

Awareness of and Receptiveness to Active Learning Strategies among STEM Faculty

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Frontiers in Education Conference, October 2012
Seattle, WA

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**

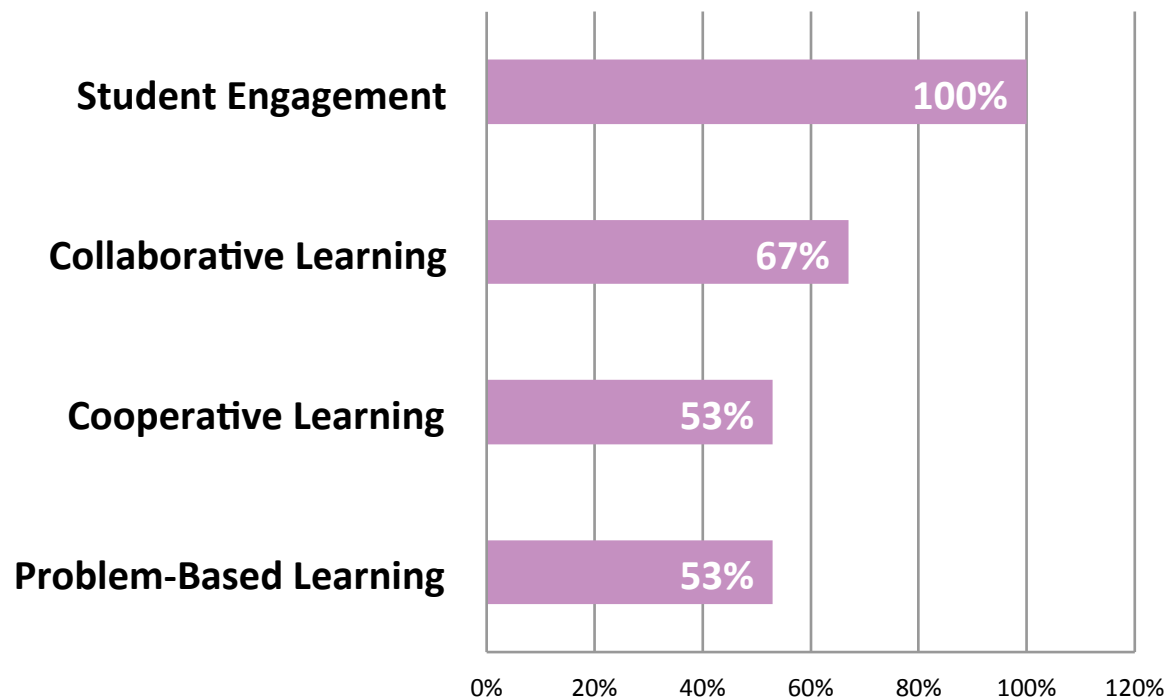
Data Collection & Analysis

- **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...



