

Teachers
Empowered to
Advance
CHange in
MATHematics

Connecting Mathematics, Children's Mathematical Thinking, and Community Knowledge through Community Math Explorations

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National Science Foundation Award No. (DRL#1020155)

Overview of Session

- *TEACH MATH* Project: Goals, Research Settings, and Research Question
- Conjectured Learning Trajectory for Pre-service and Early Career Teachers
- Community Mathematics Exploration Module
- Work Groups: Analyzing CME math lessons
- Concluding Discussion

TEACH MATH Project Goals

- To collaborate across multiple sites to design, refine, and study instructional modules for preK-8 mathematics methods courses that explicitly develop PSTs' competencies related to mathematics, children's mathematical thinking and children's community/cultural/linguistic funds of knowledge.
- To better understand the development of PSTs' knowledge, beliefs, dispositions and practices related to *connecting children's multiple mathematical funds of knowledge* in instruction

Diverse Range of Teaching Contexts Among Collaborators*

- Urban
 - J. Aguirre: University of Washington Tacoma
 - M. Foote: Queens College, CUNY
- Mixture of Urban, Suburban, and Rural
 - C. Drake: Iowa State University
 - A. Roth McDuffie: Washington State University Tri-Cities
- Suburban
 - T. Bartell: University of Delaware
- Borderlands
 - E. Turner: University of Arizona

** Note: Primary collaborators are named for each site, but many others contribute from these sites.*

Research Question

What changes do we notice in PSTs' knowledge, beliefs, dispositions, and practices related to integrating children's mathematical thinking and their home and community-based funds of knowledge in mathematics instruction?

Theoretical Perspectives

- Teacher learning as situated social practice

(Lave & Wenger, 1991)

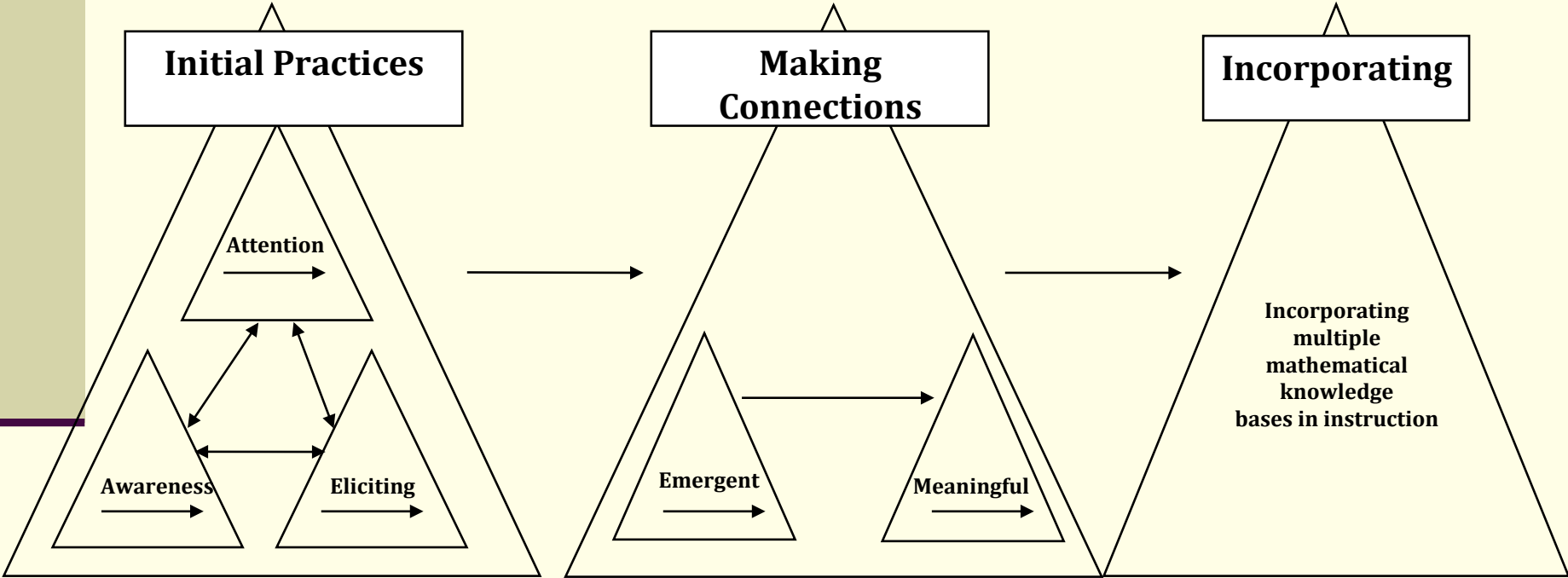
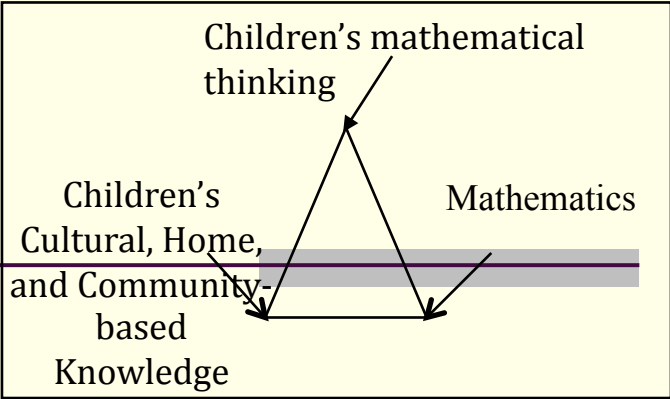
- PST learning as process of identity development

