

CASCE

WORKSHOP ON

ADVANCING THE DISSEMINATION OF THE CREATIVE ART OF
STRUCTURAL/CIVIL ENGINEERING

PRINCETON UNIVERSITY – JUNE 3-5 2015

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CASCE Evaluation Plan and Pre-Workshop Questionnaire

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Evaluation Plan - Overview

Three Project Goals:

1. Transform an introductory engineering course utilizing interactive pedagogy;
2. Ensure that the course takes a form that can be readily adopted into the engineering and general education curricula of many types of institutions of higher learning; and
3. Facilitate dissemination and adoption of course beyond the audience already being reached.

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| Activity and Analysis | Benchmark |
|---|---|
| Goal 1: Transform course with dramatically improved interactivity | |
| A. Update lessons to include more interactivity and STEM-context; management team reviews and updates each lesson | A. Currently, ~20% of lessons are interactive. By the end of first year, 60% will be transformed, implemented and revised, as needed. By the end of second year, all lessons will be transformed. By end of third year, all lessons will be implemented and revised, as needed. |
| B. Students' pre- and post-survey, as well as student grades [quantitative] | B. 75% of students will report greater interest in engineering, recognition that engineering involves creativity and impacts society, and confidence in STEM abilities. |
| C. Focus groups, interviews and open-ended survey questions [qualitative] | C. Regardless of course grade, a majority of students will report satisfaction with course structure and assessment, as well as recognition that engineering involves creativity and impacts society, and confidence in STEM abilities. |
| Goal 2: Course takes a form that can be readily adopted into curricula of many types of institutions | |
| A. Identify themes to organize lessons into modules. | A. By end of second year, 50% of lessons will modularized. By end of third year, 100% of lessons will be modularized. |
| B. Document how course is adopted at various institutions. | B. Continuously update lessons based on feedback. |
| Goal 3: Facilitate dissemination, adoption, and continuous improvement of the courses | |
| A. Submit workshop proposal to ASEE, FYEE, ASCE and AACU annually | A. Annually, facilitate two workshops at STEM relevant conference |
| B. Follow-up with ASEE and FYEE participants via email and in-person workshops | B. Receive feedback from at least 50% of participants to inform improvement of workshop. Maintain contact with 100% of individuals interested in adopting course and provide continuous support, as needed, to facilitate adoption. |

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Goal 1: Students

Student Assessment of their Learning Gains (SALG)

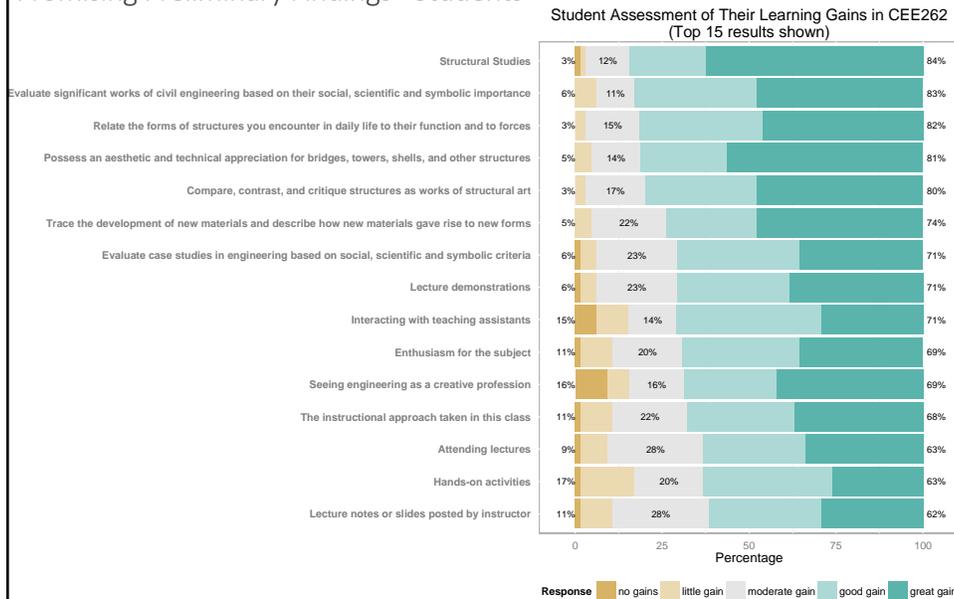
- Developed in 1997 by Elaine Seymour for the NSF-funded projects ChemLinks and ModularCHEM
- Tested for validity and reliability; currently used by 12,301 instructors with 6,777 instruments and 277,460 student respondents
- Focuses on the degree to which a course has enabled student learning

Interviews and Focus Groups

- Loosely-structured qualitative interviews
- Conducted in the last three weeks of the semester

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Promising Preliminary Findings - Students



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Promising Preliminary Findings - Students

Understanding / Wider Impact

"I've learned so much - I think about this class every time I see a building or a bridge."

"It has made me realize how creative engineering really can be!"

"I came in knowing essentially nothing about structural engineering, and now look at structures I see in the real world in a totally different light."

"I thought that the science of structures would be really hard to understand for someone with an english/history mind like me but it turns out that civil engineering is not too intimidating."

Attitudes Towards Engineering

"I no longer view engineering as a purely calculations based discipline and have come to appreciate the artistic aspects of the field."

"I definitely now understand how engineering is really a way of problem-solving in interesting, creative ways. I have a much greater appreciation for structural art and feel more interested in it."

"This course definitely made me respect the work of structural engineers as more than just a 'plug-and-chug' profession. There's a lot more creativity and factors they consider that I hadn't realized."

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**Raven –
Essence of the Course**

**Dale –
The Cantilever**

**Raven –
Why we are doing all of this...**

**Dale & Jess–
Engineering Profession**

**Raven –
Like engineering more...**

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Goals 2 & 3: Faculty Partners

Utilizing NSF's Innovation Corps (I-Corps) framework for "Customer Development" Interviews

- Pre-Workshop Questionnaire
- Immediate Post-Workshop Follow-Up
- Longitudinal: six-months post-workshop and then annually

-Next steps

- Take a break...
- Meet in small groups (identified by your nametag color)
 - Green = East Pyne 111
 - Yellow = East Pyne 127
 - Red = Chancellor Green 105
- Share responses in small groups
- Reconvene at 10:45am to debrief in large group