ACTIVELY ENGAGING BOTH ENGINEERS AND NON-ENGINEERS IN AN INTRODUCTORY ENGINEERING COURSE

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Motivation

" [The NAE] recommend[s] that the engineering education establishment should participate in a coordinated national effort to promote public understanding of engineering and technology literacy of the public."

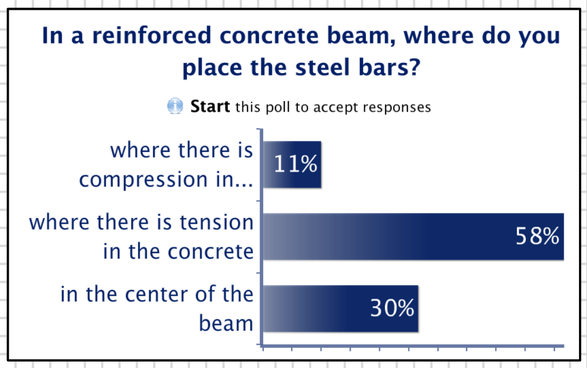
Educating the Engineer of 2020, NAE

Objectives

Take an existing introductory engineering course, which is taught to both engineers and non-engineers, and:

(1) renovate the course with research-based pedagogical techniques; &

(2) develop 'modules' for the course such that it can be disseminated to other universities in a format to suit each institution.



Course Content

"Structures and the Urban Environment"

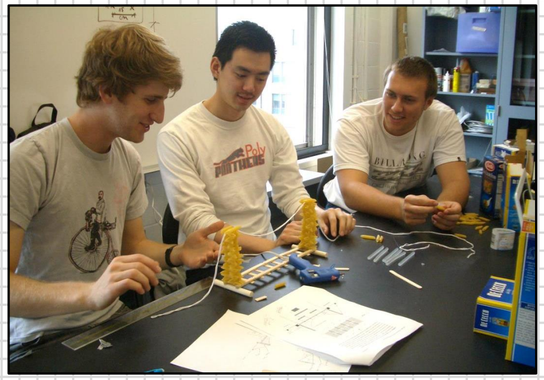
- traces the development of outstanding structures (bridges & tall buildings) since the industrial revolution
- emphasizes specific people (engineers)
- teaching w/case studies
- the creativity of the engineer is emphasized along with the technical content.
- 40 yr old class
- Typ. enrollment ~200 (most = non-engineers)

Wish-List of Activities & Materials

- Develop a active-learning exercises for each (or some) lecture(s)
- Modularize the course for dissemination
- Create an evaluation to measure effectiveness

Execution

- lecture time twice a week (w/~200 students), plus
- seminar time once a week (w/~12 students)
- Flip some classes?



Major Challenges

- Making a ~200 student class interactive;
- Teaching students with a large range of comprehension (engineers combined with non-engineers).
- Adapting this class for other universities
- How to disseminate
- Measuring outcomes (assess effectiveness)

Discussion

- By interacting with students during lecture, I am aware of their level of understanding and can adapt the lecture
- By the students interacting with me and each other they can identify any weaknesses in comprehension
- By understanding what and how to measure outcomes, it will focus the teaching to meet the outcome goals
- By speaking to colleagues from a wide range of institutions, I can hear about the needs and challenges for the dissemination that I propose
- I have submitted an unsuccessful proposal to NSF (TUES) and plan to resubmit (CAUSE).

2013 Frontiers of Engineering Education
Irvine, California
October 27-30

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