Journey to “Anti-deficit Narratives”

Adi Adiredja
Associate Professor
The University of Arizona

13 March 2023 – MSU PRIME Colloquium
What I Nerd Out On?

1. How do social narratives impact our work with students and teachers, and how do we challenge deficit narratives in mathematics education?

2. What role does everyday intuition and ideas from everyday lives play in the learning and teaching of formal mathematics?
Where do I fit?

EQUITY

E+C

C+R

COGNITION

E+R

E+C+R

RUME

White Supremacy

US Imperialism

Ableism

Heteropatriarchy

Capitalism

Anti-deficit narratives: Engaging the politics of mathematical sense making (Adiredja, 2019)

The lived experience of linear algebra: A Counter-story about women of color in mathematics (Adiredja & Zandieh, 2020)

Students’ “struggles” with temporal order in the limit definition: Uncovering resources using Knowledge in Pieces (Adiredja, 2020)
Timeline: Equity in RUME

Feb 2015
Conceptualizing Equity in Undergrad Math Ed – RUME Proceedings

Feb 2017
Taking the Sociopolitical Turn in Post-secondary Mathematics Education – IJRUME

August 2014
Dissertation: Leveraging Intuitive Knowledge in Limit Formal Definition

2012 - 2014
The murders of Trayvon Martin and Michael Brown & the start of BLM movement
Timeline: Anti-deficit Narratives

- **Nov 2015**: Exploring the Role of Cognitive Studies in Equity -- PMENA Proceedings
- **August 2014**: Dissertation: Leveraging Intuitive Knowledge in Limit Formal Definition
- **2015**
- **2016**
- **2017**: Building on Misconceptions and Intuitions -- Towards Equity and Social Justice in Mathematics Education
- **2018**: JRME Accept
- **March 2019**: Web of Deficit Discourse -- FLM
- **2019**
- **2020**
- **July 2018**: Anti-deficit Narratives: Engaging Politics -- JRME
- **July 2019**: Cognition, Equity, & Interdisciplinarity -- Handbook of Maths and Arts Sciences
- **Jan 2020**:
Timeline: Lived Experience of Linear Algebra

2014 - 2016
Hidden Figures & Black Girl Magic

2015

August 2014
Dissertation: Leveraging Intuitive Knowledge in Limit Formal Definition

2016

Feb 2016
ESM Data Collection

Feb 2017
Using intuitive examples from women of color – RUME Proceedings

2017

Feb 2018
ESM Accept w Revisions

2018

2019

2020

Feb 2020
Lived Exp of Linear Algebra: A Counterstory about Women of Color – ESM
Did I change direction in my research?
Did I experience an awakening?
A cognitive exorcism, perhaps?
Q: How did it develop?

- **Feb 2015**: Conceptualizing Equity in Undergrad Math Ed – RUME Proceedings
- **Nov 2015**: Exploring the Role of Cognitive Studies in Equity – PMENA Proceedings
- **Feb 2017**: Taking the Sociopolitical Turn in Post-sec Math – IJRUME
- **Jan 2018**: JRME Accept
- **Feb 2018**: ESM Accept
- **Feb 2020**: Lived Exp of Linear Algebra: A Counterstory - ESM

- **August 2014**: Dissertation: Leveraging Intuitive Knowledge in Limit Formal Definition
- **Feb 2016**: ESM Data Collection
- **Feb 2017**: Using intuitive examples from women of color – RUME Proceedings
- **March 2019**: Web of Deficit Discourse - FLM
- **July 2019**: Anti-deficit Narratives: Engaging Politics - JRME
How did I do it?

