

# Supporting Elementary Teachers in Developing Their Mathematics Teaching

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2015 AMTE Judith E. Jacobs Lecture



# Supporting Elementary Teachers in Developing Their Mathematics Teaching

- What are we doing?
- Can we do more? Can we make a bigger, more systemic impact?
- How can AMTE help?



<b>Year</b>	<b>JEJ Lecturer</b>	<b>Title</b>
2003	Judith E. Jacobs	Improving Mathematics Education: Mathematics Teacher Educators Lead the Way
2004	Thomas J. Cooney	The Role of Mathematics Teacher Education: Reform or Enculturation?
2005	Glenda Lappan	Reflections on a Lifetime of Work: Why Curriculum Matters
2006	Judith Sowder	Preparing Elementary Teachers: The Role of Reasoning about Numbers and Quantities
2007	Deborah Loewenberg Ball	The Core and Contemporary Challenges of Mathematics Teacher Education
2008	Ed Silver	Mathematics Teacher Education in Dodge City: Desperately Seeking Wyatt Earp and Henri Poincaré
2009	Jeremy Kilpatrick	Going to War with the Army You Have



<b>Year</b>	<b>JEJ Lecturer</b>	<b>Title</b>
2010	James Hiebert	Building Knowledge for Helping Teachers Learn to Teach: An Alternative Path for Teacher Education
2011	Joan Ferrini-Mundy	Learning for Tomorrow: Challenges and Opportunities in Mathematics Teacher Education
2012	Deborah Schifter	Interpreting the Common Core: What Might It Look Like in the Classrooms?
2013	Karen Karp	The Invisible 10% - Preparing Teachers to Teach Mathematics to Students with Special Needs
2014	Barbara J. Reys	Curriculum Matters! For Teachers, for Students, and for Mathematics Teacher Educators
2015	Nadine Bezuk	Supporting Elementary Teachers in Developing Their Mathematics Teaching



# Judith E. Jacobs Lecturers

- First, in 2003: **Judith E. Jacobs**
- “Improving Mathematics Education: Mathematics Teacher Educators Lead the Way”
- She described what it means to be a professional who is a **Mathematics-Teacher-Educator.**



According to Judith,

“I am not an educator who works with mathematics teachers; I am not a teacher educator who is concerned or interested in mathematics; and I am not a mathematics teacher who is concerned with educational issues. I am a **Mathematics-Teacher-Educator.**”



- In 2006: **Judith Sowder**  
(4<sup>th</sup> JE Jacobs Lecturer)
- “Preparing Elementary Teachers: The Role of Reasoning about Numbers and Quantities”



# My Emphasis Today

- The career of elementary teachers as teachers of mathematics
  - From prospective teachers to practicing teachers
- How do they develop their math teaching?
- How do we, as mathematics-teacher-educators, help them develop their math teaching?
- What more might we do? How can we design and implement systemic solutions?





# So What Recommendations Exist Related to This Topic?

- “Requirements to Become an Elementary Math Teacher:
- Elementary math teachers require **some formal education.**” (emphasis mine)

From “Education Portal”: <http://education-portal.com/articles/>

[Requirements\\_to\\_Become\\_an\\_Elementary\\_Math\\_Teacher.html](http://education-portal.com/articles/Requirements_to_Become_an_Elementary_Math_Teacher.html)



# National Council on Teacher Quality (NCTQ)

- No Common Denominator: The Preparation of Elementary School Teachers in Mathematics by America's Education Schools (2008)
- Examined the math preparation of America's elementary teachers.



**“Absent a conclusive body of research on how best to prepare elementary teacher candidates, we devoted two years of study to develop a set of five standards that would be the mark of a high quality program of teacher training.” (p. 1)**



“The Association of Mathematics Teacher Educators (AMTE) should organize mathematicians and mathematics educators in a professional initiative and charge them with **development of prototype assessments** that can be used for course completion, course exemption, program completion, and licensure.” (NCTQ, 2008, p. 16)



# The Mathematical Education of Teachers II

- Published by CBMS in 2012
- Section on Elementary Teachers (ch. 4)
- Focus is on mathematics for elementary teachers courses, math components in PD, and how mathematicians could be involved.
- “Coursework in mathematical pedagogy is assumed to be part of a preparation program, but is not discussed in detail” (p. 23)



# Supporting Elementary Teachers in Developing Their Mathematics Teaching

- What are we, as MTEs, doing?
- Can we do more? Can we make a bigger, more systemic impact?
- How can AMTE help?



