

## The Time is Now: A Study Promoting STEM Faculty Use of Culturally Inclusive Teaching

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## Literature Review

- STEM privilege (Patton, 2016)
- Perpetuating inequities through research (Pawley, 2017)
- Disidentification with STEM (Collin, 2018)
- Culturally Inclusive Teaching practices (Milem, 2003; Salazar, Norton, & Tuitt, 2010)

## Theoretical Frameworks

- Culturally relevant pedagogy (Ladson-Billings, 1995a, 1995b, 2004)
- Culturally responsive teaching (Gay, 2002)
- Themes of Culturally Relevant Education (Aronson & Laughter, 2016)
  - Academic skills and concepts
  - Critical reflection
  - Cultural competence
  - Critique of discourses of power

## Research Questions

1. How much do faculty in STEM, compared to non-STEM faculty, emphasize CIT in their courses?
2. How does the emphasis of CIT vary by socio-demographic, academic employment status, and course characteristics in STEM fields? In what ways do these patterns compare to faculty in non-STEM fields?

## Data Source

- Secondary Data Analysis
- Faculty Survey of Student Engagement 2017
  - Instructional faculty teaching at least one undergraduate course at four-year institutions
  - Ask faculty about their use of educational practices linked with student learning and development
  - Data used for institutional improvement efforts
  - 154 four-year institutions, +24,000 respondents
- Optional topical module: Inclusiveness and Engagement with Cultural Diversity
  - 30 institutions chose this option, +4,000 respondents

## Faculty Sample (N=2,988)

### Demographics

- 75% White, 9% PNR, 5% Asian, 4% Multiracial, 3% Black or African Am., 3% Hispanic/Latino
- 48% Man, 47% Woman, <1% Gender Variant
- 98% US citizen or permanent resident

### Academic Characteristics

- 27% STEM
- 28% Full, 23% Associate, 24% Assistant, 25% Lecturer
- 61% Upper Div students
- 53% GEC

## Analyses

### CIT Scale Development

- Mapped topical module survey items to CRE framework (Aronson & Laughter, 2016)
- EFA factor loadings
- Internal reliability
- Intra-class correlation

### Research Questions

- Descriptive Statistics (RQ1)
- OLS Regression (RQ2)
  - ✓ Two models: STEM & Non-STEM
  - ✓ Standardized dependent variable (DV)
  - ✓ Dummy coded categorical independent variables (IV)
  - ✓ Reference group identified by lowest unadjusted mean

## CIT Item Set

Earlier, you answered some questions based on one particular undergraduate course section that you are teaching or have taught during this academic year. Thinking again about the course how much does it emphasize the following?

- 1a. Developing the skills necessary to work effectively with people from various backgrounds
  - 1b. Recognizing students' cultural norms and biases
  - 1c. Students sharing their perspectives and experiences
  - 1d. Exploring students' backgrounds through projects assignments or programs
  - 1e. Learning about other cultures
  - 1f. Discussing issues of equity or privilege
  - 1g. Respecting the expression of diverse ideas
- 4 = Very much  
3 = Quite a bit  
2 = Some  
1 = Very Little

## CIT Scale Development

Table 2. Inclusive Teaching Practice Item-Components, Scale Properties, and Interclass Correlation

Item prompt: Earlier, you answered some questions based on one particular undergraduate course section that you are teaching or have taught during this academic year. Thinking again about that course, how much does it emphasize the following? (4-point response options; 4=Very much, 3=Quite a bit, 2=Some, 1=Very little)

Item Components	Min	Max	Item Mean (SD)	Factor Loadings
a. Developing the skills necessary to work effectively with people from various backgrounds	1	4	2.71 (1.01)	.817
b. Recognizing students' cultural norms and biases	1	4	2.52 (1.14)	.907
c. Students sharing their perspectives and experiences	1	4	2.78 (1.08)	.853
d. Exploring students' backgrounds through projects, assignments, or programs	1	4	2.21 (1.15)	.804
e. Learning about other cultures	1	4	2.35 (1.18)	.845
f. Discussing issues of equity or privilege	1	4	2.29 (1.17)	.841
g. Respecting the expression of diverse ideas	1	4	2.85 (1.13)	.854

Cronbach's Alpha = .93  
ICC = 2.8%

## By Discipline

### STEM (n=811)

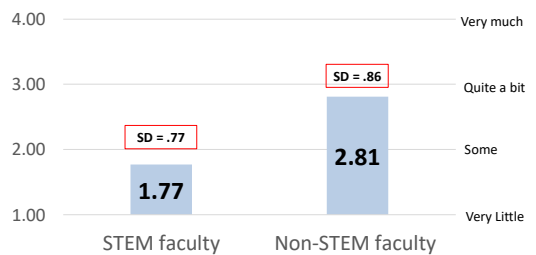
- Biological Sciences
- Ag. & Natural Resources
- Physical Sciences
- Mathematics
- Computer Science
- Engineering