1. I found co-authors, co-conspirators, community, mentors.

2. I read, read, and read.

3. I chose not to ignore the life and my life outside.

4. I am not "the best thing since sliced bread"

5. I took care of my golden egg and told the story from my perspective.
We’re Not in Kansas Anymore

Anti-deficit Learning and Teaching (Adelante):
Community Learning Project Centering Race, Gender and Mathematics

DUE-2021313 IUSE
LEAD-PI: ADITYA ADIREDDJA
CO-PI: MARTA CIVIL
Main Components of the Project

- Four Professional Development meetings focusing on Inquiry Based Learning and understanding Deficit Narratives
- One week math summer workshop in Pre-Calc, Calculus, and Linear Algebra
- Individual coaching and observation
- Five Critical Conversations about Race and Gender in STEM
- Instructor-led Student Interview
Thank you!
Research Question

What role might the instructor-led student interview play in changing narratives about students?
Data Source

- The end of summer workshop survey
  - student description
- Recording of the instructor-led interview
- Group reflections about the experience of interviewing a student
  - “surprise” question
Literature and Theoretical Framing

- Culturally Relevant Pedagogy: content, cultural competence, and political consciousness (Ladson-Billing, 1995)
- Funds of Knowledge: the focus on shifting narrative by home visits (Moll et al., 1992)
- Novel use of interview about students, and not just the mathematics (cf. CGI)
- Socioecological Perspective: individual bias vs. systems perspective (Louie and Zhang, 2023)
- The Anti-deficit Framework (Adiredja, 2019)
Anti-deficit Framework Analysis

- Is the subject implicated in deficit narratives?
- Focus and attribution analysis
  - Focus on deficits and strengths, or just deficits?
  - Attribution to the student’s character?
- Explicit articulation of deficit interpretation and counter-story

“A deficit perspective presumes that without intervention, students’ understanding of mathematical ideas would be flawed”

(Adiredja, 2019)
The case of Zaynah

Post workshop, Zaynah described Maria (Hispanic woman) as,

“very weak in basic skills at first and would typically sit back and wait for others to solve each problem without trying them for herself”

“when pushed to try and encouraged to share her ideas, though, she often had very good ideas that the others hadn't thought of”
Did anything surprise you?

Zaynah: I'm not sure if anything surprised me... She did strike me as very **focused**. She was very clear about what she wanted to do. And had gone through the work and the background research to figure out what major she needed to do to be able to do [forensics] later in her life. She figured this out /.../ as a high school student before coming to school. She found the right people to talk to and get the right information to choose the right major. She seems to be quite happy about what she's doing and very excited about her future. I thought that was **very impressive**, especially as a freshman.
Did anything surprise you?

Adi: And you did know that before?

Zaynah: I did not know that before

Zaynah: [In the workshop] She was just kind of there. She was friendly and she was participating. She's not majoring in math, and that's right for her. But she did have this strong focus and interest. And she's got goals and she's got ideas. She's gonna go follow them. And she can and will do the math but that's not her thing. That's cool.
Zaynah’s Description of Maria

Post Workshop
- “very weak in basic skills”
- “would typically sit back and wait for others to solve each problem without trying them for herself”
- “When pushed to try and encouraged to share her ideas, though, she often had very good ideas that the others hadn’t thought of”

Post Interview
- “very focused”
- “very clear about what she wanted to do”
- “happy about what she's doing and very excited about her future,” which was “very impressive”
- “strong focus and interest”
- “she had this passion that I knew nothing about”
- “she can and will do the math but that's not her thing”
Anti-deficit Analysis

Zaynah’s new story as an anti-deficit story:
1. Almost exclusively focused on Maria’s assets
2. It acknowledges and explicitly counters Zaynah’s prior characterization of Maria as a student (i.e., lack of initiative to focused and passionate)
3. The new story reframes Maria’s mathematical skill (“weak algebra skill”) as something that Maria would be able to develop (“she can and will do the math”)
Dismantling Deficit Story about Zaynah

**Deficit story:** A deficit-oriented instructor who changed as a result of the study intervention, i.e., the interview experience.

- Zaynah is not a deficit-oriented instructor. Her description of other students in her class—all women of color—were very positive, with no mention of deficits.
- Successful intervention vs. membership in a community of practice (socio-ecological perspective)
Takeaways

- Instructor-led student interview for a counter-story
- Funds of Knowledge (in RUME)
- Not accepting simple narratives
Thank you!

Email: adiredja@math.arizona.edu