Awareness of and Receptiveness to Active Learning Strategies among STEM Faculty

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Background

- Active learning has been shown to lead to better student performance.
- Active learning strategies are not widely or frequently used in STEM instruction.
- This paper explores:
  1) How STEM faculty conceptualize active learning.
  2) How their views of active learning impact their receptiveness to and use of related teaching strategies.
Framework

What students do:
(Engineering Education community, Prince 2004)

• Active Student Engagement
• Collaborative Learning
• Cooperative Learning
• Problem-Based Learning

What students think:
(K12, Fostering Communities of Learners, Brown & Campione 1990)

• Motivated
• Aware
• Strategic
Data Collection & Analysis

• Semi-Structured Interviews

• Subjects: 24 faculty at 4 diverse institutions, cross-section of disciplines

• Coded to identify emergent themes using the constant comparison method
Results

How do STEM faculty define active learning with regard to what students are *doing*?

Active Learning Includes...

- **Student Engagement**: 100%
- **Collaborative Learning**: 67%
- **Cooperative Learning**: 53%
- **Problem-Based Learning**: 53%
Results

How do STEM faculty define active learning with regard to what students are *thinking*?

Motivated
Aware
Strategic
Results

How receptive are faculty to active learning, and are they using these strategies?

- 50% Not Receptive-Not Using
- 31% Receptive-Not Using
- 19% Receptive-Using
Results

• Not Receptive:
  • “I could not see the value [of active learning]. I feel a little sorry for people who need active learning in order to learn better. I think it shows their weakness. ... I think active learning serves the weaker student population.”

• Receptive But Not Using:
  • “I don’t do that much of those activities where students have to somehow form little groups within the classroom and do things. I have nothing against it, but it hasn’t been that convenient to do it and it takes time.”

• Receptive AND Using:
  • “I like to facilitate active learning and I like to activate the students. ... Work with your neighbor. We’ll do multiple-choice. From time to time I’ll use the audience response systems. ... So I like to have an active classroom. I really don’t like the days where I’m just up there talking and there’s no interaction.”
Results

How do views of active learning impact receptiveness, use of active learning strategies?

- More limited definitions of AL
  - Less receptive, less likely to use

- More detailed, comprehensive definitions of AL
  - More receptive, more likely to use
Results

How do views of active learning impact receptiveness, use of active learning strategies?

“Anything other than just sitting there listening.”

- More limited definitions of AL → Less receptive, less likely to use
- More detailed, comprehensive definitions of AL → More receptive, more likely to use
Results

How do views of active learning impact receptiveness, use of active learning strategies?

“Anything other than just sitting there listening.”

“turn them loose on some problems”

“I’m there to help facilitate their learning.”

“student learning comes from student doing”

“a sense of collaboration in the learning experience”

More limited definitions of AL → Less receptive, less likely to use

More detailed, comprehensive definitions of AL → More receptive, more likely to use
What’s Missing

For many STEM faculty, certain elements tend to be missing in their conceptions of active learning.

• In what students do: cooperative learning and problem-based learning
• In what students think: being strategic about their learning

These characteristics are consistent with teaching philosophies that heavily emphasize delivering content.
Implications

Step 1: Before any systemic change: Overcome the “Content Barrier”

Flipping the classroom? Other?
Thank You

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