



The Praxis of Ethnic Studies Mathematics & Ontological Playgrounds of Youth Liberation

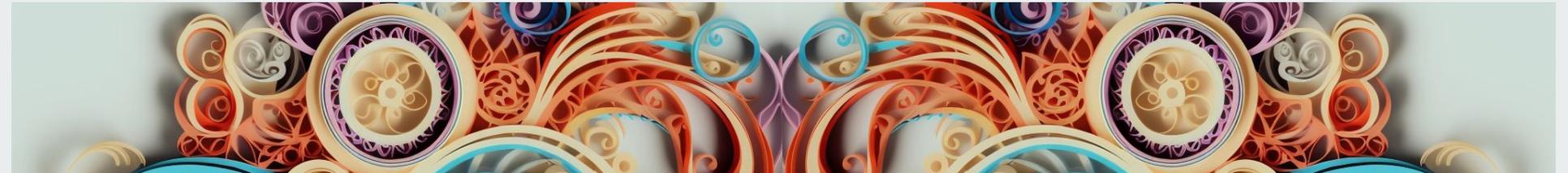
Presented by:

Dr. Ricardo Martinez

Assistant Professor

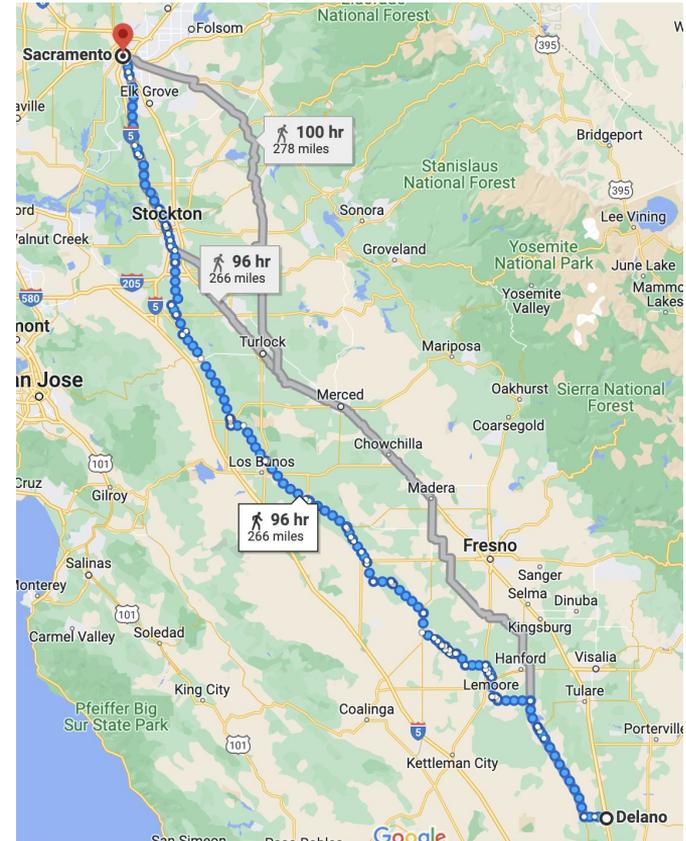
Pennsylvania State University

October 11, 2023



Lived History

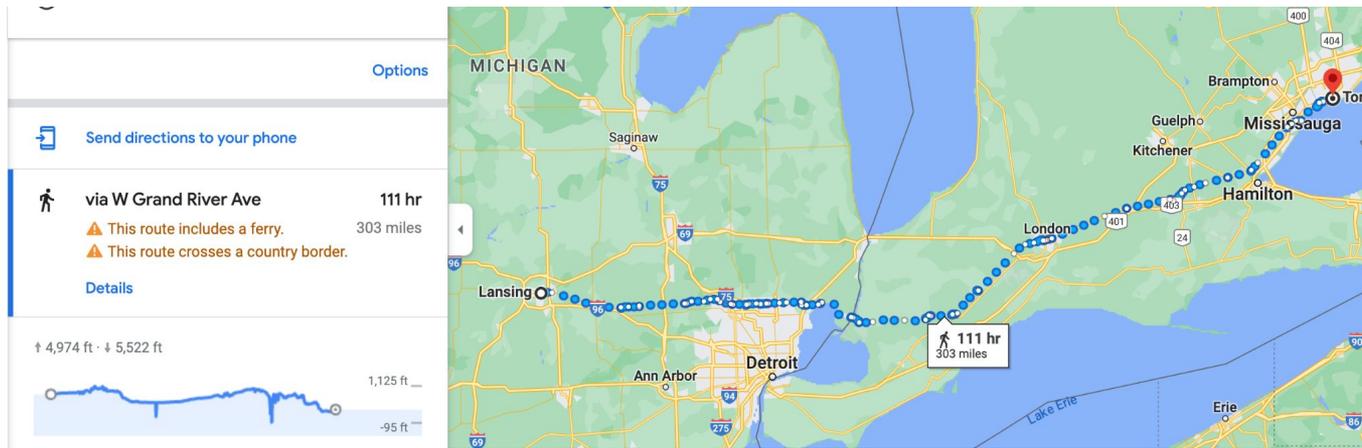
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Remixed Future

Lived History

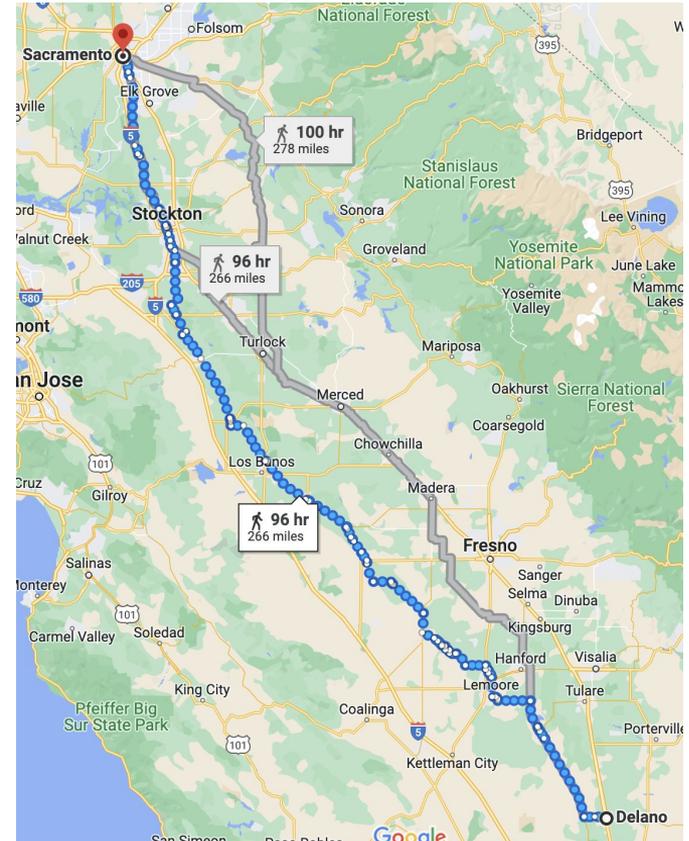
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Remixed Future

Lived History of the Land

PROVISIONAL LAND ACKNOWLEDGEMENT

We collectively acknowledge that Michigan State University occupies the ancestral, traditional, and contemporary Lands of the Anishinaabeg – Three Fires Confederacy of Ojibwe, Odawa, and Potawatomi peoples.

The Pennsylvania State University campuses are located on the original homelands of the Erie, Haudenosaunee (Seneca, Cayuga, Onondaga, Oneida, Mohawk, and Tuscarora), Lenape (Delaware Nation, Delaware Tribe, Stockbridge-Munsee), Monongahela, Shawnee (Absentee, Eastern, and Oklahoma), Susquehannock, and Wahzhazhe (Osage) Nations. As a land grant institution, we acknowledge and honor the traditional caretakers of these lands and strive to understand and model their responsible stewardship. We also acknowledge the longer history of these lands and our place in that history.

Our First Teacher

Lived History of the Land

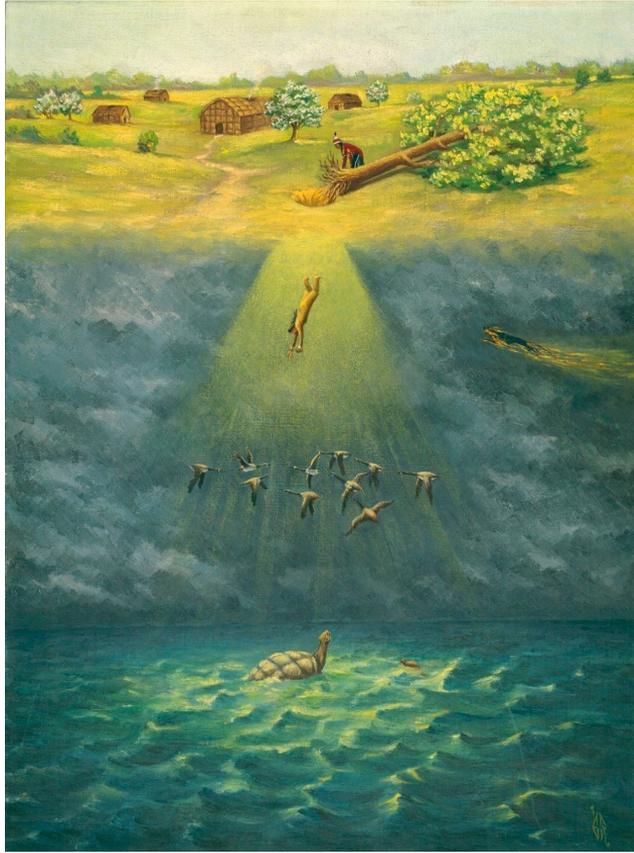
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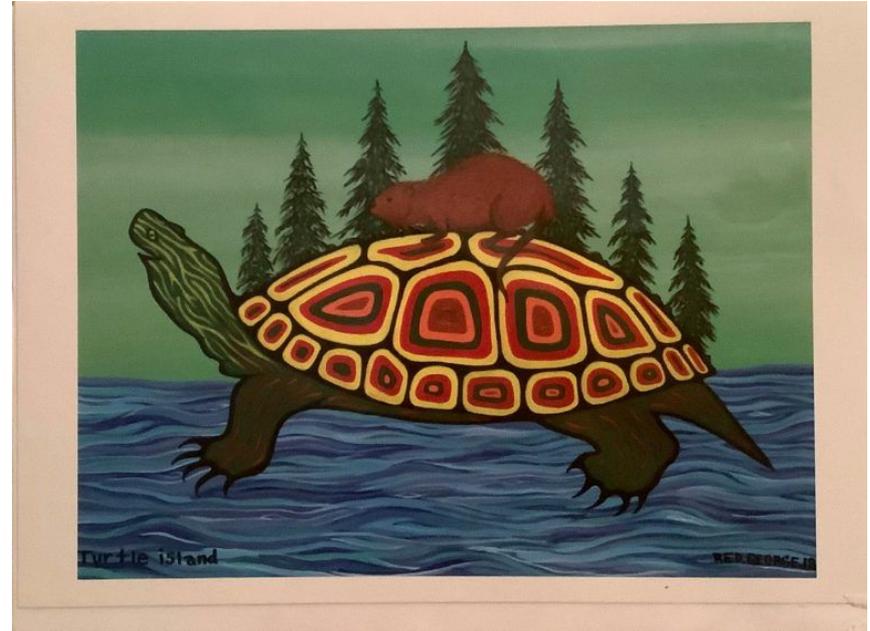
Our First Teacher

Lived History of the Land



Sky Woman (1936), by Seneca artist Ernest Smith, depicts the story of Turtle Island

Turtle Island by Jeffrey George



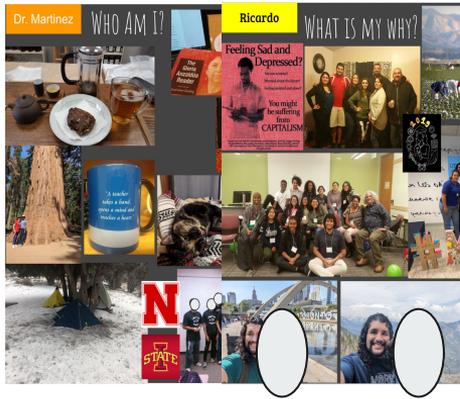
Our First Teacher

Lived History of Me



Who am I - What's My Why

Mathematics is the lived history of Me, You, and the Land



Interconnectedness



"Many of my teachers want to put labels on me and fit me into nice, neat categories that allow them not to think too much of who I am and what I can be, just where I belong - or where they think I belong. " High School Student Jasmine Medina (Irizarry, 2011)

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“Though inclusive of formal academic training, educación additionally refers to competence in the social world, wherein one respects the dignity and individuality of others. (Valenzuela, 1999, p.23)”

Ethnic Studies

“Ethnic Studies is an interdisciplinary field that begins with the assumption that race and racism have been and will continue to be strong social and cultural forces in American society (Hu-Dehart, 1993). It builds on the pioneering work of Carter G Woodson (1933) and W.E.B. Du Bois (1903), Third World movements for decolonization (Fanon, 1963), Black independent schools and Afrocentric public schools, and tribal schools (Sleeter, 2011) (p.180)”.