# Who Am I and What Have I Done?

## San Diego State University

- 11 MTEs in two different departments in two different colleges (College of Education and College of Sciences)
- My primary teaching assignment: elementary math methods (for approx. 30 years)
  - Previously taught K-1-2, 4, 8, and high school math
- Research Center (CRMSE), Interim Director
- School of Teacher Education, Director



# SDSU Professional Development Collaborative

- Co-director (with Judy Sowder, Nicholas Branca, and Janet Bowers)
- Created 3 math specialist programs for primary, upper elementary, and middle school teachers
  - Over 400 teachers have earned our certificates
  - Conducted PD for over 2500 K-12 teachers in San Diego County





# State of California

- Served on the Teaching Mathematics Advisory Panel to review and revise the state's math specialist credential
- Panel also made recommendation that a math methods course be required for an elementary teaching credential in CA
  - Past requirements only included a reading methods course and a general methods course



# AMTE Involvement

- Served on the Board for 20 years (President, Treasurer, NCTM Representative, Executive Director)
- Member of groups that developed:
  - AMTE's Guidelines for Mathematics Specialist Programs
  - AMTE's forthcoming book on Elementary Math Specialists



Where do elementary teachers learn (more) about teaching math?

Think, then discuss with a neighbor.



# CA Credentialing System

- No BAs in Education
- Credential program is a fifth-year program or part of a masters degree
- New teachers must participate in an induction program in their first few years of teaching in order to “clear” their credential to a permanent credential (renewable every 5 years)



# Where do elementary teachers learn (more) about teaching math?

- In undergraduate programs
- In teaching credential programs
- During student teaching
- In induction programs
- In masters programs
- In professional development programs
- In doctoral programs



# In Undergraduate Programs

## “Math for Elementary Teachers”

- What do students learn? How many units/credits/courses?
- Who teaches it?
- What do students do? How do they learn?
- Who are students' models of math teaching? How are they selected?
- Do folks teaching these courses interact with folks teaching math methods?



# In a Credential Program

## Elementary Math Methods

- What do they learn? How many units/credits/courses?
- Who teaches it?
- What do they do? How do they learn it?
- Is it part of a high-stakes assessment? (edTPA, TPA, etc.) How does that impact the course and students' learning?

(continued)



- Is there a field experience/clinical experience connected with it? Do students have opportunities to see math being taught? To interview children?
- Who are students' models of math teaching? How are they selected?
- Do folks teaching this course interact with folks teaching math for elementary teachers?





# Student Teaching Experience(s)

- What do they learn about teaching math?
- What do they do?
- Who are their models of math teaching?
  - How are they selected?
- What are they experiencing related to math teaching and learning?



# Induction Program

- What do they learn about teaching math?
- What do they do?
- Who are their models of math teaching?
- What are they experiencing?



# Masters Program

■ Is it a general program, say in elementary education?

- Are they learning anything about teaching math?

Is it focused on math/math education?

- What are they learning?
- How can they influence colleagues and practices at their school?



# Professional Development/Learning/ Partnerships with Local Schools & Districts

- What are the goals?
- Who's planning it and leading it?
- What do they learn about teaching math?
- What's the role of math?
- What's the balance between mathematics, mathematics pedagogy, and general pedagogy?



# Doctoral Program

- What opportunities exist for elementary teachers to earn a doctorate related to math education?
- How much math content do they need/must they have upon entrance to the program?
- How can they learn more mathematics?
- If we require a masters in math as an entrance requirement, are we excluding some students who might make contributions to our field? Can they learn more math as part of their doctoral program?

(continued)



- If we don't have more people in our field with experience in teaching math in elementary schools, are we narrowing the expertise of our MTE community?
  - Are we limiting our effectiveness in improving math teaching in elementary schools?
- How many doctoral programs have an emphasis in elementary mathematics education as an option?



# What Else Might We Do?



# At our Universities

- Who else on our campuses is involved in or interested mathematics teacher preparation?
- How can we collaborate? To what end?





# With School Districts

- Are local districts involved in conversations with university MTEs about preparing elementary teachers to teach math?
- Are we involved with local districts in designing and delivering PD?



# With Partners & State Agencies

Does a state-wide organization exist that could help?

- An AMTE affiliate? (CAMTE)
- An NCTM affiliate? (CMC)

State agencies

- CA DOE
- CCTC

Program review panels

- Task forces examining requirements



# With AMTE

■ Building a professional knowledge base about effective elementary math teacher preparation and development

When do we have enough horsepower to say something definitive? (Denise Spangler)

- who's working on it?
- might we form collaboratives to work on this?



- MTE focus issue or an AMTE Monograph
- Task force
- Standards for elementary math teacher preparation and development (i.e., MET 2 re elementary math teacher preparation)



# Build or Expand Partnerships with Other Groups

- NCTM
- NCSM
- AMATYC
- MAA, AMS
- Others



# What Should We Do???

- Expand our professional knowledge based and share broadly.
- Work in a more systemic way on our campuses to enhance programs.
- Create national recommendations.



In the absence of genuine leadership, people will listen to anyone who steps up to the microphone.



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"Improving Mathematics Education:  
**Mathematics Teacher Educators  
Lead the Way**"





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**WHO is going to lead the way?**



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**WHO is going to lead the way?**

**If not us, WHO?**



Thank you!

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