(Wenger, 1998)

- PSTs move along a trajectory toward becoming mathematics teachers

Simon (1995); Mason (2008)

PST's **Learning Trajectory** for engaging children's multiple mathematical knowledge bases



Learning Modules

- **Critical Analysis of Mathematics Classroom Practice**
 - Video Case Analysis
 - Analysis of Curriculum Spaces
 - Observation and/or Analysis of Mathematics Lesson
- **Mathematics Learning Case Study**
 - Mathematics “Getting to Know You” Interview and/or Shadowing of a Student
 - Problem Solving Interview/s
- **Community Mathematics Exploration**
 - Community Walk/Visit
 - Lesson/Task Planning

Community Mathematics Exploration

- PSTs identify mathematical practices and mathematical funds of knowledge in students' communities by going on a **Community Walk/Visit**
- PSTs build on this information in developing either a standards-based **Mathematics Lesson/Task**.
- PSTs reflect on these activities through discussion and debriefing. This may include presentations of their lesson plans/tasks, followed by an individual written reflection (completed in class as a quick write or out of class as a homework assignment).

Work Group Session

- Look for evidence (narratives and lesson plans) of PST's knowledge about:
 1. Mathematics
 2. Children's mathematical thinking
 3. Community/home-based funds of knowledge.

- ***How would you describe the connections made among these three knowledge bases?***

First Example: Pizza Parlor (3rd grade)

Work Group Session

- Various Community Math Exploration Lesson Examples:
 - Las Socias Tienda (3rd grade)
 - Coastal Drums (Kindergarten)
 - Fencing Terminal Park (4th grade)

Work Group Session

- Look for **evidence** (narratives and lesson plans) of PST's knowledge about: 1) Mathematics, 2) Children's mathematical thinking, and 3) Community/Home-based funds of knowledge.
 - **How would you describe the connections made among these three knowledge bases?**
 - **Given the community walk context the PSTs examined, what other possible connections might have been made?**
 - **Why might this be an important experience for PSTs in a k-8 math methods class?**
- Summarize your discussion on poster paper and prepare to share with group.

Promises and Challenges of CME

- Provides opportunities for PSTs to engage in *initial practices* toward making *meaningful connections* mathematics beyond the classroom
- Develops an integrated knowledge base for the teaching practice of lesson planning
- Supports awareness of mathematical-community connections in multiple ways
 - going beyond math and money
 - more nuanced and complex views of both mathematics and communities as resources for teaching and children's learning

Final Reflection: New ways to see math and the community

“I actively looked for numbers in places that I normally would not. It was easy to spot numbers in the café or the corner store: prices and money. But in addition, it was fun to think about the angles of the crooked fencing near the school, or the garbage-to-receptacle ratios in People’s Park...”

Final Reflection: New ways to see math and the community

“In my past, I have spent a lot of time highlighting the gentrification of the [Neighborhood] to City officials, and espousing the positive qualities of the neighborhood and its residents. However, this time, with the “math” and “kid” lenses also in focus, I saw new places for justice. The corner store, with its miles of candy and its spoiled meat from [Big Store Chain], struck me, in particular. It seems to be a place preying upon kids, under the guise of convenience. I’m sure an interesting math lesson exists there.”

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Thank you

Questions?

For more information
TEACH MATH Website:
<http://mathconnect.hs.iastate.edu>



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