Changes from Within: *Nurturing Leadership and Professional Learning among Fellow Teachers of Math*

Jessica Alvarado, Susie Min, Julie Spykerman
Anaheim Union High School District

NCTM San Diego
April 5, 2019

This work is supported by a grant from the National Science Foundation, award #1660809
To learn more, see http://atmala.weebly.com

CALIFORNIA STATE UNIVERSITY FULLERTON

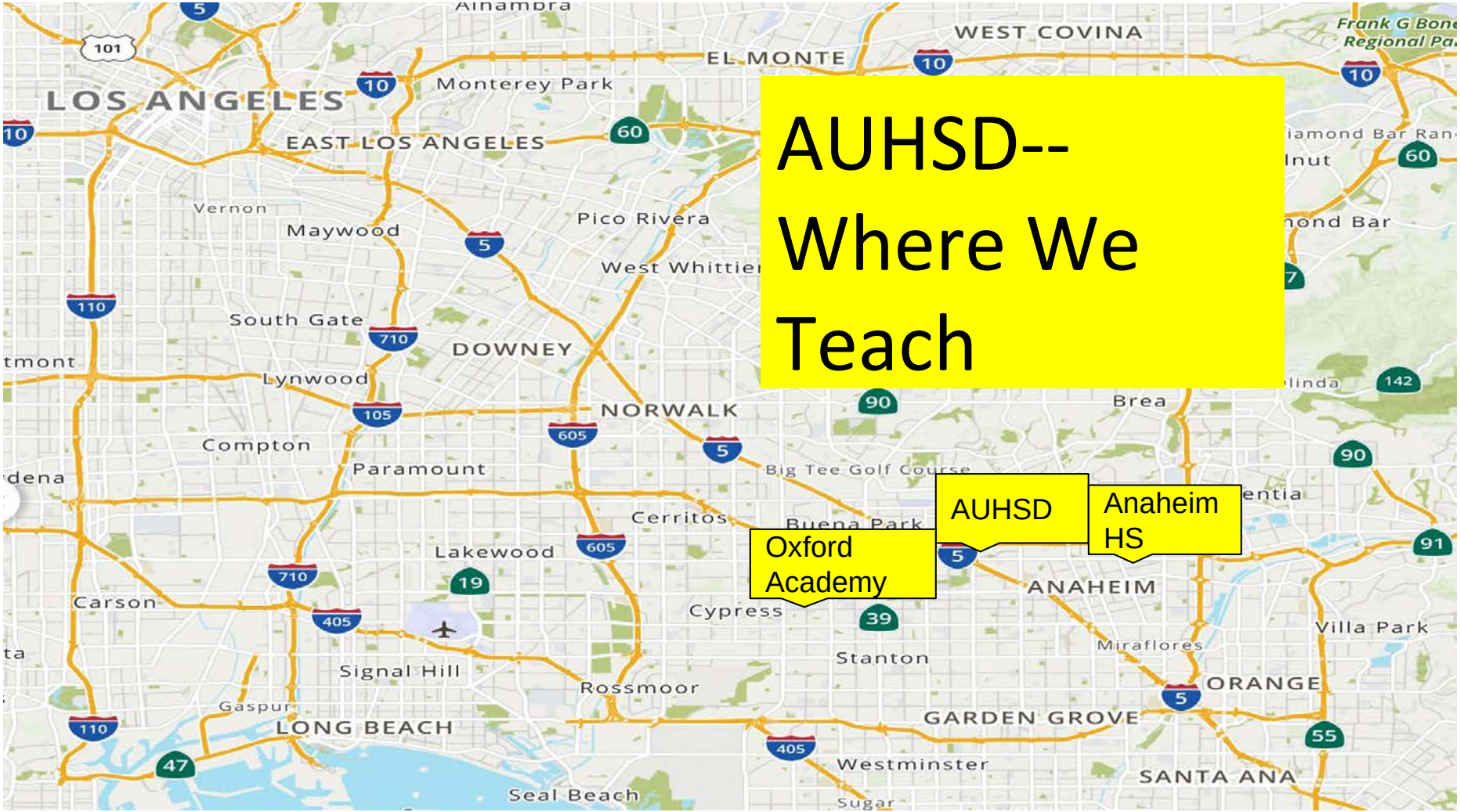
UNLIMITED YOU
ANAHEIM UNION HIGH SCHOOL DISTRICT

