



Teaching At Cross-Purposes:

# Shifting Our Pedagogy Toward epiSTEMic Inclusion

James Holly, Jr.  
CISTEME365





# Table of contents

01

## Miss Me With That...

How STEM educators are  
“talking at cross-  
purposes”

02

## If You Know You Know

Problematizing the  
underlying  
epistemologies of U.S.  
STEM education

03

## Make It Make Sense

Using non-White ways of  
knowing to foster STEM  
comprehension

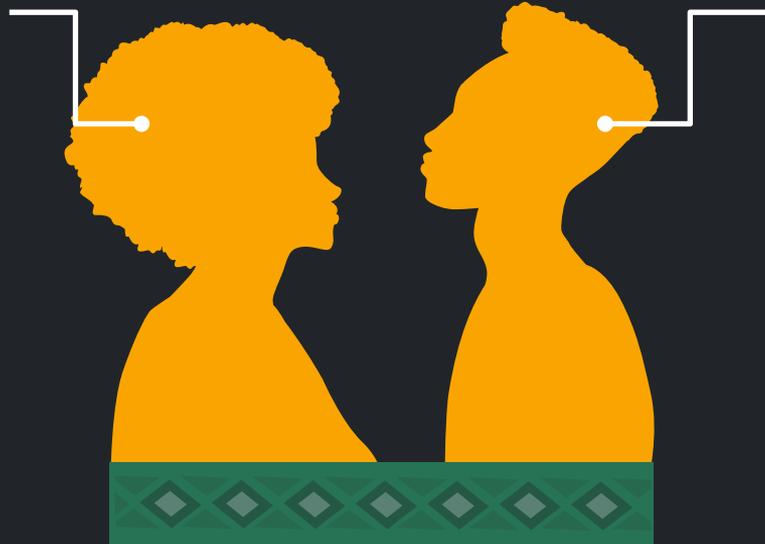
01

**Miss Me With That...**



# "Talking at cross-purposes"

...in a way that causes confusion or failure because **people are working or talking with different goals or purposes**



To talk with others in a way that **causes continued conflict, opposition, or misunderstanding** within a pair or group of people

# Different goals/purposes

individualistic – focusing on individual identity, <b>independence</b> , self-fulfillment, and standing out	collectivistic or socio-centric – focusing on group identity, <b>interdependence</b> , social responsibility, and fitting in
School as essential	School as obligation
Potential for profit	Potential for (community) impact
Solve (technological) problems	Solve (sociological) problems

There is a connection between communal goals and feelings of belonging, low motivation, and perceived poor academic performance

McKinley, E. (2016, August 08). *STEM and Indigenous learners* [Paper presentation]. Research Conference 2016 - Improving STEM Learning : What will it take?. [https://research.acer.edu.au/research\\_conference/RC2016/8august/14](https://research.acer.edu.au/research_conference/RC2016/8august/14)

Smith, J. L., Cech, E., Metz, A., Huntoon, M., & Moyer, C. (2014). Giving back or giving up: Native American student experiences in science and engineering. *Cultural Diversity and Ethnic Minority Psychology, 20*(3), 413–429. <https://doi.org/10.1037/a0036945>

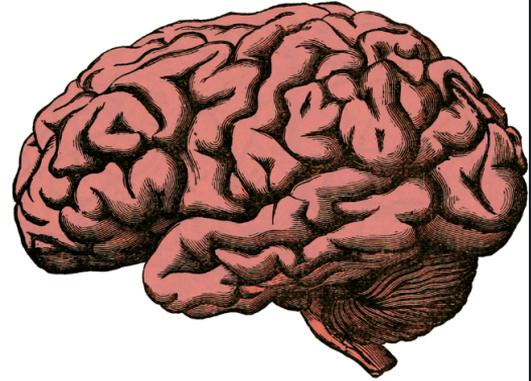
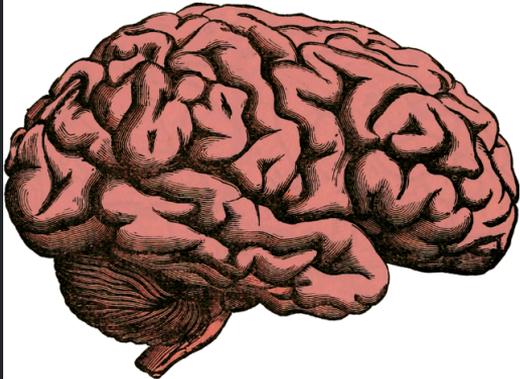
02

**If You Know You Know**



# Epistemology

the theory of knowledge, especially with regard to its methods, validity, and scope. Epistemology is the investigation of what distinguishes justified belief from opinion.



Epistemic  
access

Knowing vs. not knowing  
Types of evidence/mode of access  
Degree of certainty  
(Grounded in experience/evidence)

Epistemic  
authority

Relative right to know or claim/  
Authority of knowledge  
(Can be based on experience/socially  
constructed/discursively constructed)

Epistemic  
responsibility

Obligations/rights to have information  
(Related to experience or social/professional status)

# Reflect

**A**

Are we **providing epistemic access** for marginalized students?

**B**

Are we **affirming the epistemic authority** of marginalized students?

**C**

Are we **cultivating epistemic responsibility** in marginalized students?



**03**



**Make It Make Sense**

# Ways of Knowing/Systems of Thought

(Passed Down Through the Ages) This category asks the question, **“what kinds of systems did African peoples develop to explain their existence and how did they use those systems to address fundamental issues of living?”**

Making students aware that Africans developed their own systems of thinking about reality will allow them to **ask how Africans in the U.S. (or throughout the diaspora) have retained elements of their African identities while adapting new experiences and cultures to the challenge of living.**





“Logical positivism—the belief that science and engineering work can be separated from messy “social” concerns as long as proper scientific and engineering methods of inquiry and design are followed.” (p. 71)

—**Dr. Erin Cech, Sociology, ME**



# The Afrocentric paradigm

## Africana

- Where is STEM engaged in daily life?
- STEM has been used to oppress

## Spirituality

- How does innovation influence the interconnectedness of all life?
- Egyptian pyramids, George Washington Carver

- Who determines which problems are worth solving?
- The Engineering Grand Challenges neglect domestic disenfranchisement

## Liberation/ Humanness

# Thanks!

Do you have any questions?  
james.hollyjr@umich.edu



CREDITS: This presentation template was created by [Slidesgo](#), and includes icons by [Flaticon](#), and infographics & images by [Freepik](#)

Please keep this slide for attribution