policy by the instructor
 - ③ McGraw center study halls: 6 hours per week
 - ④ Discussion board through Blackboard
- Short but frequent assignments
 - ① 4 problem sets
 - ② 3 inclass quizzes
 - ③ Precept questions for each precept
- The number of students in trouble has decreased
- Small number of students still struggle with materials and require substantial individual tutoring by instructors

Concluding Remarks

- Teaching introductory statistics in the social science departments is challenging but rewarding
 - ① Last year's best senior thesis prize winner was a former student of POL 345 who collected an original data set and performed a statistical analysis
 - ② This year, a student is conducting an original survey in Myanmar to study citizens' support level for the junta
 - ③ Some former students contact me about the use of statistics in their post-graduate career
 - ④ Last year, a preceptor won the APGA teaching award
- After three years of trial and error, many challenges remain
- Any suggestions to improve teaching are appreciated