National Board for PROFESSIONAL TEACHING STANDARDS

Welcome to: Changes from Within: *Nurturing Leadership and Professional Learning among Fellow Teachers of Math*

Please go to this Padlet link (**https://padlet.com/min_s/crmt**) or scan the QR code & respond to the following prompt:

- **What examples or questions do you have about Culturally Responsive Math Teaching? (Please include your role in your response.)**


AUHSD--
Where We
Teach
AUHSD
Anaheim
HS
Oxford
Academy
LOS ANGELES
EAST LOS ANGELES
Monterey Park
EL MONTE
WEST COVINA
Vernon
Maywood
Pico Rivera
South Gate
DOWNEY
Lynwood
NORWALK
Compton
Paramount
Big Tee Golf Course
Brea
Cerritos
Buena Park
Lakewood
ANAHEIM
Carson
Cypress
Stanton
Villa Park
Miraflores
Signal Hill
Rossmoor
ORANGE
Gaspur
LONG BEACH
GARDEN GROVE
Westminster
SANTA ANA
Seal Beach
Sugar

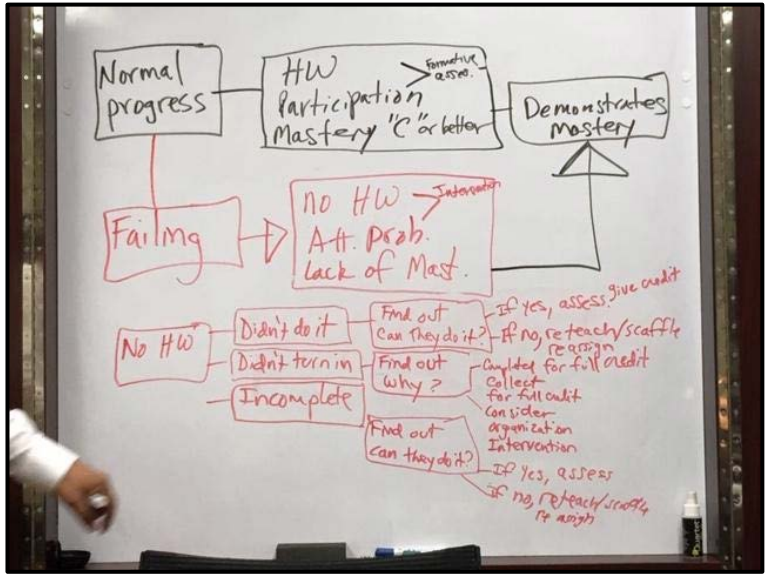
Goals/ Agenda

I. CRMT Framework & Sample CRMT Lessons

II. Courageous Conversations about Equity & Opportunity

III. Creating a Culture of Reflection and Learning

Seeking to Uncover Root Causes for Poor Math Grades



Normal Progress	Homework Completed and turned in	Able to demonstrate mastery of content
	Class Participation	
	Mastery of content (as measured by grade of 'C' or better	