“Ethnic Studies, as a field, is very broad and critical in that it seeks to deconstruct the forces that contribute to the normalizing of racialized inequity and in that it also seeks to affirm and include multiple voices, perspectives, and artifacts within the corpus of sanctioned knowledge (p.181).”

Ethnic Studies

“What is ethnic studies? First, the field is distinct from global or international studies, particularly those programs known generally as “area studies,” with which ethnic studies is often compared and confused. Area studies programs arose out of American imperialism in the Third World and bear names such as African studies, Asian studies, and Latin American studies.”

“Ethnic studies programs, which grew out of student and community grassroots movements, challenge the prevailing academic power structure and the Eurocentric curricula of our colleges and universities. These insurgent programs had a subversive agenda from the outset; hence they were suspect and regarded as illegitimate even as they were grudgingly allowed into the academy.”

Ethnic Studies

Ethnic studies includes units of study, courses, or programs that are centered on the knowledge and perspectives of an ethnic or racial group, reflecting narratives and points of view rooted in that group's lived experiences and intellectual scholarship. Ethnic studies arose as a counter to the traditional mainstream curriculum (Sleeter, 2011 p.vii).

“In Tucson, Arizona, ethnic studies has been a strategy to develop critical consciousness despite the oppressive context of schooling. Because ethnic studies challenges the educational function of sorting students into racial hierarchies (Cammarota p.234)”

Cammarota, J. (2016). The praxis of ethnic studies: Transforming second sight into critical consciousness. *Race Ethnicity and Education*, 19(2), 233-251.

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Educación



Ethnic Studies



Bill Whitfield, Black Panther Party Free Breakfast before school program

Revolutionary by Nature

Ethnic Studies



Bill Whitfield, Black Panther Party Free Breakfast before school program

YOUNG LORDS PARTY 13 POINT PROGRAM AND PLATFORM

1. We want self-determination for Puerto Ricans—Liberation of the Island and inside the United States.

6. We want a true education of our Creole culture and Spanish language. We must learn our history of fighting against cultural, as well as economic genocide by the yanqui. Revolutionary culture, culture of our people, is the only true teaching.

13. We want a socialist society.

May 1970

Revolutionary by Nature

Ethnic Studies



Bill Whitfield, Black Panther Party Free Breakfast before school program



L.A. Walkouts

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Late News

Associated Press Leased Wires

The Bee

Durham, Va., Monday Afternoon, May 17, 1954

FOR ALL DEPARTMENTS CALL
4500

South Being Tried

MEMPHIS, Va. (AP)—A man in the state capital today was accused of plotting to murder a Negro minister in the state capital.

The man, a white man, was charged with plotting to murder the Rev. Martin Luther King Jr. in Memphis, Tenn., last year.

The man was charged with plotting to murder King in the state capital.

SEGREGATION IN PUBLIC SCHOOLS ENDED BY COURT

Firm Entered, Paroled Slayer

Haul Is Made; Boy Wounded

Man Accidentally Shot In The Hand

Held For Four Brutal Killings

Ruled Unconstitutional

By Supreme Court; Date To End Practice Not Set

Rules Separate Facilities Are Unequal

Danville School Board Will Meet At Once To Study Court Decision

McCarthy-Army Hearings' Future Thrown In Doubt

Presidential Order Shutting Off Inquiry Denounced By Sen. McCarthy

Strike Called

...of the ...

Officials Give Views On Matter; Call For Calm Study On All Sides

...of the ...

Good Progress

...of the ...

Revolutionary by Nature

Ethnic Studies



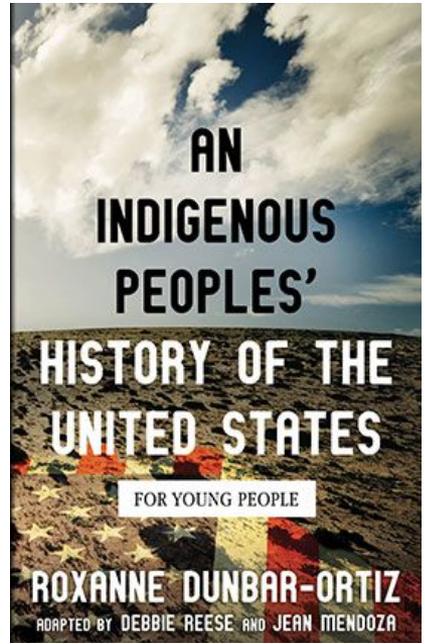
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Revolutionary by Nature

Late News

6th Year

Associated Press
Leased Wires

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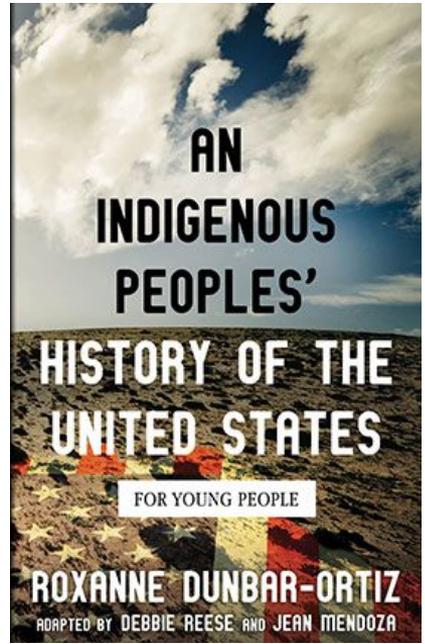
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Revolutionary by Nature

Late News

5th Year

Associated Press
Leased Wires

The Bee

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FOR ALL DEPARTMENTS CALL
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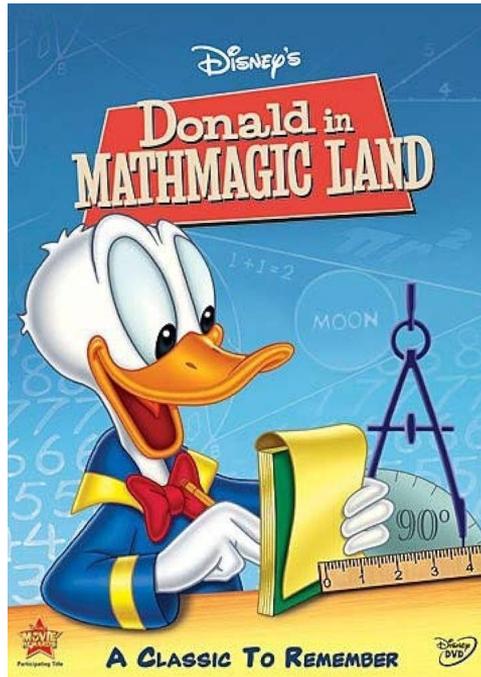
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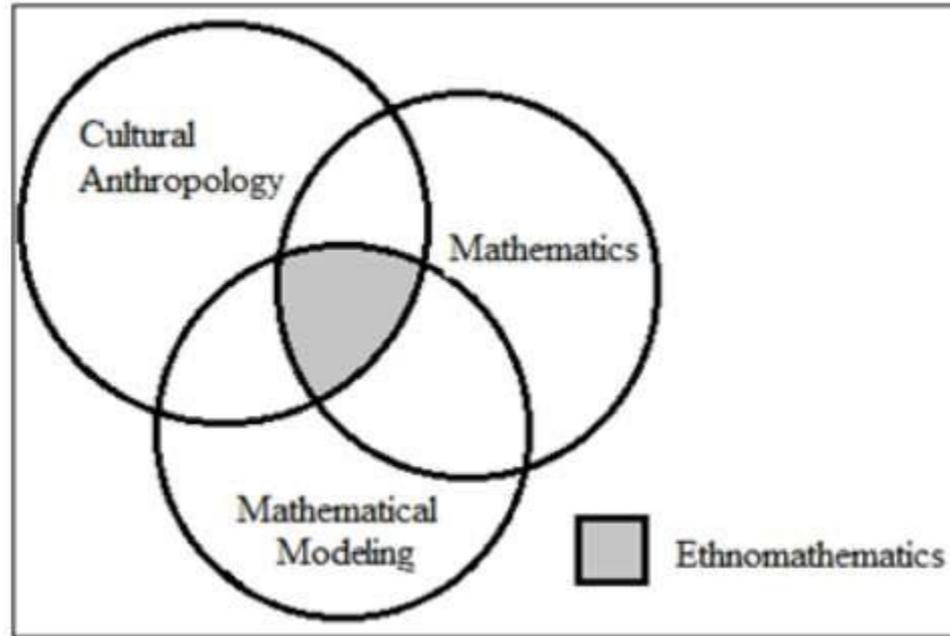
Keep this slide as a reminder to take a drink of water.
If the session is not going how you want - fake an injury

The image below is just for fun or is it



What about Ethnomathematics?

"ethnomathematics is used to express the relationship between culture and mathematics" (d'Ambrosio, 2001, p. 308).



D'Ambrosio, U. (2001). What is ethnomathematics, and how can it help children in schools?.

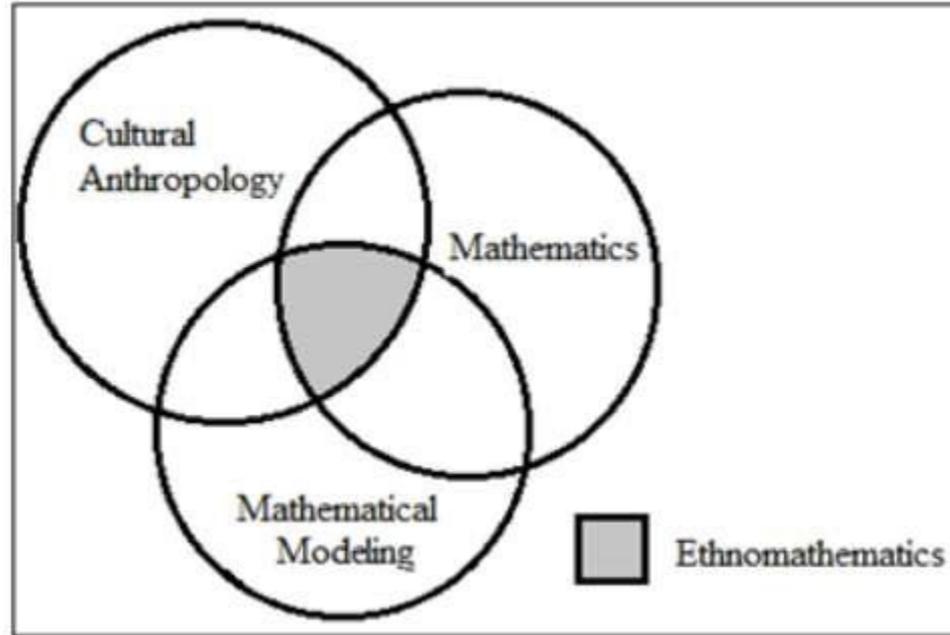
Teaching children mathematics, 7(6), 308.a

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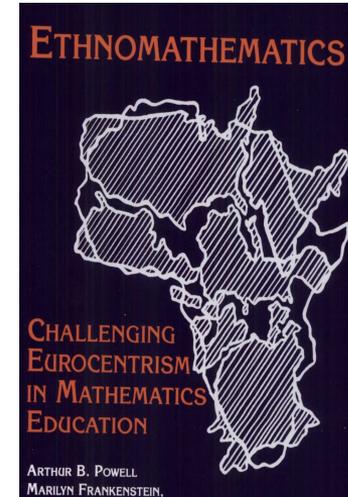
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"ethnomathematics is used to express the relationship between culture and mathematics" (d'Ambrosio, 2001, p. 308).

