Use of SCALE-UP at Two Universities: Where Does It Start? How Does It Spread?

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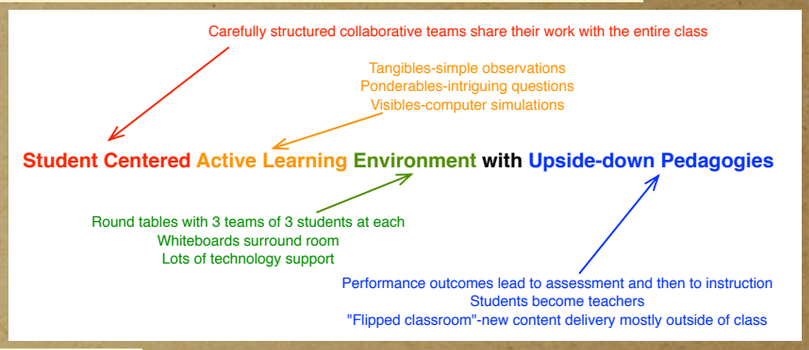
Motivation
Much time and effort has been spent on R&D to create research-based reforms for science education [1]
This traditional Development & Dissemination model has failed to create lasting change [2, 3]

GOAL: Develop a more robust model of change. Examine two universities as case studies to determine:
1. How does the reform begin at an institution? Is a top-down or bottom-up approach more effective?
2. How does it spread within an institution?

The Reform: SCALE-UP [4]
SCALE-UP radically reforms the classroom design and pedagogy to promote interaction between students and their instructors. It has spread to over 250 departments worldwide and dozens of disciplines.



The University of Iowa TILE

Initiation

FIRST EXPOSURE: • A video circulated around campus about the University of Minnesota's SCALE-UP-style reform
EXTERNAL INFLUENCES: • A major flood resulted in the need to reconstruct classrooms and federal **funding** was available
INITIATION: • **Top-down** reform effort from upper administration

Implementation

FIRST CLASSROOMS: • Began with 2 classrooms in 2009 (seating 36 and 72), design followed UMN/NCSU models
CONTINUED SPREAD: • Instructors are required to undergo **mandatory training** to qualify to use rooms
• **Centrally controlled rooms** for use by any department
• Some **department chairs** gave faculty incentives and extra encouragement for use
• Positive feedback from instructors and students helped motivate other faculty to apply

Current Use

- 7 TILE classrooms used by 60 departments
- From 2010 to 2013, TILE trained 171 staff who taught 345 course sections, with a total enrollment of 8400 students

Clemson University

Initiation

- Math and engineering faculty members heard about SCALE-UP through an NSF engineering reform initiative
- **High failure rates** in gatekeeper courses in math and engineering prepared administrators for change
- **Bottom-up** reform from two instructors who secured support & funding from department heads

Implementation

- Began with 2 classrooms in 2004 (seating 26 and 72), design followed NCSU model
- In 2006, math department head decided all introductory calculus courses would be SCALE-UP and converted 5 classrooms
- Spread from math and general engineering to civil and mechanical engineering because of an **interdisciplinary grant**
- Instructors invited colleagues and alumni to observe classes to spread the reform outside STEM and secure further monetary support

Current Use

- 10 SCALE-UP classrooms used by 10 departments
- All general engineering courses are SCALE-UP

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Method
We chose these sites based: (i) longevity (iii) number of departments involved and (iii) geographical location
Four key contact people at each institution were interviewed about SCALE-UP's history and current status in their departments

Initial Findings:
1) Initiation from the bottom or the top be effective if faculty and administration work together
2) Word of mouth spreads awareness throughout an institution
3) Redesigned classrooms add visibility to the reform, as a visible symbol of change
4) Financial investment in redesigning classroom may make sites less likely to abandon use

Future Work
We treat these initial findings as hypotheses to test as we contact more institutions

References

[1] National Research Council. (2003). Improving Undergraduate Instruction in Science, Technology, Engineering, and Mathematics: Report of A Workshop. Washington, D.C.: The National Academies Press.
[2] Henderson, C., Beach, A., & Finkelstein, N. (2011) Facilitating Change in Undergraduate STEM Instructional Practices: An Analytic Review of the Literature, Journal of Research in Science Teaching, 48 (8).
[3] Seymour, E. (2001). Tracking the process of change in US undergraduate education in science, mathematics, engineering, and technology. Science Education, 86(1), 79–105.
[4] http://scaleup.ncsu.edu