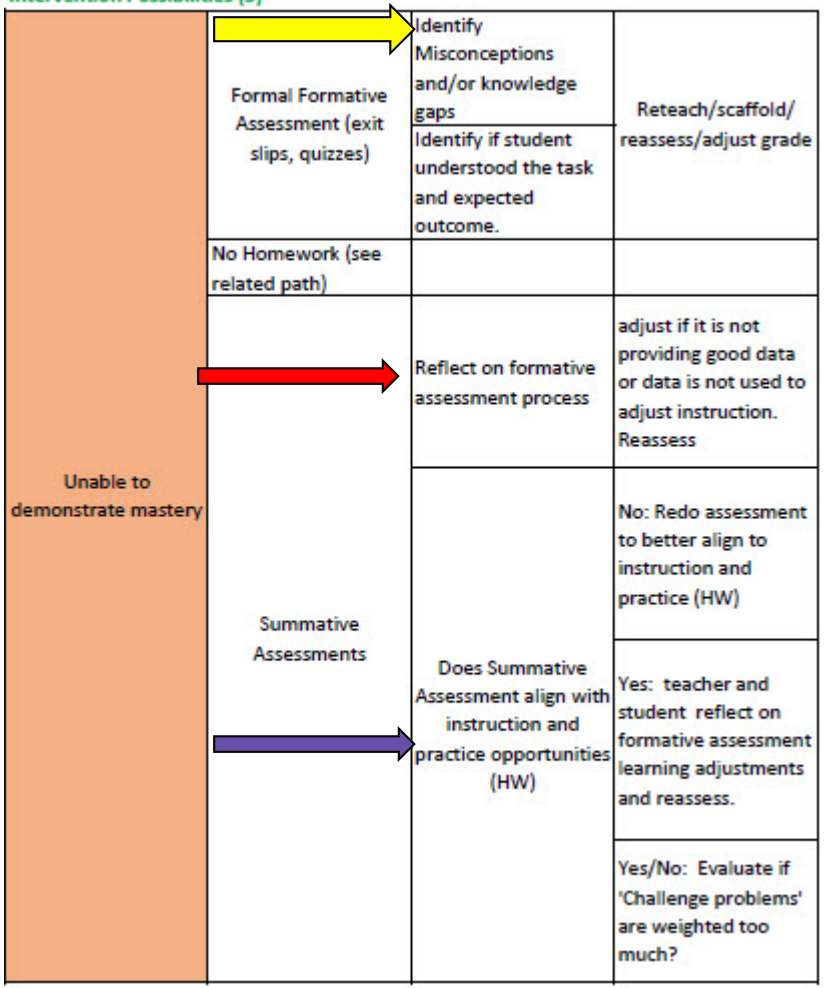
Collaboration Investigation/Research to Uncover Root Causes Poor Grades

Normal Progress	Homework Completed and turned in	Able to demonstrate mastery of content
	Class Participation	
	Mastery of content (as measured by grade of 'C' or better	

Sudden Danger of Failing

Failing	Homework not completed or turned in	Interventions Needed
	Attendance Problems	
	Unable to demonstrate mastery	

Intervention Possibilities (3)



Unable to demonstrate mastery	Formal Formative Assessment (exit slips, quizzes)	Identify Misconceptions and/or knowledge gaps	Reteach/scaffold/ reassess/adjust grade
		Identify if student understood the task and expected outcome.	
	No Homework (see related path)		
	Summative Assessments	Reflect on formative assessment process	adjust if it is not providing good data or data is not used to adjust instruction. Reassess
		Does Summative Assessment align with instruction and practice opportunities (HW)	No: Redo assessment to better align to instruction and practice (HW)
			Yes: teacher and student reflect on formative assessment learning adjustments and reassess.
			Yes/No: Evaluate if 'Challenge problems' are weighted too much?

Formative Assessment should guide adjustments in instruction

If Summative Assessment results are out of line of expectations, revisit FA,

OR

Analyze alignment of instruction and practice with assessment.

Project ATMALA

(Advancing Teaching of Mathematics to Advance Learning for All)

http://atmala.weebly.com

- 20 teachers of mathematics, Grades 6-12, in diverse southern California high-need school districts
- Pursuing National Board Certification (or already Board Certified)
- Learning about and putting CRMT into practice
- Developing as leaders
- Creating microcredential modules
- Led by 3 CSU Fullerton faculty and 1 school district math specialist

I. WHAT IS CULTURALLY RESPONSIVE MATHEMATICS TEACHING AND WHY IS IT IMPORTANT?

Research Tells Us…

- Mathematics ability is primarily a function of **opportunity**, **experience**, **and effort**—not innate intelligence.
- Effective mathematics teaching **cultivates the mathematics abilities and identities of all students**.
- Equitable access and support includes attention to **students' reasoning and ideas**— *one size does not fit all.*

(Boaler & Staples, 2008; Gutierrez, 2013; Kisker, et al., 2012; Malloy & Malloy, 1998; NCTM, 2000, 2014; National Research Council, 2009; Razfar, Khisty, & Chval, 2009)

What is Culturally Relevant Pedagogy (CRP)?