Ethnomathematics, to include the mathematical ideas of peoples manifested in written or non-written, oral or non-oral forms, many of which have been either ignored or otherwise distorted by conventional histories of mathematics (Powell & Frankenstein, 1997,p. 9).



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Is it Ethnic Studies?

Ethnomathematics is about Peace?

"ethnomathematics is used to express the relationship between culture and mathematics" (d'Ambrosio, 2001, p. 308).



“Peace must be understood in its multiple dimensions:

- inner peace
- social peace
- environmental peace
- military peace.

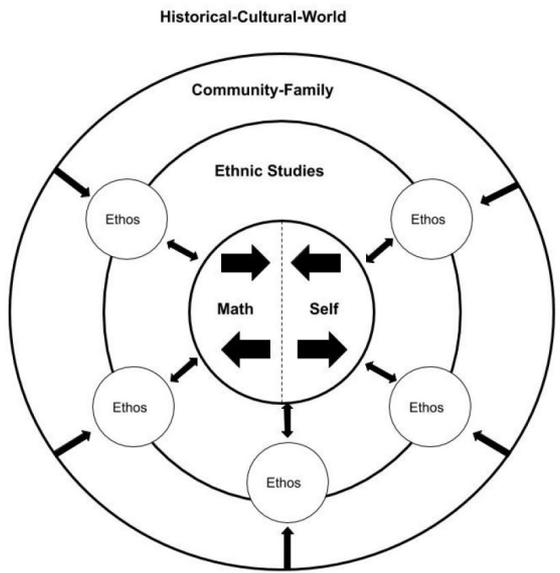
The Program Ethnomathematics, ... , is a response to this.

Ethnic Studies Mathematics

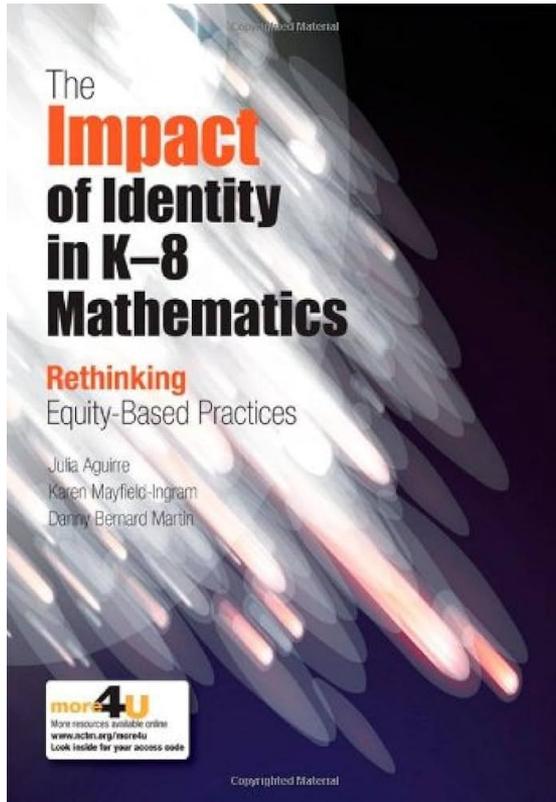
Table 1
Ethos of Ethnic Studies Mathematics

Ethos	Description
Identities, Narratives & Agency	Identity, Narratives, and Agency in mathematics, as defined by ethnic studies, are the ways in which we view and learn about ourselves as mathematical beings that go beyond the dominant narrative. This requires an intentional grounding of pedagogies and curriculum on counter-narratives that offer historical accounts, interpretations, and cultural practices of communities of color. As mathematical beings, our humanity is tied to our ancestors, to each other, and to our relationship with the natural world defined by mathematics.
Power & Oppression	Power and Oppression in mathematics, as defined by ethnic studies, is the acknowledgement of the coercive powers that have historically been used to silence and disrupt the liberation of peoples of color. Dismantling hegemonic structures requires naming them, questioning their existence, and then envisioning and working toward alternatives. The internalization of our <i>true</i> mathematical identities as a tool against coercion and disenfranchisement is our power.
Community & Solidarity	Community and Solidarity in mathematics, as defined by ethnic studies, see mathematics as integral to activist movements for social justice. Ethnic studies is a process that connects learning to the community and to the real world, acknowledging the situated, embodied, and collective nature of learning and change. Mathematics learning is not just experienced cognitively; it is a process that is lived, engraved in students' bodies and memories, and shaped by our histories, ancestors, and communities.
Resistance & Liberation	Resistance and Liberation in mathematics, as defined by ethnic studies, is the determination to resist & disrupt oppression. Ethnic studies mathematics projects engage critical consciousness that moves toward praxis—students take action at the individual and/or community level to create change in the world using mathematics. Peoples of color find empowerment in the internalization of their own mathematical identities.
Intersectionality & Multiplicity	Intersectionality and Multiplicity in mathematics, as defined by ethnic studies, explicitly examines tensions at the intersections of identities and attends to broader sociohistorical discourses that are at work. Rather than conceptualizing identities as fixed and essentialized, identity is seen as a fluid, temporal spectrum shaped by sociohistorical context.

Ethos of Ethnic Studies: Interconnectedness



Ethnic Studies Mathematics



Excerpt from *The Wrong Bathroom, Continuously* by Yusuf Kara

I am a continuous function.

I oscillate My gender, in constant motion, And I don't care if I am unrecognizable to you

*I approach both infinities From the left and the right
Expanding with each self discovery. Expanding far beyond
your comprehension*

*I am disjointed Deconstructed and decolonized. I teleport
between and beyond genders You cannot pin me down to a
single point*

Aguirre, J., Mayfield-Ingram, K., & Martin, D. B. (2013). *The impact of identity in K-8 mathematics learning and teaching: Rethinking equity-based practices*. National Council of Teachers of Mathematics, Incorporated.

Identity, Narratives, Agency

Black American Racial Identity (William Cross)

1. **PRE-ENCOUNTER:** absorbed many beliefs and values of the dominant white culture, including the notion that “white is right” and “black is wrong”; de-emphasis on one’s racial group membership; largely unaware of race or racial implications
2. **ENCOUNTER:** forced by event or series of events to acknowledge the impact of racism in one’s life and the reality that one cannot truly be white; forced to focus on identity as a member of a group targeted by racism
3. **IMMERSION/EMERSION:** simultaneous desire to surround oneself with visible symbols of one’s racial identity and an active avoidance of symbols of whiteness; actively seek out opportunities to explore aspects of one’s own history and culture with support of peers from one’s own racial background

Identity, Narratives, Agency

4. **INTERNALIZATION:** secure in one’s own sense of racial identity; pro-black attitudes become more expansive, open, and less defensive; willing to establish meaningful relationships with whites who acknowledge and are respectful of one’s self-definition
5. **INTERNALIZATION-COMMITMENT:** found ways to translate one’s personal sense of blackness into a plan of action or a general sense of commitment to concerns of blacks as a group, which is sustained over time; comfort with one’s own race and those around them

Identity, Narratives, Agency

Filipino American (Nadal)

1. **ETHNIC AWARENESS:** neutral or positive feelings about all ethnic groups, including one's own; little exposure to prejudice
2. **ASSIMILATION TO DOMINANT CULTURE:** views only whites as positive, negative toward other ethnicities
3. **SOCIAL POLITICAL AWAKENING:** negative views toward whites, positive toward other ethnicities
4. **PAN-ETHNIC ASIAN AMERICAN CONSCIOUSNESS:** partiality toward Asian Americans
5. **ETHNOCENTRIC REALIZATION:** views oneself and other communities of color as empowering
6. **INCORPORATION**

Ethnic Minority (Berry)

1. **ASSIMILATION:** valuing the majority culture over one's own culture
2. **SEPARATION:** preserving one's culture while withdrawing from the majority culture
3. **MARGINALIZATION:** losing cultural contact and identification with one's culture as well as the majority culture
4. **INTEGRATION:** valuing and integrating one's culture as well as the majority culture

Biracial (Poston)

1. **PERSONAL IDENTITY:** sense of self unrelated to ethnic grouping; occurs during childhood
2. **CHOICE OF GROUP:** as a result of multiple factors, individuals feel pressured to choose one racial or ethnic group identity over another
3. **CATEGORIZATION:** choices influenced by status of the group, parental influence, cultural knowledge, appearance
4. **ENMESHMENT/ DENIAL:** guilt and confusion about choosing an identity that isn't fully expressive of all their cultural influences; denial of differences between the racial groupings; possible exploration of the identities that were not chosen in stages 2 and 3
5. **APPRECIATION:** of multiple identities
6. **INTEGRATION:** sense of wholeness, integrating multiple identities

Identity, Narratives, Agency

Resolutions of Biracial Identity Tensions (Maria P.P. Root)

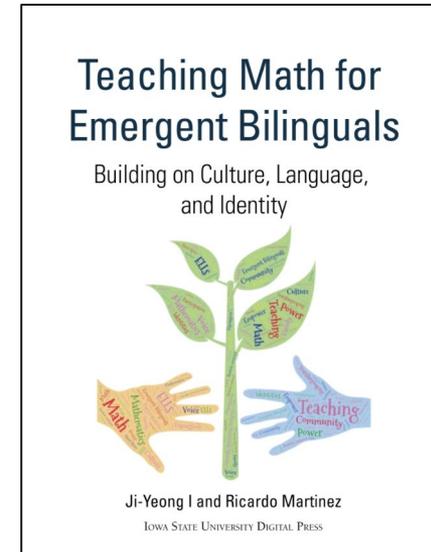
1. **Acceptance of the identity society assigns:** identifying with the group into which others assume the biracial individual most belongs, usually with family support
2. **Identification with both racial groups:** Identify with both (or all) heritage groups, depending on social and personal support
3. **Identification with a single racial group:** Choosing one group, independent of social pressure, to identify himself or herself in a particular way
4. **Identification as a new racial group:** Move fluidly among racial groups but identifies most strongly with other biracial people, regardless of specific heritage backgrounds

1. **CONTACT:** In the first stage of contact, the individual adheres to the “colorblind” motto. They see racial difference but do not find it salient and in fact may feel that racism is in fact propagated by the discussion and acknowledgement of race as an issue. In this stage, there is no conscious demonstration of racism here. This seemingly non-racist position can cover unconscious racist beliefs. If the individual is confronted with real-world experiences or knowledge that uncovers the privileges of White skin, they may move into the disintegration stage.
2. **DISINTEGRATION:** In this stage, because the person has new experiences which confront his prior conception of the world and because this conception is now challenged by this new information or experience, the person is often plagued by feelings of guilt and shame. These emotions of guilt and shame can be modified when the person decides to channel these emotions in a positive way but when those emotions continue to dominate, the person may move into the reintegration stage.
3. **REINTEGRATION:** This stage is marked by a “blame-the-victim” attitude that’s more intense than anything experienced in the contact stage. They may feel that although Whites do have privileges, it is probably because they deserve them and in are in
3. **REINTEGRATION:** This stage is marked by a “blame-the-victim” attitude that’s more intense than anything experienced in the contact stage. They may feel that although Whites do have privileges, it is probably because they deserve them and in are in some way superior to minority groups. If the person is able to combat these feelings, they maybe able to move on to the pseudo-independence stage
4. **PSEUDO-INDEPENDENCE:** This is the first stage of positive racial identification. Although an individual in this stage does not feel that Whites deserve privilege, they look to people of color, not themselves, to confront and uncover racism. They approve of these efforts and comfort the person as these efforts validate this person’s desire to be non-racist. Although this is positive White racial identity, the person does not have a sense of how they can be both White and non-racist together.
5. **IMMERSION/EMERSION:** In this stage, the person makes a genuine attempt to connect to his/her own White identity and to be anti-racist. This stage is usually accompanied by deep concern with understanding and connecting to other Whites who are or have been dealing with issues of racism.
6. **AUTONOMY:** The last stage is reached when an individual has a clear understanding of and positive connection to their White racial identity while also actively pursuing social justice. Helms’ stages are as much about finding a positive racial identification with being White and becoming an active anti-racist.