Results

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

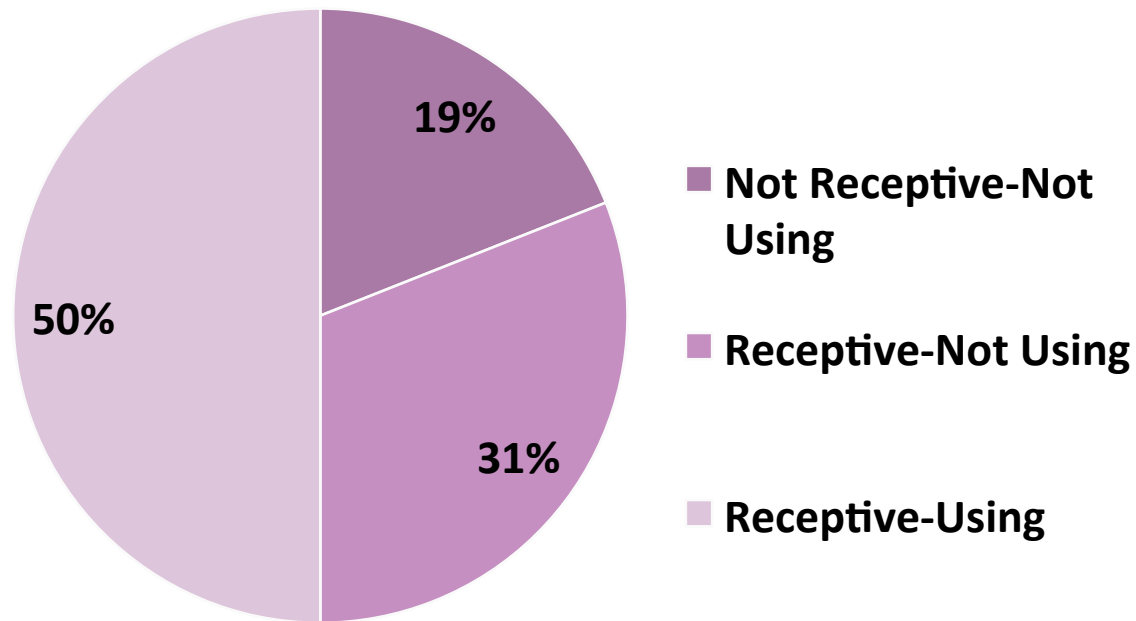
Motivated

Aware

Strategic

Results

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

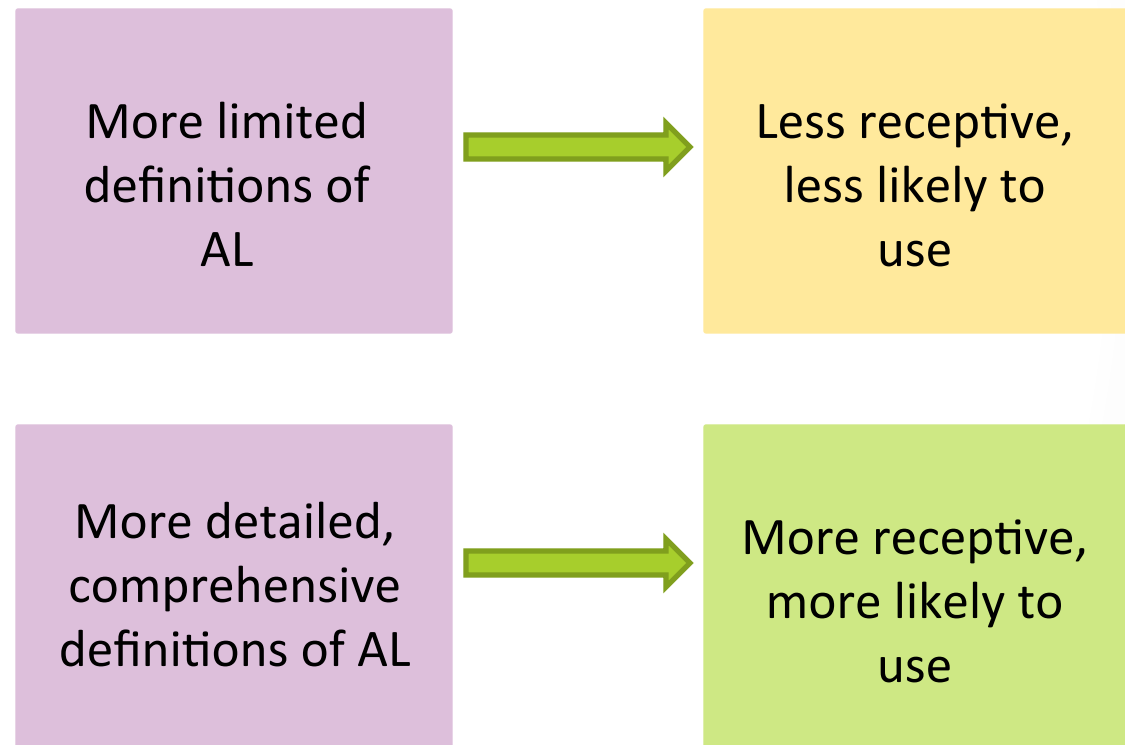


Results

- **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.”*