A pedagogy that empowers students intellectually, socially, emotionally, and politically by using cultural referents to impart knowledge, skills, and attitudes.

- Gloria Ladson-Billings 2009

Characteristics of Culturally Responsive Mathematics Teaching

- Promoting **deep, meaningful mathematics learning**
- **Student-driven** learning with **teacher as facilitator**
- Knowing and **caring** about students' sense of identity
- Positive perspectives on **families** and **community**
- Engagement in **equitable** and **social justice** practices
- **Integrating** students' culture into the official curriculum
- Expanding students' **sense of possibility**

Culturally Responsive Teaching: What is it NOT

- Assuming all students learn with the same approaches and share the same cultural norms or experiences.
- Changing the names or language to represent diversity.
  - i.e. Maria is planting a rectangular rose garden. In the center of the garden, she puts a smaller rectangular patch of grass. The grass is 2 feet by 3 feet. What is the area of the rose garden?
  - i.e. María está plantando un jardín de rosas rectangulares. En el centro del jardín, pone un pequeño trozo rectangular de hierba. La hierba es de 2 pies por 3 pies. ¿Cuál es el área de la rosaleda?

True or False Pair Activity

With your elbow partner(s), read and discuss each statement. Decide whether the statements are true or false.

Clue: Exactly half are true!

True or False Statements

1. “Mathematics is a human activity that is grounded in people’s culture and their attempts to describe and understand physical and social phenomena.”
2. “Mathematics is primarily about using algorithms, or rules, to get correct answers.”
3. “Mathematics is universal regardless of cultural background or perspective.”

True or False Statements

1. “Mathematics is a human activity that is grounded in people’s culture and their attempts to describe and understand physical and social phenomena.” T
2. “Mathematics is primarily about using algorithms, or rules, to get correct answers.” F
3. “Mathematics is universal regardless of cultural background or perspective.” F

True or False Statements

4. “One of the main reasons why teachers do not engage in CRMT is the view of mathematics as culturally neutral.”
5. “Teachers can draw explicitly on students’ use of mathematics in their cultures and/or home and community lives through high-level mathematics tasks.”
6. “The primary purpose for including activities that involve student interaction with peers is to create a positive atmosphere in the class.”

True or False Statements

4. “One of the main reasons why teachers do not engage in CRMT is the view of mathematics as culturally neutral.” T
5. “Teachers can draw explicitly on students’ use of mathematics in their cultures and/or home and community lives through high-level mathematics tasks.” T
6. “The primary purpose for including activities that involve student interaction with peers is to create a positive atmosphere in the class.” F

Think - Pair - Share

List the concerns you have with current outcomes

(for example, high failure rates; students feeling pushed away from math; inequities in enrollment in higher level math courses; etc.)

List things you are trying to address with colleagues

(for example, biased beliefs; instructional practices; strength-based noticing; etc.)

How does CRMT help address some of the concerns?

Sample CRMT Lessons

- **“Impact Project”**: Students collaborated in groups to pick a topic they were passionate about and conducted surveys, experiments, or observational studies. They shared their findings on a class blog for greater audience.
- **“Student-Driven Statistics Inquiry”**: Students were shown data distribution by gender and race on STEM workers. Students then generated statistical questions they wanted to investigate on. They analyzed data and shared their findings. Lesson outline link

Sample CRMT Lessons

- “How Fast Can You Text?”

Students use their phones to time each other texting similar statements; one will have less words than the other so they can investigate who is faster.

Students describe how they found the faster texter, then apply their strategy to a different problem, and justify their reasoning. Students then develop a real-life situation where they might compare rates and answer why it would be useful to know proportional reasoning. Link to lesson.