Ethnic Studies Mathematics



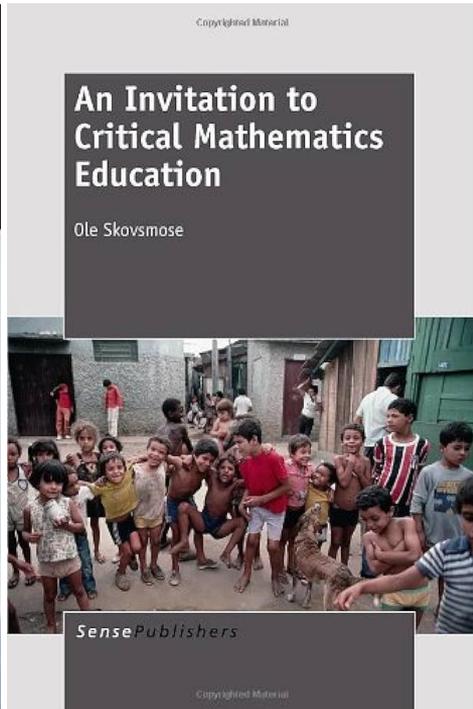
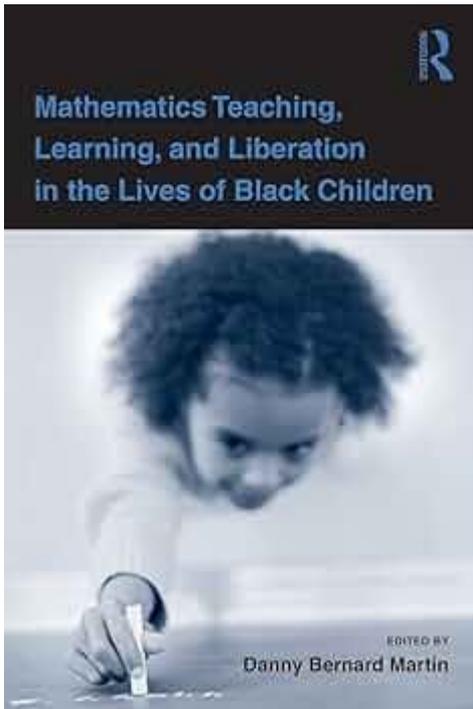
“Teachers may not realize that selecting a problem’s context is powerful. For EBs, we need to make sure the problem’s context is void of any cultural bias because the last thing we want is the problem to force EBs to shut down, disengaging them from learning. (Martinez & I, 2020) ”





“pretending that we can “improve” marginalized students’ mathematical learning opportunities without taking their lived experiences is educationally naïve at best” (Marta Civil, 2014 p.11)

Ethnic Studies Mathematics

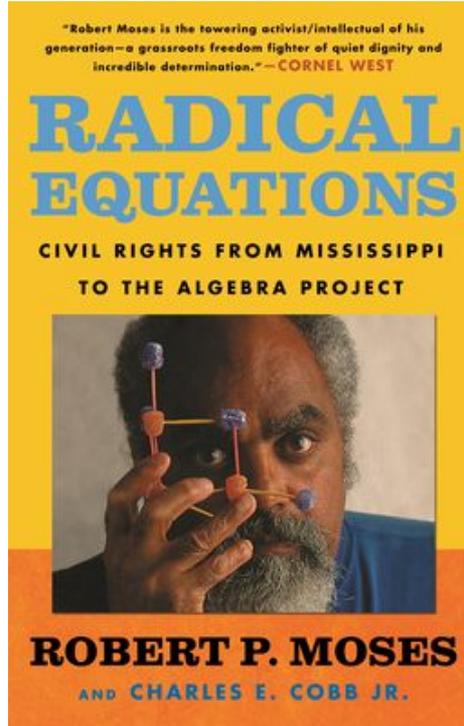


Series on Mathematics Education Vol. 16

Edited by
Hector Rosario

MATHEMATICAL
OUTREACH

Explorations in Social Justice Around the Globe



Resistance & Liberation

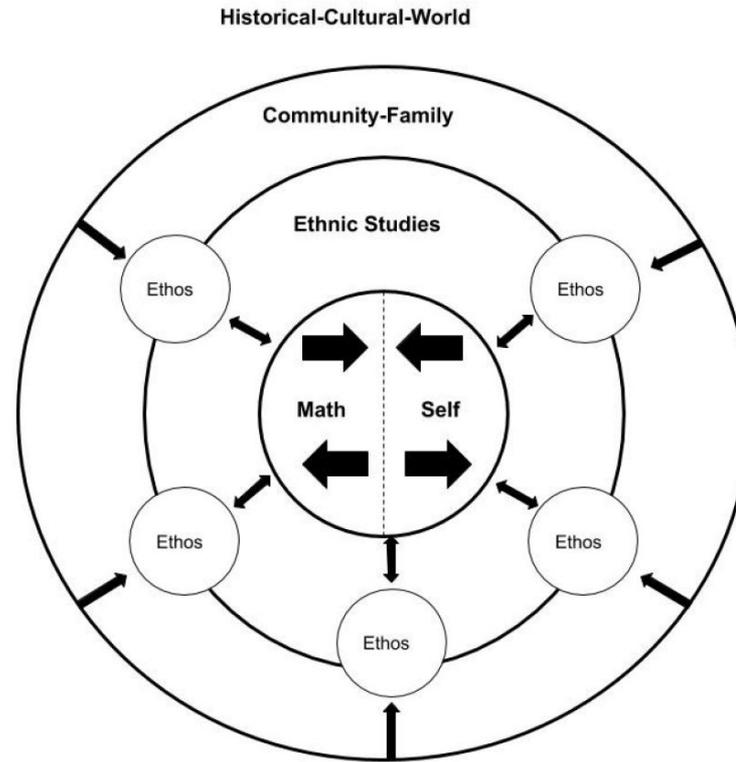
Ethnic Studies Mathematics



Intersectionality & Multiplicity

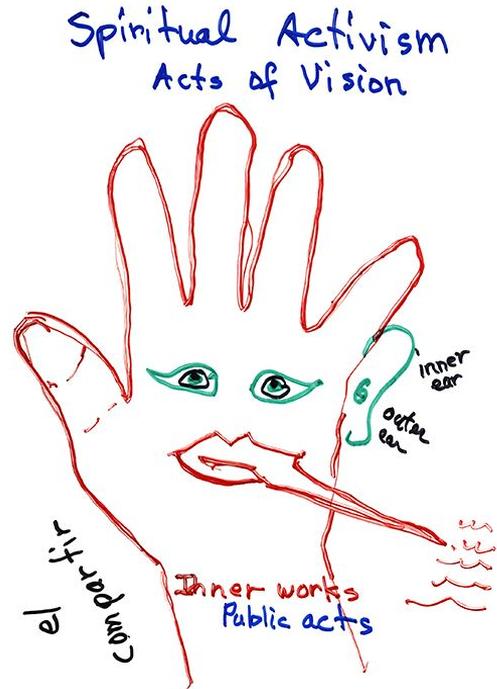
Ethnic Studies Mathematics

Ethos of Ethnic Studies: Interconnectedness



Yeh, C., Martinez, R., Rezvi, S., & Shirude, S. (2021). Radical love as praxis: Ethnic studies and teaching mathematics for collective liberation. *Journal of Urban Mathematics Education*, 14(1), 71-95.

Radical Love

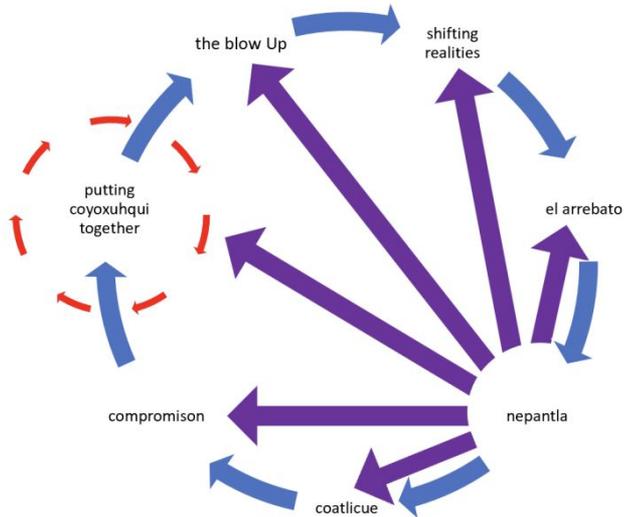


Mathematical Spiritual Wisdoms

Mathematical spiritual wisdom: the cultural, historical, spiritual and logical forms of mathematics that are collectively created to interconnect us to other forms of mathematics.

Mathematical spiritual activism: mathematical spiritual wisdom that seeks to build collective action in bringing about social transformation in and outside of mathematics. Mathematical spiritual activism reflects the mathematical and individual-cultural knowledge gained as and through conocimientos with others.

Mathematics with|in Conocimientos



Mathematics with|in conocimientos

Stage	Mathematical Embodiment
<i>el arrebato</i>	Mathematics connected to emotions, from the surprise and joy of learning to the anxiety and fear created by mathematics.
<i>nepantla</i>	Mathematical wonder and the possibility of connections made while learning. Connections can be between learners, mathematical ideas or between a wide range of physical and metaphysical forms of mathematics.
<i>coatlicue</i>	The pain of learning mathematics and other strong feelings associated reflecting upon the mathematical world.
<i>compromison</i>	A mathematical imaginary between mathematical history, ethnomathematics, and future mathematics that are not fixed.
<i>putting Coyolxuhqui together</i>	Mathematical critical self literacy. The ability to use mathematics to understand better the world and the process of transforming, the self, that results.
<i>the blow up</i>	Collective mathematical reflection. Dialogue of mathematical learning in identifying that mathematics is already a part of each individual person.
<i>shifting realities</i>	Mathematical critical action. Living with mathematics in using mathematics when no one is looking. The action associated with sharing mathematical knowledge.

Conocimientos with|in Mathematics

First what is YPAR?



Moments of Mathematical Clarity

First what is YPAR?



Youth participatory action research (YPAR) works to create spaces where young people can collectively liberate themselves, and inevitably the world. YPAR works to cultivate the recognition of oppression, establish of collectives to understand the root causes (**reflection**) of societal injustices and possible solutions (**actions**).

YPAR is a

- Method
- Epistemology
- Pedagogy
- Research Methodology

YPAR is

- What the youth want and need
- Lifework
- Community & Relationships
- Sustainability

Moments of Mathematical Clarity

Benefits of YPAR



Once students learn that they too can contribute to history, they become more engaged in their education. (Cammarota, 2017)

Chicano students in the SJEP [YPAR] outscored Anglo students in the same school on the state's exams, which was a considerably higher pass rate than the Anglo students attained. SJEP students' graduation rates (about 95%) exceeded those of Anglo students (about 84%) in the site(s) where the program was offered. (Sleeter, 2011)

Cammarota, J. (2017). Youth participatory action research: A pedagogy of transformational resistance for critical youth studies. *Journal for Critical Education Policy Studies (JCEPS)*, 15(2).

Sleeter, C. E. (2011). The academic and social value of ethnic studies.

Benefits of YPAR



Students felt enabled by the opportunity to participate in research projects and they became different kinds of people because of their involvement in these projects. (Morrell, 2008)

Action in response to injustice can contribute to well-being and mental health among African American youth. While this is not a new idea, it does open some interesting opportunities for further research in this area. (Ginwright, 2010)

Ginwright, S. A. (2010). Black youth rising: Activism and radical healing in urban America (p. 8). New York, NY: Teachers College Press.