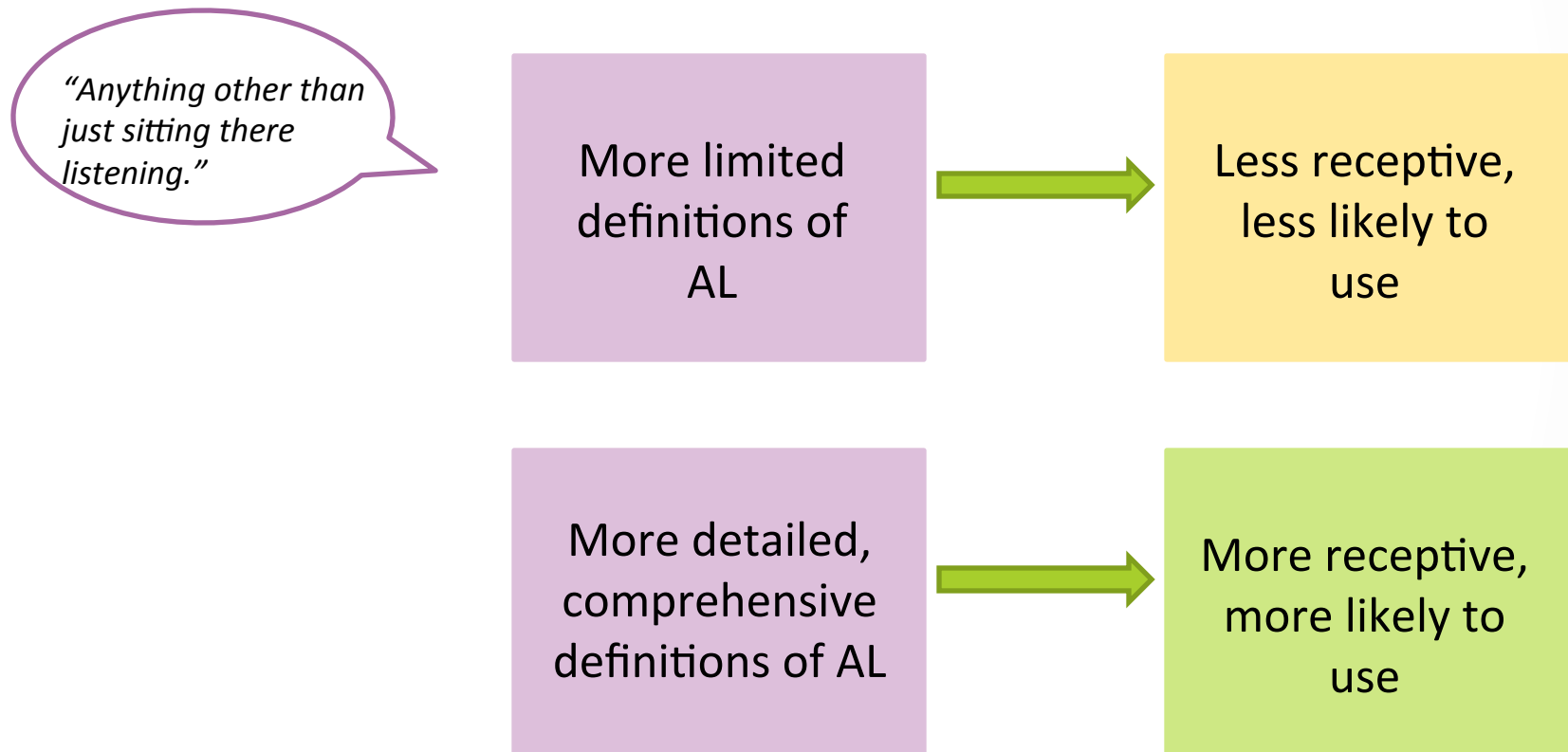
Results

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



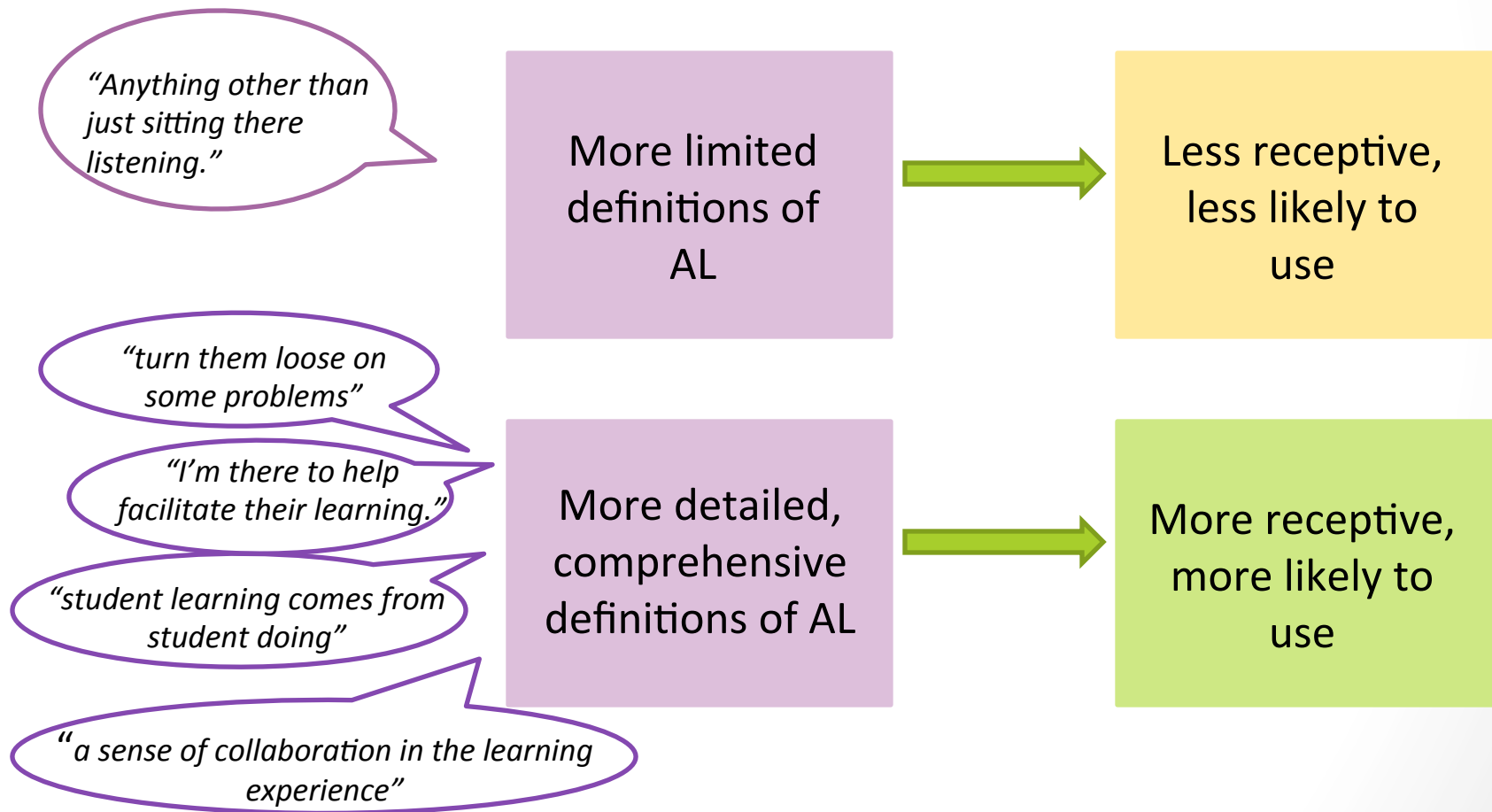
Results

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



Results

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



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

This material is based upon work supported by the National Science Foundation under Grant Nos. DUE-0817625 (Wilson) and DUE-0816642 (Bates).



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