Statisticians and Consulting

Aaron Rendahl
slides by Gary Oehlert, revised by S. Weisberg

School of Statistics
University of Minnesota

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Introductions

- Who are you? What's your preferred name?
- Where are you from? Country? State? Department?
- Why are you in statistics?
- Do you hope or expect to do statistical consulting someday?

What is Statistical Consulting?

We'll divide into groups and try to come up with a working definition of statistical consulting.

What do others think?

ASA Section on Statistical Consulting

"Statistical consulting is the most challenging and most rewarding part of statistics. A consultant uses the art and science of statistics to solve a practical problem."

Too general. What's missing?

Derr's First Line

Derr (2000) begins:

Statisticians often work with people in other professions and disciplines.

Here is the key: Consulting is working with people in other fields. Sometimes it is merely working *for* someone, other times it is working *together*.

Cabrera and McDougall's 2¢

Cabrera and McDougall (2002) add the following:

Ultimately, [statistical consulting] is about communication . . .

The statistical consultant is a problem solver . . . [who] needs to have a strong interest in science, and, in particular, the art of scientific discovery.

Hyams' Ideal

Hyams (*Biometrics*, 1971) described the ideal consultation:

. . . The 'Ideal Consultation' is not a consultation. It is a working-together, a voluntary meeting of minds and union of energies whose prime aim is to seek a 'truth'. In such meetings both parties are familiar with each other's basic language. . . .

Here the science drives new statistics and the statistics supports good science.

What is consulting?

So. . .

essentially anything statistical that isn't sitting alone in your office doing research or teaching/taking a class is statistical consulting.

In this sense, almost all[1] statistics is statistical consulting, and most of the rest is inspired by consulting-type problems.

[1] Except on a set of measure zero.

Everywhere

We work in

- Academia
- Business/Industry
- Government
- Nonprofits/NGOs
- ...

Here are some examples from the ASA website
(www.amstat.org/careers/index.cfm?fuseaction=whoemploys).

Biomedical

- Animal Health
- Biostatistics
- Clinical Trials
- Epidemiology
- Genetics
- Pharmacology
- Public Health

Business/Industry

- Agriculture
- Chemistry
- Computer Science
- Economics
- Engineering
- Finance
- Insurance
- Manufacturing
- Marketing
- Quality Improvement
- Reliability

Government

- Census
- Ecology
- Forestry
- Government Regulation (e.g. No child left behind)
- Law
- National Defense
- Population Research
- Risk Assessment
- Surveys

Academia

- Research 1
- Other graduate/four year
- Liberal Arts colleges
- Community Colleges
- Education research

An Ideal Statistician

What are some qualities of an ideal statistical consultant?

Desiderata

1980 ASA committee: qualities of an ideal industrial statistician

1. Well trained in theory and practice of statistics
2. Effective problem solver
3. Good oral and written communication skills
4. Can work within the constraints of the real world
5. Knows how to use computers to solve problems
6. Is familiar with the statistical literature
7. Understands the realities of statistical practice
8. Has a pleasing personality and is able to work with others
9. Gets highly involved in the solution of company problems
10. Is able to extend and develop statistical methodology
11. Can adapt quickly to new problems and challenges
12. Produces high-quality work in a timely fashion
13. Walks on water

Teams

Another interesting feature is teamwork. More and more, in government, industry, and elsewhere, work is done on teams, not individually.
Phil Ross (1995):

> *The most important thing I would like to see is people emerging from graduate school understanding that they are going to play on a team, and knowing how to communicate in that team setting. That is very difficult for people, especially those majoring in mathematics and statistics.*

What lies ahead

We are going to work in teams on problems that are likely to be new to you that may require you to learn a new skill or technique quickly.

We are going to write, present, and critique, over and over to get better.

We will poke in the literature, work on interpersonal skills, talk about some common real-world problems that don't always make it into the curriculum, do it on time and under budget, and maybe even have some fun.