Morrell, E. (2008). Six summers of YPAR. Revolutionizing education: Youth participatory action research in motion, 155-184.

Benefits of YPAR



Mathematics in youth PAR has been underexplored and is often reduced to the practice of making statistically based statements about injustice. But mathematics can be more than a tool of advocacy. It can lead to increased skills across literate domains. (Yang, 2009)

EXAMPLE??????????

YPAR

Epistemology

Methods

Methodology

PAR EntreMundos Epistemologies					PAR EntreMundos Guiding Principles				
Critical Race Praxis (CRP)	Collective Critical Consciousness (CCC)	Indigenous Cosmologies (IC)	Southern Tradition (ST)	Feminist Lineages (FL)	Participation (P)	Critical Inquiry (CI)	Knowledge Construction (KC)	Power with(in) (PW)	
					Indigenous Cosmologies (IC)	Creative Praxes (CP)	Transformative Active (TA)	Collective Critical Consciousness (CCC)	
YPAR Structure									
Develop Critical Lens (Y-0)	Formation of Collective (Y-1)	Identify Generative Themes (Y-2)	Develop Research Questions (Y-3)	Collect Data (Y-4)	Analyze Data (Y-5)	Create report/ offering of findings (Y-6)	Take Action (Y-7)	Next Steps & Reflection (Y-8)	
Day 1	Day 2	Day 3	Day 4 (5)		Day 6	Day 7	Day 8	Day 9	Day 10
Collective Expectations (Y-0)	Reading infographics (Y-0) (CI)(CRP)(CP)	Problem Tree (Y-2)	Identify key stakeholder (Y-3)	Review Generative Themes (Y-3)	Ratios, Power & Gender activity (Y-0) (CI)(CRP)(FL)	Mathematical Resistance (PW) (CI)(ST)	Identifying Patterns & Themes (Y-6)	Work time and finalize reports (Y-6)	Presentations to peers (Y-7)
A Democratic Critical Pedagogy (Y-0)	Conocimientos Arte de las Matematica (Y-2)	Math & Reading infographics (Y-0) (CI)(CRP)(CP)	Develop research questions (Y-3)	Survey simulation & testing (Y-0) (CI)(KC)	Finalize Surveys (Y-4)(Y-5)	Group Work Time	Slopes of students and teachers of color (Y-0) (CI) (ST)	Bones and the origins of mathematics (Y-7) (CCC) (KC)	Next Steps collectively & with each group (Y-8)
What is YPAR? (Y-0)	Schools and Prison (Y-2)	Newspaper "find the math" (Y-0) (CI) (CRP)	Narrative, poetry and testimonios (Y-3)	Dancing and the Math steps that follow (CI) (CCC)(P)		Conocimientos Revesting the Seven Stages (Y-2)	Analyzing Open ended responses (CI) (P) (CCC)	Patolli, Macula and Senet (KC) (CI) (CRP)	Potluck Celebration (CCC)
Mathematic de las Americas (IC) (PW)	If I was president (PWI) (CCC)	I am from Math Poems (CP) (CCC) (ST)	Identifying Variables to the Problem Tree (Y-2)	Role Playing Mock Focus Groups (Y-4)					

EXAMPLE???????????

Methodology

PAR EntreMundos Epistemologies				
Critical Race Praxis (CRP)	Collective Critical Consciousness (CCC)	Indigenous Cosmologies (IC)	Southern Tradition (ST)	Feminist Lineages (FL)

YPAR Structure					
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Day 1	Day 2
Collective Expectations (Y-0)	Reading infographics (Y-0) (CI)(CRP)(CP)
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YPAR Structure

Develop
Critical Lens
(Y-0)

Formation of
Collective
(Y-1)

Identify
Generative
Themes
(Y-2)

Develop
Research
Questions
(Y-3)

Collect Data
(Y-4)

Analyze Data
(Y-5)

Create report/
offering of
findings
(Y-6)

Take Action
(Y-7)

Next Steps &
Reflection
(Y-8)

Matrix of Oppression

Social Identity Categories	Privileged Social Groups	Border Social Groups ↔	Targeted Social Groups	Ism
Race	White People	Biracial People (White/Latino, Black, Asian)	Asian, Black, Latino, Native People	Racism
Sex	Bio Men	Transsexual, Intersex People	Bio Women	Sexism
Gender	Gender Conforming Bio Men And Women	Gender Ambiguous Bio Men and Women	Transgender, Genderqueer, Intersex People	Transgender Oppression
Sexual Orientation	Heterosexual People	Bisexual People	Lesbians, Gay Men	Heterosexism
Class	Rich, Upper Class People	Middle Class People	Working Class, Poor People	Classism
Ability/Disability	Temporarily Abled-Bodied People	People with Temporary Disabilities	People with Disabilities	Ableism
Religion	Protestants	Roman Catholic (historically)	Jews, Muslims, Hindus	Religious Oppression
Age	Adults	Young Adults	Elders, Young People	Ageism/Adultism

YPAR Structure

Develop
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(Y-0)

Formation of
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(Y-1)

Identify
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Develop
Research
Questions
(Y-3)

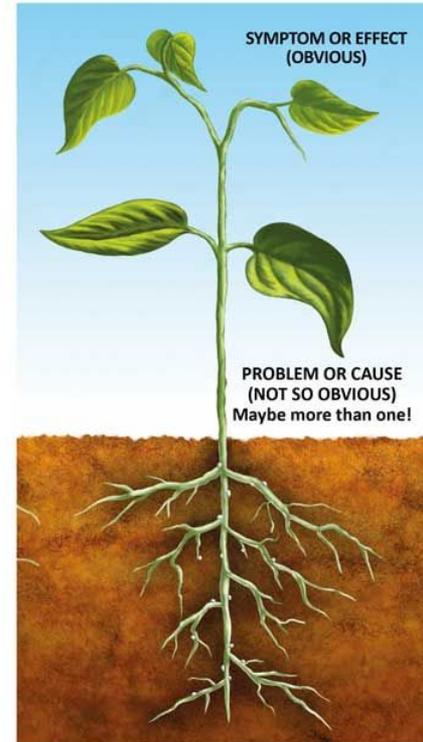
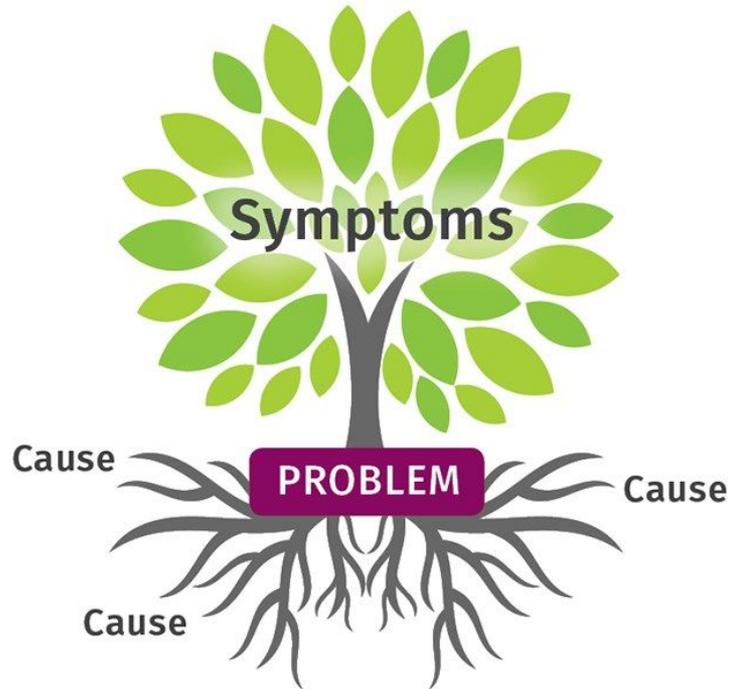
Collect Data
(Y-4)

Analyze Data
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Next Steps &
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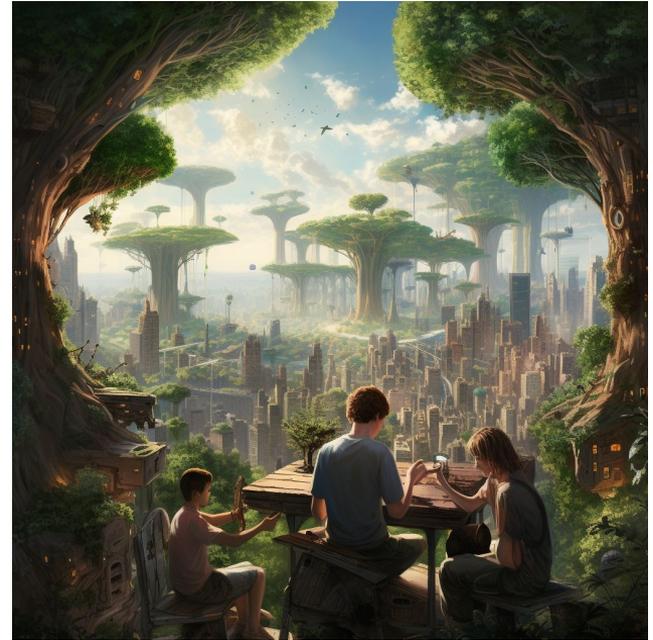
Analyze Data
(Y-5)

Create report/
offering of
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(Y-6)

Take Action
(Y-7)

Next Steps &
Reflection
(Y-8)

Relationships Matter



YPAR Structure

Develop
Critical Lens
(Y-0)

Formation of
Collective
(Y-1)

Identify
Generative
Themes
(Y-2)

Develop
Research
Questions
(Y-3)

Collect Data
(Y-4)

Analyze Data
(Y-5)

Create report/
offering of
findings
(Y-6)

Take Action
(Y-7)

Next Steps &
Reflection
(Y-8)

Question to ponder:

- What have you learned about the youth and their communities?
- What do you know about the youth and their futures?
- How does this knowledge connect to systemic structure that need to change?
- What the youth live needs to be part of all future steps



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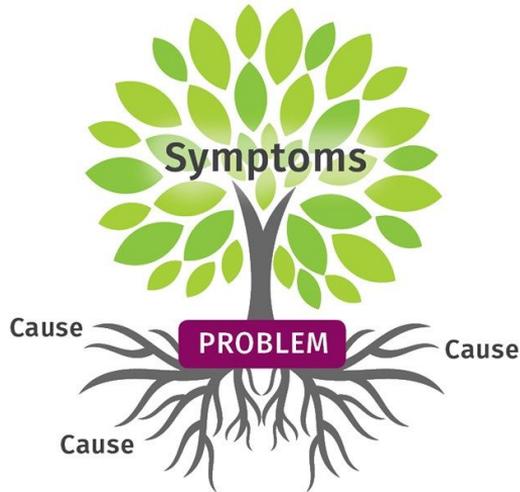
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Next Steps &
Reflection
(Y-8)

What supports do you have?



What supports do you need



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(Y-8)

**This is an opportunity
to be creative
So meet the needs of
the youth,
their communities,
Stakeholders,
And
Align what is created to
Action**



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Take Action
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Next Steps &
Reflection
(Y-8)

What is my role as an adult?

..

..

..

Whatever the youth need and ask of me

..

..

Also to shut down toxic adults



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Develop
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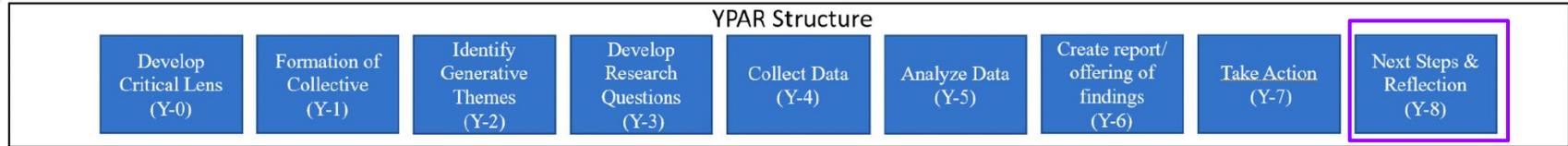
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Action ←→ Reflection



Youth participatory action research (YPAR) works to create spaces where young people can collectively liberate themselves, and inevitably the world. YPAR works to cultivate the recognition of oppression, establish of collectives to understand the root causes (**reflection**) of societal injustices and possible solutions (**actions**).

