Four Challenges to Institutional Change

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Overview

• Why do we need institutional change?
• Four challenges to institutional change
• An example: Implementation of SCALE-UP
**Four Categories of Change Strategies**

**Focus on Changing Individuals**

- **Prescribed Final Condition**
  - DISSEMINATING Curriculum & Pedagogy
  - DEVELOPING Policy

- **Emergent Final Condition**
  - DEVELOPING Reflective Teachers
  - DEVELOPING Shared Vision

**Focus on Changing Environment/Structures**


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**How they Work**

**Focus on Changing Individuals**

- **Prescribed Final Condition**
  - Evaluate
  - Design
  - Implement

- **Emergent Final Condition**
  - Institutionalize
  - Experiment
  - Learn

How they Work


STEM change agents often focus on individuals. This is not sufficient.

Focusing only on individuals does not change the traditional situations in which individuals work.

3. Content Coverage Expectations

Common 1st Semester Introductory Physics Topics

1. Vectors 11. Gravity
3. Motion in One Dimension 13. Mechanics of Fluids
7. Systems of Particles 17. Oscillations
8. Conservation of Momentum 18. Waves on a String
9. Rotation 19. Sound
10. Static Equilibrium

Successful change requires changing traditional situations. We often call this institutional change.

- Even motivated instructors who are knowledgeable about new teaching methods run into difficulties
- Instructors face many situational constraints that frequently result in discontinuation or inappropriate use
Four Challenges to Institutional Change

- **Vision** – Change involves new ideas
  - Where do the new ideas come from? How are they selected?
  - To what extent are they prescribed vs. emergent?

- **Motivation** – People need to behave differently
  - What communication messages will people find motivating?
  - What structures need to be in place for people to be motivated?

- **Momentum** – New ideas and practices need to spread beyond their initial location
  - What is generalizable about the new idea or practice? How can this be communicated?
  - What are the environmental (cultural or structural) barriers to the use of the new idea or practice?

- **Institutionalization** – Sustained use of new ideas and practices requires a change in the environment
  - What environmental barriers need to be removed?
  - What new environmental structures should be added?

Innovation works differently in prescribed vs. emergent change. Spread is the same.
Examples

• SCALE-UP

• Boulder
  • Just now
• WMU
  • 10:05 Bonnet Carre Room

SCALE-UP Involves redesigning the classroom and pedagogy
Case studies of SCALE-UP implementations

• Phone interviews with “successful” SCALE-UP implementations. Selected from a web survey.
  • Most departments
  • Most influential
  • High longevity
  • High penetration

• 22 initiation efforts at 20 institutions.

13 doctoral/research institutions
6 masters colleges and universities
1 Associates College

13 physics departments
6 biology departments
4 engineering/computer science departments
2 math departments
2 geology departments
1 marine science department

Innovation

• Top-Down Institution
  • Video of SCALE-UP reform was circulating around campus, generating interest.
  • Major flood resulted in need to reconstruct classrooms and federal funding was available.
  • Provost created team to decide on funding use, they build SU classrooms and implemented training program for faculty.

• Bottom-Up Institution
  • Math and engineering faculty were collaborating on funded reform efforts and heard about SU through NSF reform initiative and Beichner’s post-doc.
  • High failure rates in gatekeeper courses were a concern of upper administration who provided funds for SU classrooms at request of faculty champions.
Spread

**Top-Down Institution** (7 classrooms used by 60 departments)
- Rooms centrally controlled --> all departments could use
- Center for Teaching ran mandatory training program
- Some department chairs encouraged their faculty
- Faculty and student excitement about successful courses helped motivate faculty

**Bottom-Up Institution** (10 SU classrooms used by 10 departments, all general engineering courses are SU)
- Math department head decided all introductory calculus courses would be SCALE-UP
- Spread from math and general engineering to civil and mechanical engineering because of an interdisciplinary grant
- Instructors invited visitors to observe classes → spread outside STEM

Commonalities

- Key figures with existing interest in reform were introduced to SCALE-UP through informal mechanisms and colleague connections.
- Financial support for redesigned rooms was available due to supportive administrators.
- Administrative support and the visibility of redesigned classrooms contributed to success.
Implications

- Change can happen either bottom-up or top-down
- Administration-faculty partnerships is important
- Cross departmental collaboration assists dissemination
- Structural changes (i.e., redesigned classrooms) add visibility and sustainability

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