### Non-STEM (n=2,177)

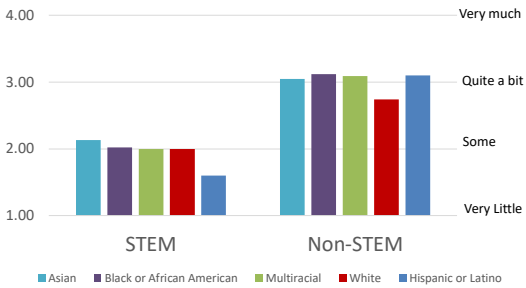
- Arts & Humanities
- Social Science
- Business
- Communications
- Health Professions
- Other fields

CRE Themes	Description	FSSE Survey Item
Academic skills and concepts	Culturally relevant educators use constructivist methods to develop bridges connecting students' cultural references to academic skills and concepts.	a. Developing the skills necessary to work effectively with people from various backgrounds b. Recognizing students' cultural norms and biases c. Sharing their perspective and experiences
Critical reflection	Culturally relevant educators engage students in critical reflection about their own lives and societies.	b. Recognizing students' cultural norms and biases d. Exploring students' background and assignments e. Learning about other cultures
Cultural competence	Culturally relevant educators facilitate students' cultural competence.	d. Exploring students' backgrounds through projects, assignments, or programs e. Learning about other cultures g. Respecting the expression of diverse ideas
Critique of discourses of power	Culturally relevant educators explicitly unmask and unmake oppressive systems through the critique of discourses of power.	f. Discussing issues of equity or privilege

## Descriptive Statistics



## Descriptive Statistics



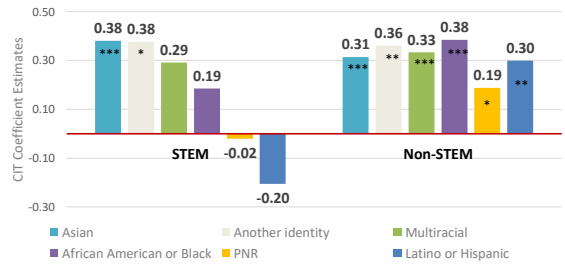
## Independent Variables

- Socio-demographics**
  - Gender identity
  - Race-ethnic identity
  - US citizenship
- Course characteristics**
  - General education requirement
  - Class size
  - Division level
- Academic characteristics**
  - Rank/Tenure

## Independent Variables

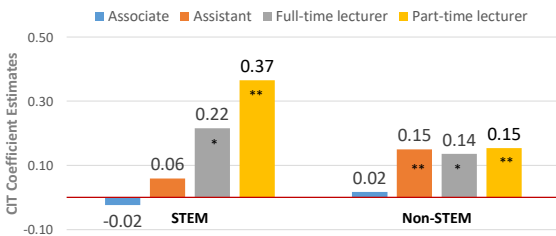
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## Model Results by Race-Ethnicity



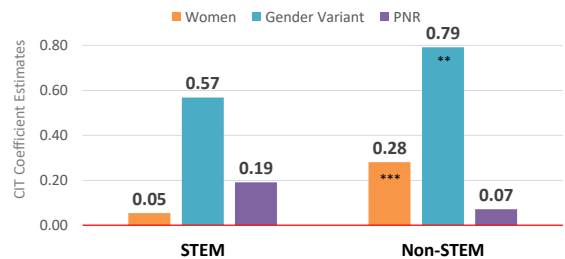
Reference group: White faculty  
 \*p-value < 0.05; \*\*p-value < 0.01; \*\*\*p-value < 0.001  
 Statistically significant coefficient estimates controlling for socio-demographics, academic, and course characteristics

## Model Results by Rank



Reference group: Full rank faculty  
 \*p-value < 0.05; \*\*p-value < 0.01; \*\*\*p-value < 0.001  
 Statistically significant coefficient estimates controlling for socio-demographics, academic, and course characteristics

## Model Results by Gender Identity



Reference group: Men  
 \*p-value < 0.05; \*\*p-value < 0.01; \*\*\*p-value < 0.001  
 Statistically significant coefficient estimates controlling for socio-demographics, academic, and course characteristics

## Discussion

- Dominant faculty are less likely to emphasize culturally inclusive teaching
- CIT doesn't appear to be a high priority in STEM
- Little variation between Hispanic/Latino, Black, and White STEM faculty
  - Perceptions of departmental climate
- Lecturers are leading the way

## Next Steps

- Room for improvement in scale development
- Identify multi-pronged solutions: institutional, department, faculty level
  - Influence of the promotion and tenure processes
  - Start early, T&L course in graduate education
  - What motivates/prevents STEM faculty in making instructional improvements? Applying culturally relevant pedagogy?

THANK YOU!

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