YPAR is a commitment to you, others and the world

YPAR is collective action to challenge and change societal injustices

YPAR is an opportunity for youth to reimagine their futures

YPAR is space for adults to learn without getting in the way

YPAR is not a simple set of steps that leads to empowerment

Mathematical Youth Participatory Action Research and Teaching



MYPART is Collective Action to Challenge and Change injustices

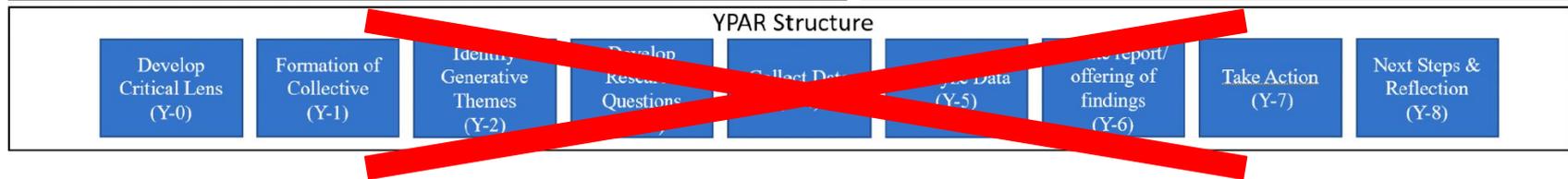
- What the youth want & need (they all secretly want math)
- Lifework & Resistance (math is in our blood)
- Community & Relationships (math friends are forever friends)
- Sustainability & Healing (are you really not a math person)
- Friction & Joy (Math = fun)

Moments of Mathematical Clarity

MYPART - in Four Parts

Mathematical Youth Participatory Action Research and Teaching

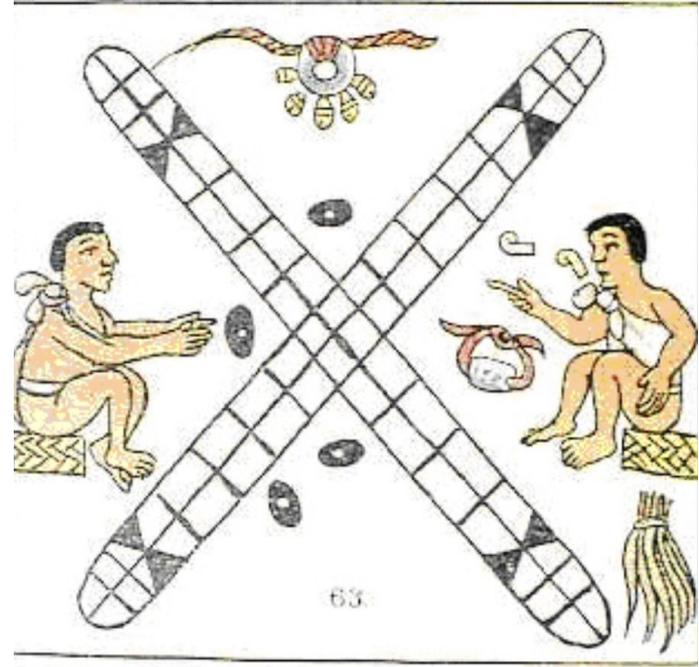
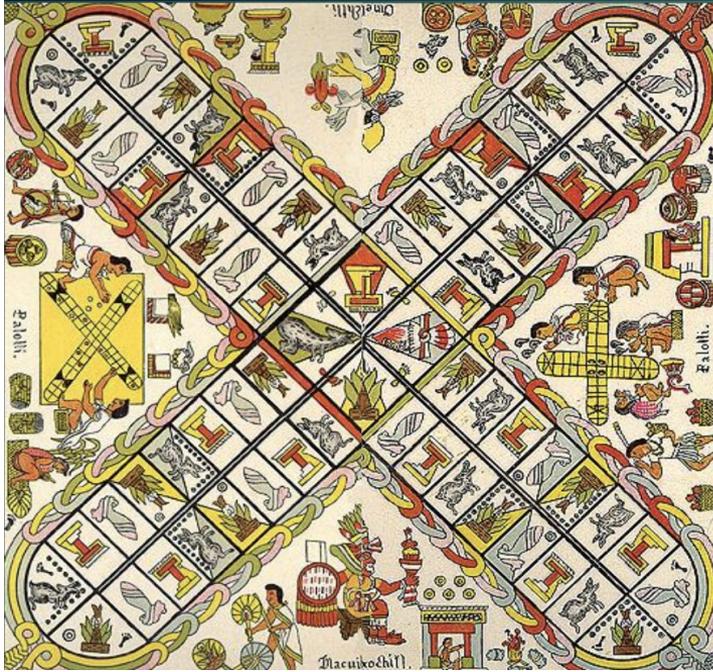
1. Relationships
2. Root cause awareness and analysis
3. Action to key stakeholders
4. Enough fun that you don't want to stop



Moments of Mathematical Clarity

MYPART - Part 1

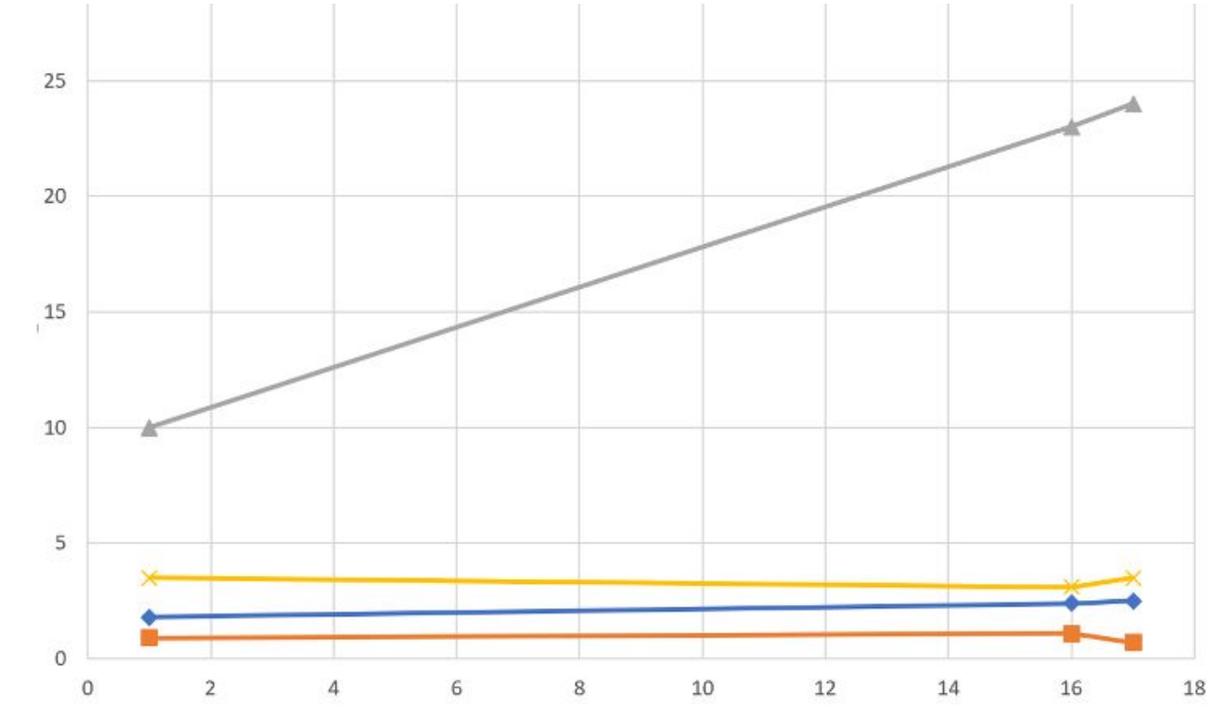
Patolli



Relationships

MYPART - Part 2

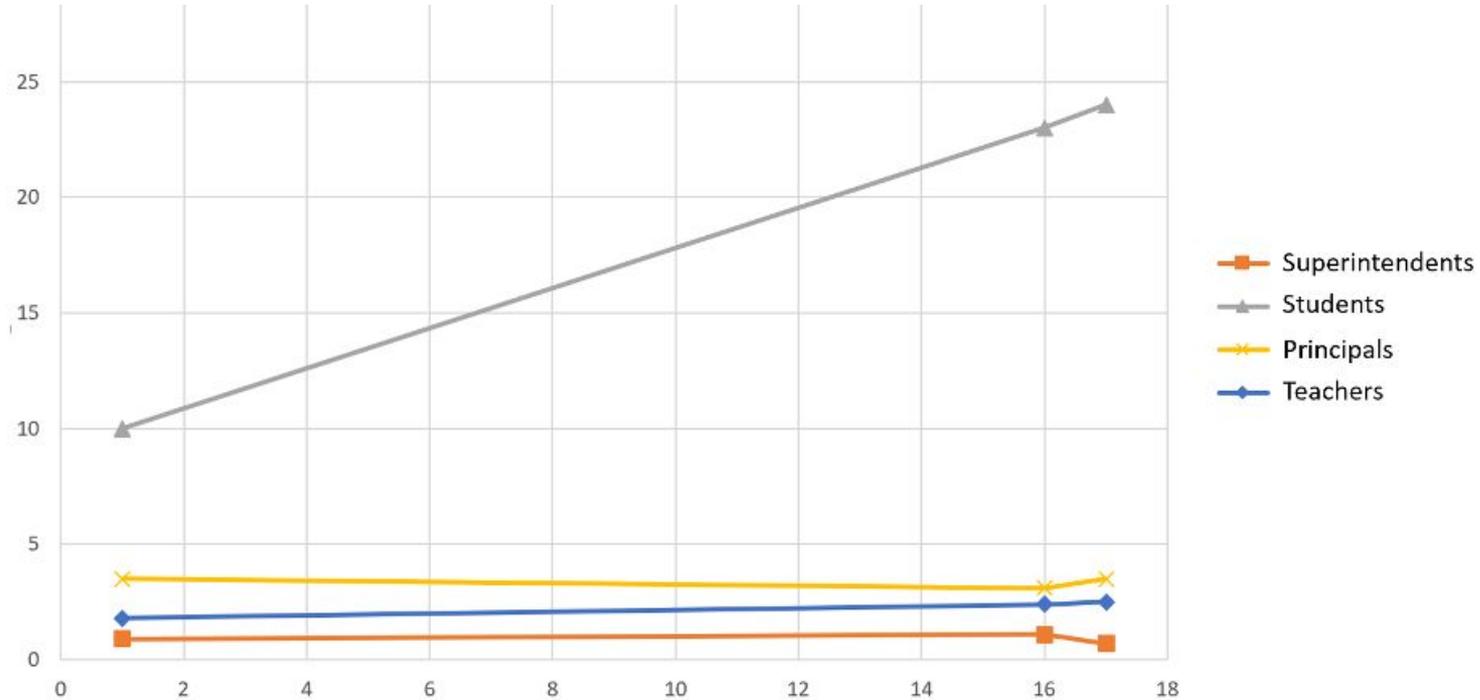
Root Cause



Root Cause Awareness/Analysis

MYPART - Part 2

Root Cause



Root Cause Awareness/Analysis

Root Cause

39. Median weekly earnings of full-time wage and salary workers by detailed occupation and sex [Numbers in thousands]

Occupation	2018					
	Total		Men		Women	
	Number of workers	Median weekly earnings	Number of workers	Median weekly earnings	Number of workers	Median weekly earnings
Total, full-time wage and salary workers	115,567	\$886	64,142	\$973	51,425	\$789

Ratios of Occupations Worksheet (Part 1)

Instructions: Select any four occupations and complete the table. Make sure to write out the ratio in any form and find the value of the ratio.

