

UC Irvine

**Collaborative Research: Investigating the
Most Impactful Culturally-responsive
Informal Pedagogical Practices for STEM
Afterschool Programs Engaging
Marginalized Youth**

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2026 AISL Awardee Meeting (Award #2215695)



Research



Math CEO

Ice Breaker

Please answer via the Zoom poll:

1. What area of informal STEM do you work in?
2. Have you heard of “culturally responsive practices”?



Background: Afterschool Activities

- **Organized afterschool activities** hold promise as structural supports.

(Krishnamurthi et al., 2014)

- Afterschool activities provide **enriching experiences** that complement and enhance formal education.

(Vandell & Simpkins, 2024)

- Participation has been associated with numerous **positive outcomes**.

(e.g., Durlak et al., 2010; Mahoney et al., 2005; Seitz et al., 2022; Vandell et al., 2020)

- However, more research is needed to understand how to make them effective, empowering spaces for **all youth**.

Background: Culturally Responsive Practices



- Learning is **cultural**.
(Cole, 2002; Vygotsky, 1978)
- Culturally responsive practices **affirm** youths' backgrounds, experiences, and funds of knowledge.
(Gay, 2018; Ladson-Billings, 1995, 2005)
- Most research focuses on classrooms, with limited attention to afterschool spaces.
(Simpkins et al., 2016)
- Without attention to cultural responsiveness, activities risk **reinforcing existing disparities**.
(Ettekal et al., 2020; Lin et al., 2016)

Culturally Relevant Pedagogy

Academic
Success

Cultural
Competence

Critical
Consciousness

Ladson-Billings, 1995

Culturally Responsive Teaching



Educators'
Attitudes and
Beliefs

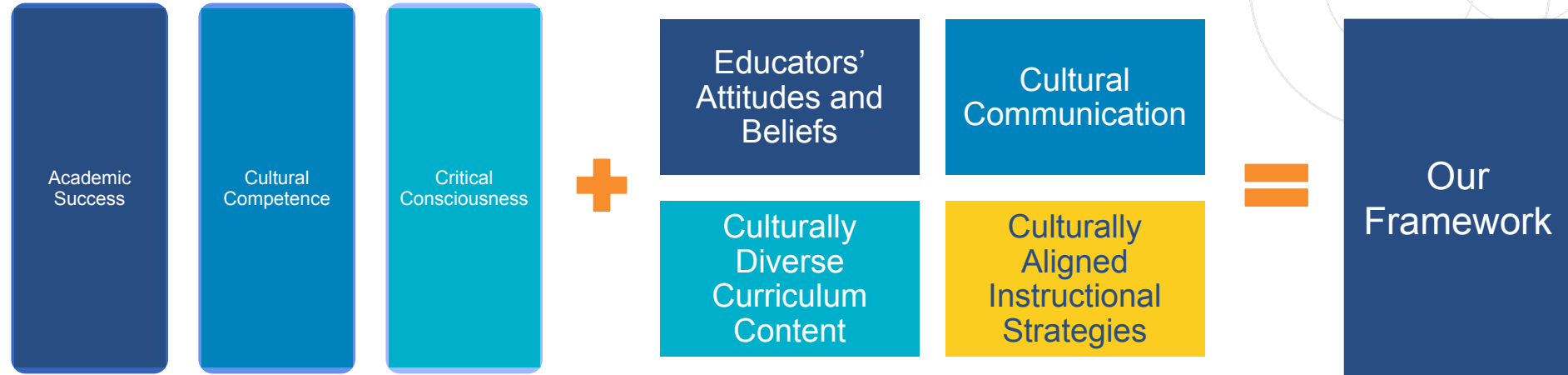
Cultural
Communication

Culturally
Diverse
Curriculum
Content

Culturally
Aligned
Instructional
Strategies

Gay, 2018

A New Framework for Organized Afterschool Activities



Gay, 2018; Ladson-Billings, 1995

Culturally Responsive Practices in Afterschool Activities

Caring & Inclusive Relationships

1. Demonstrating an ethic of caring

Cultural & Linguistic Affirmation

2. Affirming diverse language and communication preferences
3. Promoting cultural knowledge and appreciation

Empowerment & Engagement

4. Empowering youth
5. Having high expectations
6. Centering youth's knowledge and ways of doing things

Relevance and Real-World Connection

7. Making the activity content relevant
8. Solving problems and addressing inequities

Culturally Responsive Pedagogy (Ladson-Billings, 1995, 2021; Gay, 2018)

Research Context

Math Community Educational Outreach

- After-school math enrichment activity
- University-Community partnership located at UCI
- Serves students from low-performing under-resourced middle schools in Santa Ana
- 1x week, middle school students work with undergraduate mentors on enriching team-based math activities



Goals of the Grant



Develop a new framework



Develop new survey measures



Develop staff training materials

Qualitative Measures & Analyses

- In-person interviews conducted during activity hours in winter/spring quarters of 2024
- Approx. 15-20 minutes each
- Interview section of analysis included 5 questions (e.g., “What strategies do Math CEO mentors use to help you learn math?”)
- Audio recorded, transcribed verbatim
- Deductive and inductive coding by first and second authors, followed by consensus-building discussions to reconcile interpretations

Qualitative Results

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Demonstrating an Ethic of Caring

- Humor
- Kindness
- Patience
- Encouragement
- Guidance (problem solving)
- Teaching math strategies

“I appreciate the fact that they explain it more to me and **they encourage me** and they don’t judge if I get an answer wrong and they explain what I did wrong.”

“They’re like, **they’re calm** with us. They don’t, **they don’t** like, **lose their temper** with us.”

Centering Youth's Knowledge and Ways of Doing Things

- One-on-one focus
- Collaboration
- Grade-level learning
- Guidance (problem solving)
- Youth led
- Youth oriented

“They just use all kinds of strategies. It’s easier to understand...they make it more understandable...if you get it wrong they don’t just call on someone else like **they focus on you.**”

Promoting Cultural Knowledge and Appreciation

- Cultural relevance

“I just care about coming here and **learning about different things, cultures** and other stuff on **how to use their techniques** on math, measurement, or science or whatever.”

“they helped us learn on how to measure stuff not just by saying this is how but by showing us and **doing it how the Hawaiian people would do it.**”

Reflections

**Which part of the framework
feels most relevant to your work?**

Which part of the framework feels most relevant to your work?

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Research

Thank you!

Any questions?

Contact: twycoff@uci.edu



Math CEO

Next Up: *Peer-to-Peer Session tomorrow, **2/26/26 @ 1:15-2:05 EST** with Dr.'s Cynthia Sanchez Tapia and Alessandra Pantano*
Session E