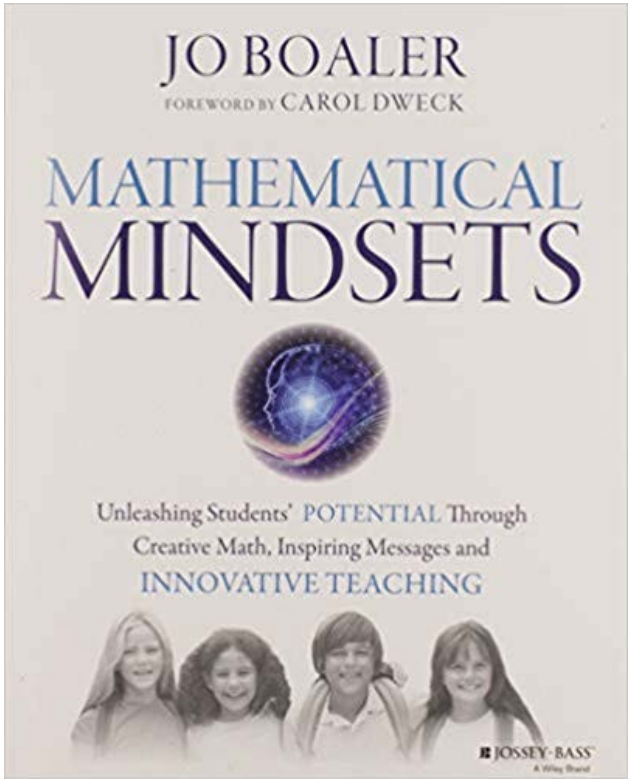
II. HOW DO WE PROMOTE LEARNING and REFLECTING ABOUT EQUITY & OPPORTUNITY?

Julie’s Experience

Challenges

- Changing the focus of the classroom (from teacher to student)
- The need to intentionally plan lessons to meet the needs and interests of our students
- Gap Gazing… Deficit Thinking

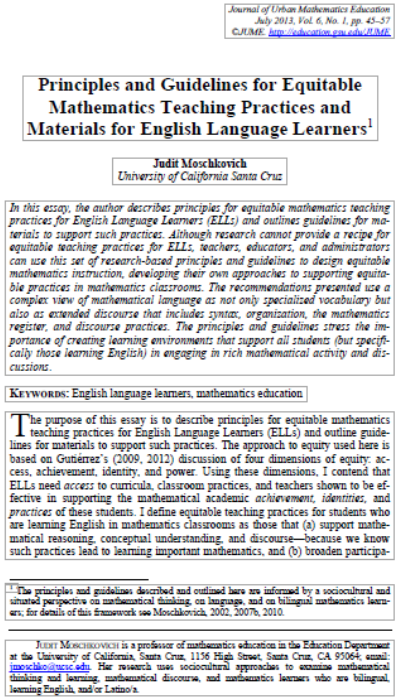
Growth Mindset



"Another misconception about mathematics that is pervasive and damaging—and wrong—is the idea that people who can do math are the smartest or cleverest people. This makes math failure particularly crushing for students, as they interpret it as meaning that they are not smart."

Sample of a Golden Line

Student Populations that can be better served...



Journal of Urban Mathematics Education
July 2013, Vol. 6, No. 1, pp. 45–57
©JUME http://education.gsu.edu/JUME

Principles and Guidelines for Equitable Mathematics Teaching Practices and Materials for English Language Learners[1]

Judit Moschkovich
University of California Santa Cruz

In this essay, the author describes principles for equitable mathematics teaching practices for English Language Learners (ELLs) and outlines guidelines for materials to support such practices. Although research cannot provide a recipe for equitable teaching practices for ELLs, teachers, educators, and administrators can use this set of research-based principles and guidelines to design equitable mathematics instruction, developing their own approaches to supporting equitable practices in mathematics classrooms. The recommendations presented use a complex view of mathematical language as not only specialized vocabulary but also as extended discourse that includes syntax, organization, the mathematics register, and discourse practices. The principles and guidelines stress the importance of creating learning environments that support all students (but specifically those learning English) in engaging in rich mathematical activity and discussions.