Occupation	Ratio of Women median income to male median income.	Ratio of men median income to women median income.	Ratio of Women median to total median income	Ratio of number of Women workers to men workers	

Root Cause

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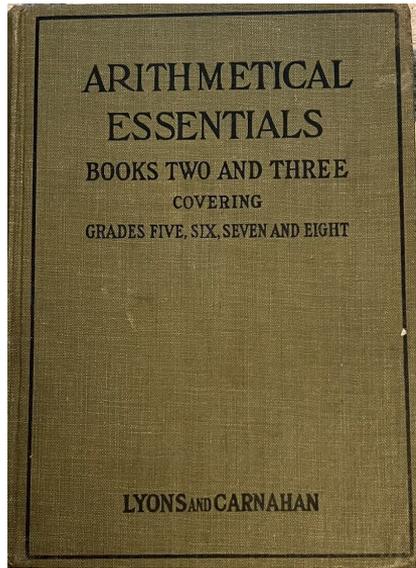
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Congress		
Women	Total	Value of the ratio of the number of Women To the number of Men
127	535	

Action to key stakeholders



EFFECTS OF RACIAL DISCRIMINATION ON MINORITIZED STUDENTS

70%
OF [REDACTED] STUDENTS OF COLOR HAVE EXPERIENCED RACIAL DISCRIMINATION. WE OBSERVED THAT THE REACTION TO RACIAL DISCRIMINATION CHANGES BASED ON THE INDIVIDUALS SCHOOL

[REDACTED] School 1 AND [REDACTED] School 2 WHEN EXPERIENCING RACIAL DISCRIMINATION BELIEVE THEY HAVE THE ABILITY TO BRUSH IT OFF. [REDACTED] School 3 [REDACTED] School 4 AND [REDACTED] School 5 DO NOT HAVE THIS BELIEF AND INSTEAD ARE HURT DEEPLY AND PERSONALLY.

[REDACTED] School 5
HIGHSCHOOL

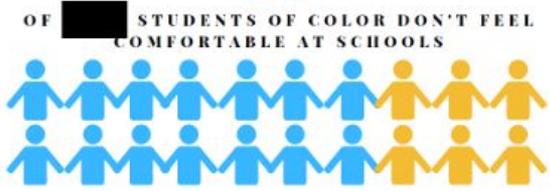
[REDACTED] School 4
HIGHSCHOOL

[REDACTED] School 4
HIGHSCHOOL

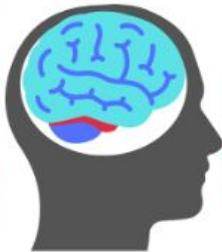
[REDACTED] School 2
HIGHSCHOOL

[REDACTED] School 1
HIGHSCHOOL

30%



- "IT MADE WANT TO CHANGE MY RACE, BECAUSE I NO LONGER FELT NORMAL."
- "I FELT ALIENATED AND AN OUTCAST"
- "IT MADE ME FEEL AS IF I WASN'T ALLOWED IN THE UNITED STATES"

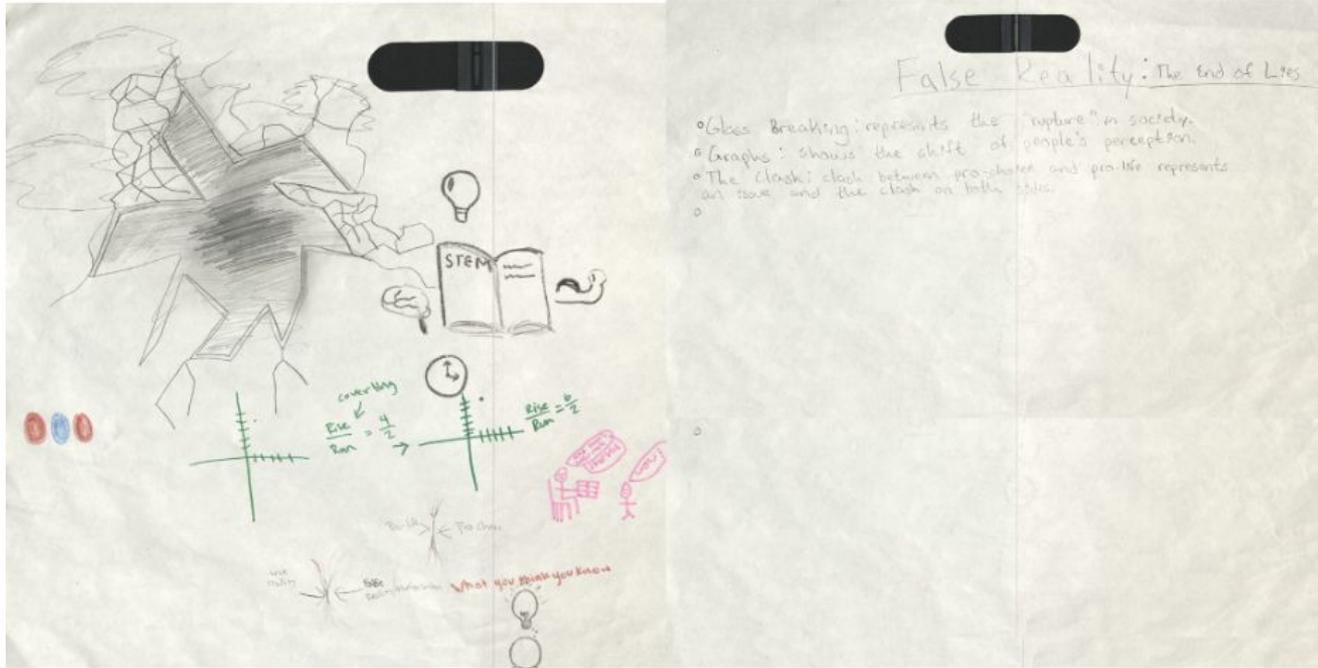


- "I'M USED TO IT? I THINK! SO IT DOESN'T REALLY BOTHER ME THAT MUCH BUT MAYBE THAT'S CONCERNING HAHA YIKES"
- "LIKE I HAD TO DEFEND MY SELF EVERYTIME"
- "NOT GREAT BUT IT'S NEVER BEEN SO BAD THAT I ACTUALLY FELT DEEPLY AFFECTED"

Action

MYPART - Part 4

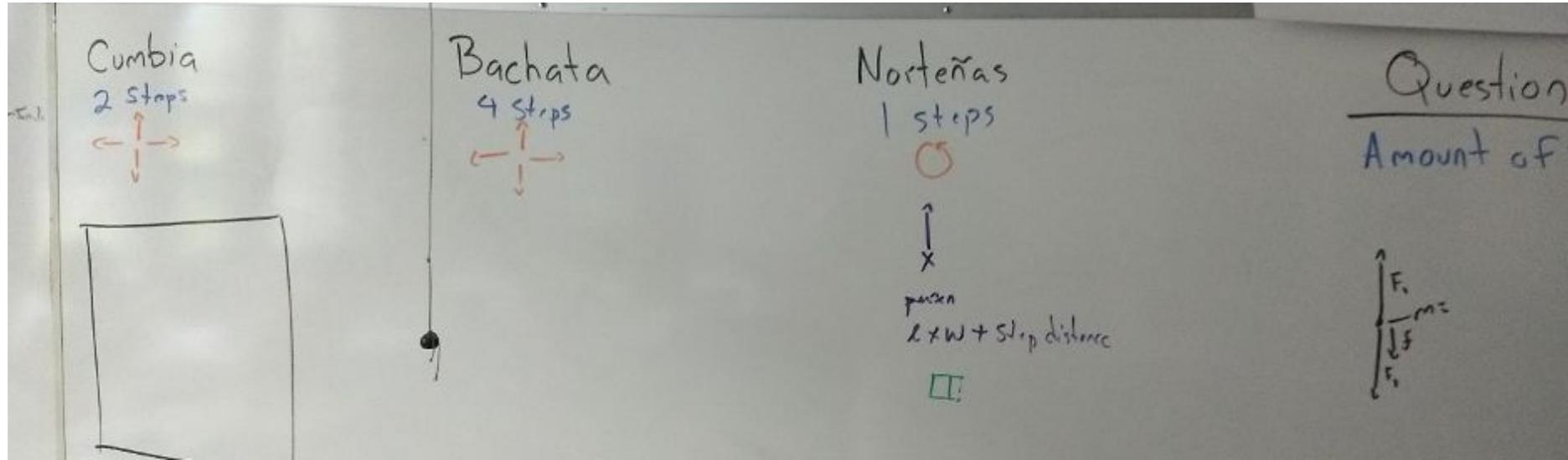
The revolution



Enough Fun so you don't want to stop

MYPART - Part 4

The revolution



Enough Fun so you don't want to stop

MYPART - Part 4

The revolution



Math is me, resilient
(A positive characteristic that describes you)

And math is you understanding and short
(a characteristic that you like in others) (another characteristic that you like in others)

From negative to positive infinity

math is us, as we become world changer's
(Your future career)

Fore, I am math

And

together we will change climate and prejudice
(Something in this world you want to change)

