Method, Laboratories, Case Studies: Context for Teaching Statistics.

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No proper application of statistical methodology occurs without careful consideration of the problem's subject matter context. Consequently teaching our discipline using little or no context seems doomed to failure. This is especially true for that first (and often only) course in statistics!

In this talk, I describe a first course in statistics where all statistical methodology presented is done so in the context of solving problems. The course itself is presented in the larger historical context of scientific method and explanation dating back to Aristotle. To distinguish the approach we call the course an introduction to "Empirical Problem Solving".

Three important techniques are used to develop the students' understanding of, and skills for, empirical problem solving. First, a systematic method for empirical problem solving is adopted, a Problem-Plan-Data-Analysis-Conclusion cycle, and used to organize the course itself. Second, we devote five 2 hour contiguous time slots to laboratories where students work from prepared instructions with specially designed equipment on laboratories that address some of the most important statistical issues they are likely to encounter: bias and variability, process improvement, sampling methods, experimental design, and causality. Third, all other lectures are spent examining the solutions to real problems via case studies that are either drawn from our experience or are based on current and historical studies where enough literature exists to draw a fairly complete picture of the problem context.

These three approaches are entertwined to present a positive course devoted to solving problems and addressing the larger scientific concepts.