KEYWORDS: English language learners, mathematics education

The purpose of this essay is to describe principles for equitable mathematics teaching practices for English Language Learners (ELLs) and outline guidelines for materials to support such practices. The approach to equity used here is based on Gutierrez's (2009, 2012) discussion of four dimensions of equity: access, achievement, identity, and power. Using these dimensions, I contend that ELLs need *access* to curricula, classroom practices, and teachers shown to be effective in supporting the mathematical academic *achievement*, *identities*, and *practices* of these students. I define equitable teaching practices for students who are learning English in mathematics classrooms as those that (a) support mathematical reasoning, conceptual understanding, and discourse—because we know such practices lead to learning important mathematics, and (b) broaden participa-

[1] The principles and guidelines described and outlined here are informed by a sociocultural and situated perspective on mathematical thinking, on language, and on bilingual mathematics learners, for details of this framework see Moschkovich, 2002, 2007b, 2010.

JUDIT MOSCHKOVICH is a professor of mathematics education in the Education Department at the University of California, Santa Cruz, 1156 High Street, Santa Cruz, CA 95064; email: jmoschko@ucsc.edu. Her research uses sociocultural approaches to examine mathematical thinking and learning, mathematical discourse, and mathematics learners who are bilingual, learning English, and/or Latino/a.

Prompt:
Write about a new idea or a new take on a known idea from the essay.

"Math communication is more than just vocabulary."

"Learning vocab is not enough, they must be able to use it in discourse. I will work on doing this more often."

"I like the idea that the "language of mathematics" is not just a list of vocabulary"

"Four dimensions of equity: access, achievement, identity and power."

"Approaching Math word problems with intentional math practices for access & relevance."

Selected Responses From Math Department Chairs 9/18/17

Journal of Urban Mathematics Education, July 2013, Vol. 6, No. 1, pp. 45–57 ©JUME.http://education.gsu.edu/JUME

Modeling Strategies during Leadership Meetings/Workshops

Collaboration:

1. Read, write, pair-share, group-share
2. Written conversations (pencil/paper or online discussions)
3. Intentional Collaborative Lesson Planning

III. HOW ARE WE CREATING A CULTURE OF REFLECTION AND LEARNING AMONG OUR COLLEAGUES?

Julie’s Experience

Modeling Reflective Strategies in Teacher-Led Workshops

Teacher Leaders demonstrate and provide collaborative opportunities

- District-wide Math Talks PLC
- Follow-up workshops (based on request and teacher expertise)
- Book Study Groups

Jessica's Experience

Challenges

- Distrust of leadership & broken relationships
- Resistance to transition from Traditional to Student-Centered Instruction
- Focusing Blame on Materials

Road to Solutions

- Changing the narrative
- Solution-Driven
- Collaborative Lesson Planning
- PLC - Teacher Video

Susie's Experience

Challenges

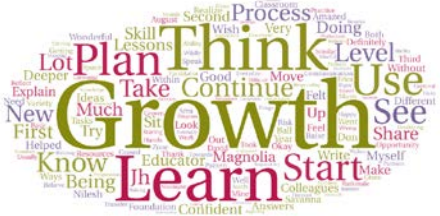
- New to the school and became the Dept Chair
- Resistance to Transition from Traditional to Student-Centered Instruction
- Distrust & Lack of Collaboration

Road to Solutions

- Slow, but consistent with direction; "Stay the Course"
- Thank You Notes from Students to Teachers
- Assume Positive Intentions
- Shift Focus from Problems to Solutions

Math Talk Microcredential Module Pilot

- New PD format to support and promote Growth Mindset for Teachers
- Continued support as teachers are implementing a newly learned instructional strategy; e.g., “Math Talk”
- What Participating Teachers Said - Link
- 4/12 (33%) teachers earned Proficiency the first time around
- 12/12 (100%) teachers earned it after second or third attempt



Where Do We Go From Here?

Takeaway & Action Steps

Reflect on what we have talked about and pick one area that you would like to focus on. What are your action steps?

Link to Padlet here or Scan the QR Code

https://padlet.com/min_s/takeaway

Thank You!

Julie Spykerman
spykerman_j@auhsd.us

Susie Min
min_s@auhsd.us

Jessica Alvarado
alvarado_je@auhsd.us