Enough Fun so you don't want to stop

Mathematical Youth Participatory Action Research and Teaching

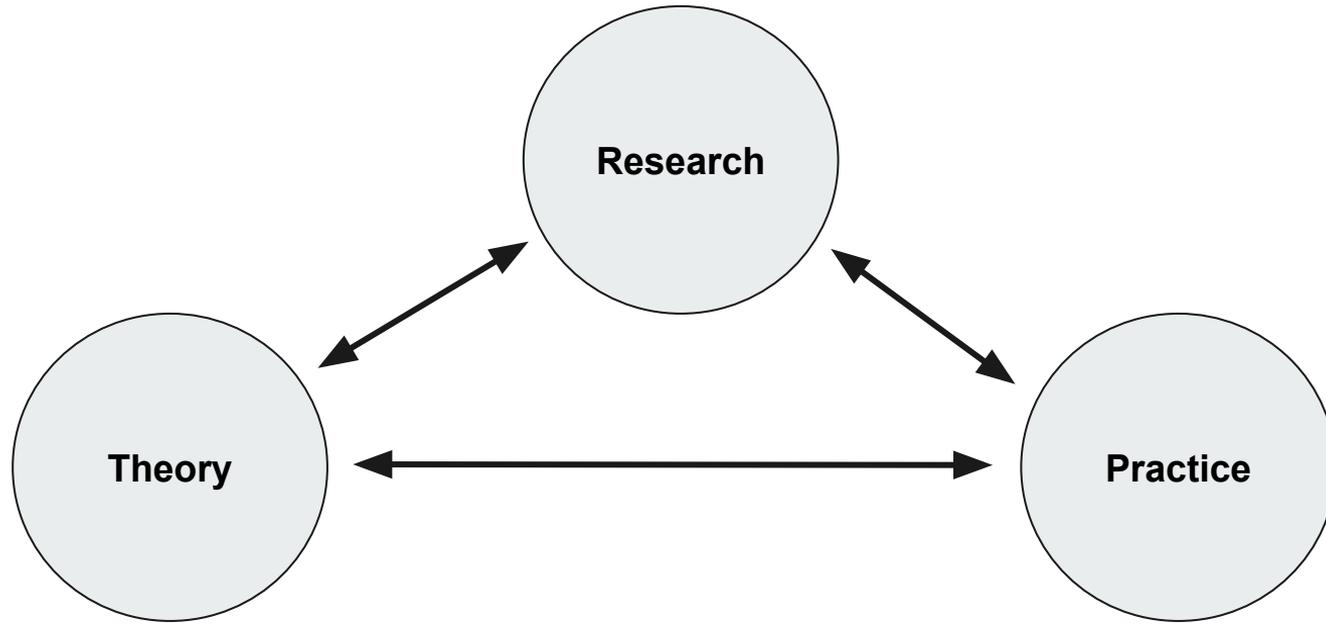
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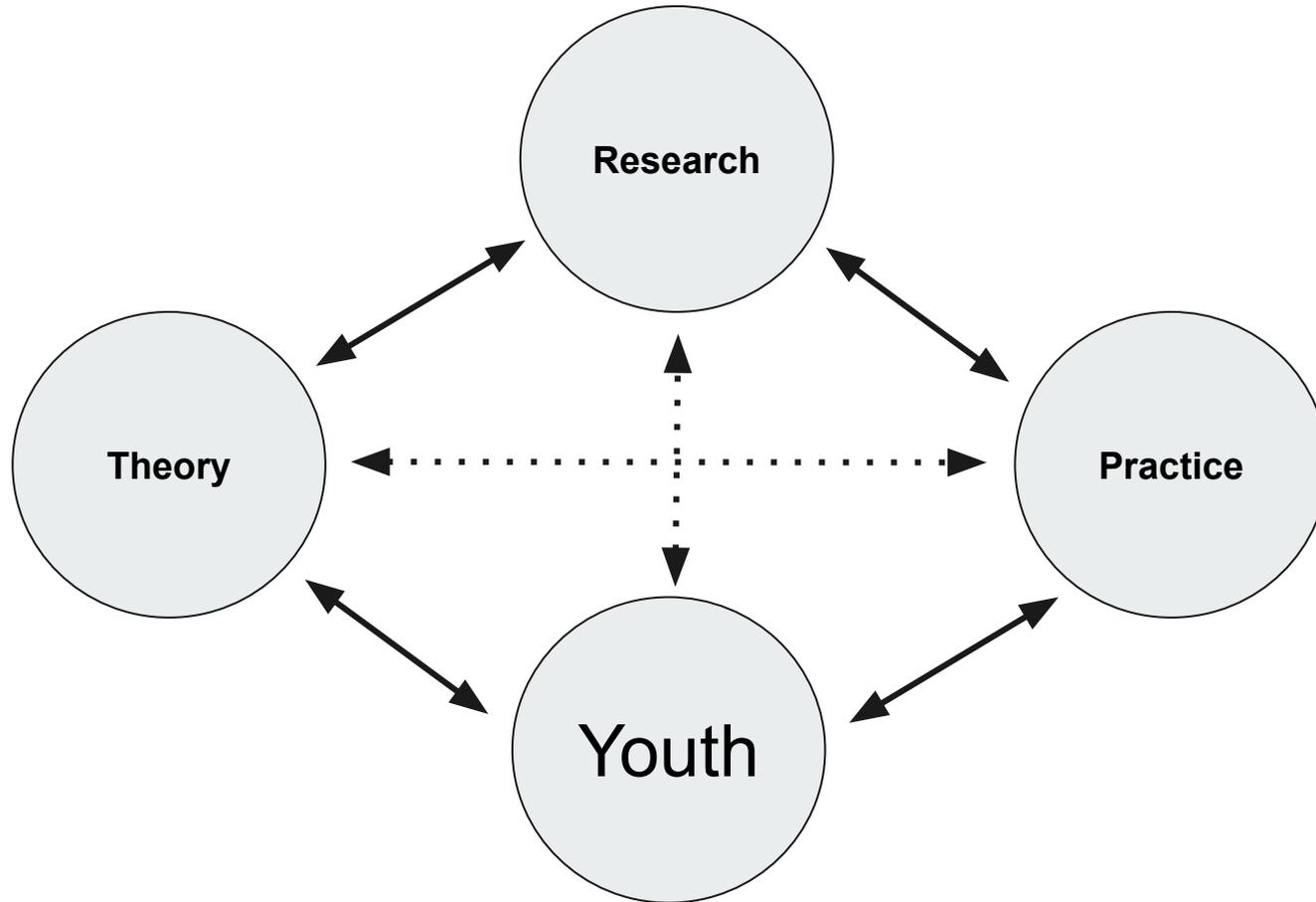


Moments of Mathematical Clarity

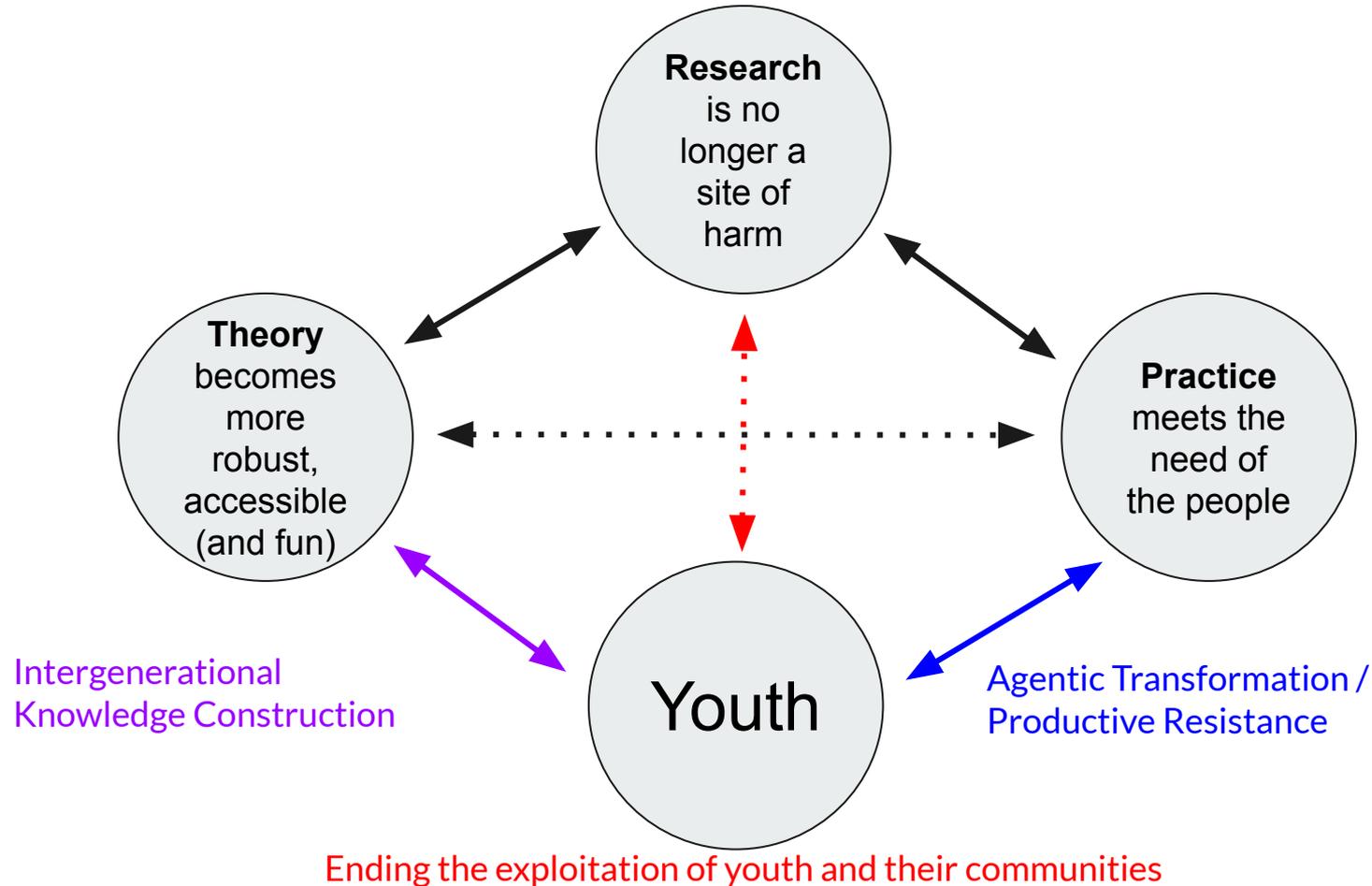
Research, Theory, and Practice

Research, Theory, and Practice

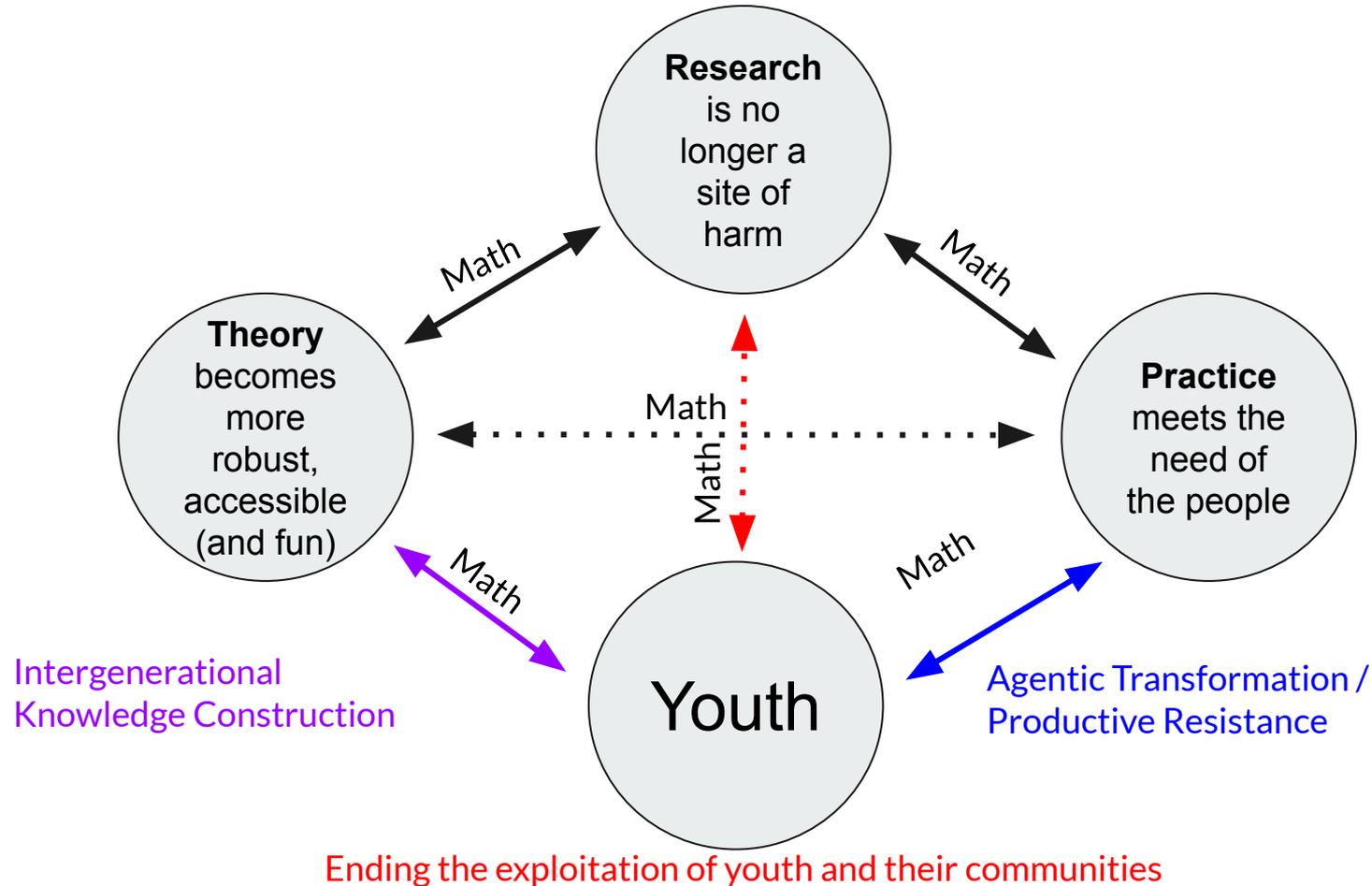




Research, Theory, and Practice in Service not subjugation of Youth



Research, Theory, and Practice in Service not subjugation of Youth



Critical Youth Mathematics Education Studies



1. Challenges Adultism and Traditional Linear models of youth mathematical development
2. Youth are assets, experts, agents of change, and must be centered in the teaching and learning of mathematics.
3. Focus on the socio-political and critical consciousness development of youth in relation to mathematics.
4. Collective youth action brought to you by youth for youth
5. Joy and Love is central to resistance in embracing the multiplicity of youth culture.

Questions



[Comments](#)



The Praxis of Ethnic Studies Mathematics & Ontological Playgrounds of Youth Liberation

Presented by:

Dr. Ricardo Martinez

Assistant Professor

Pennsylvania State University

October 11, 2023

