Using Faculty Research in Teaching
A Case Study

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Last updated: June 11, 2014 at 15:12
It’s almost axiomatic in academia that faculty research benefits teaching. But does it?

Feldman conducted a meta-analysis of 44 studies, concluding that “the likelihood that research productivity actually benefits teaching is extremely small; the two, for all practical purposes, are essentially unrelated.”

Astin found that: “Attending a college whose faculty is heavily research-oriented increases student dissatisfaction and impacts negatively on most measures of cognitive and affective development.”
Clearly, faculty research could improve instruction in a number of ways:

- keep course content fresh and current;
- increase the knowledge base of the instructor;
- demonstrate the value of examining a topic in detailed and sustained ways;
- showcase the discipline of subjecting scholarly results to broad scrutiny and critique;

- model for students the intellectual curiosity and critical thinking that characterize good research;
- enhance staff enthusiasm, credibility and institutional reputation.
So What Goes Wrong?

So why doesn’t there seem to be a strong connection between research and quality undergraduate teaching?

- Cutting edge research is often esoteric and distant from core curricula.
- Constraints on the curricula may limit opportunities to introduce new material.
- The structure of faculty incentives rewards research, but not the integration of research into the undergraduate classroom.

Conjecture: These may apply less to information security than to many other science disciplines.
See if faculty research results can be used effectively in classroom teaching.

The Course: CS361C: Information Assurance and Security, at the University of Texas at Austin.

Goals: Learn to think creatively and wholistically about security problems.

Topics: Risk management, physical security, operational security, incident response, human factors, etc.
The Case Study

The Research: A project on enhancing supply chain security for the U.S. Army.

Given the need to acquire COTS software, how to improve the efficacy and efficiency of assessing whether applications are adequately “networthy” for deployment on Army networks.

Using the Research in Class

Use the research problem as a guided gedanken experiment for the students. *How would they tackle the same problem confronted by our research team?*

- Via a series of assignments, feedback, and class discussion, acquaint students with approaching a real-world security problem.
- Use as a way to introduce related topics:
  - COTS vs. custom products;
  - limitations of automated vulnerability scanning;
  - reputation-based screening;
  - open vs. closed source;
  - life cycle issues in security;
  - practical risk management;
  - many more.
For *this research* and *this class*, experiment was extremely successful.

- The research topic was exceptionally relevant to the goals of the class.
- The topic engaged the students and led to learning in a variety of relevant areas.
- Students viewed the experience favorably, in many cases as a first opportunity to engage in “research.”
Faculty research *can* be used to good effect in undergraduate teaching.

Use as a spur to student effort, rather than as an additional body of material to learn.

Encourage institutions to incentivize integrating research with teaching.

Must be the *right* research for the purpose.

Look for possibilities when designing instructional materials, and (maybe) when selecting research projects.