



Professional Development for Highly Qualified Teachers

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NCTM Board of Directors

TODOS: Mathematics for All President-Elect

ASU CRESMET, Director of Professional Development



Research on Latino/Hispanic Teachers

- 1989 study by the Tomas Rivera Center
- 156 Latino teachers
- 11 years Average years of experience
- 70% K-6 teachers
- 73% Bilingual
- 55% Masters degrees

G. Monsivais, 1990, Latino Teachers: Well educated but not well prepared



Research on Latino/Hispanic Teachers

Reported barriers to pursuing teaching careers

- 87% Poor K-12 preparation
- 51% Testing requirements

G. Monsivais, 1990, Latino Teachers: Well educated but not well prepared



Feeling of Preparedness

K-6 Teachers feeling prepared to teach

- 63% English
- 59% Mathematics

K-12 Teachers feeling prepared to teach

- 34% Latino students
- 27% “Limited English Proficiency”

G. Monsivais



In Addition

- 65% indicated that fellow teachers have lower expectations of Latino students than Anglo students

G. Monsivais



Research on Mathematics Professional Development

Content needs to

- Challenge core beliefs
- Motivate teachers to develop knowledge, skills, and disposition
- Address math content
- Address how students learn
- Address knowledge needed for teaching
- Make issues of equity visible

Judy Sowder, 2007

Handbook of Research on Mathematics



Address Mathematics Content

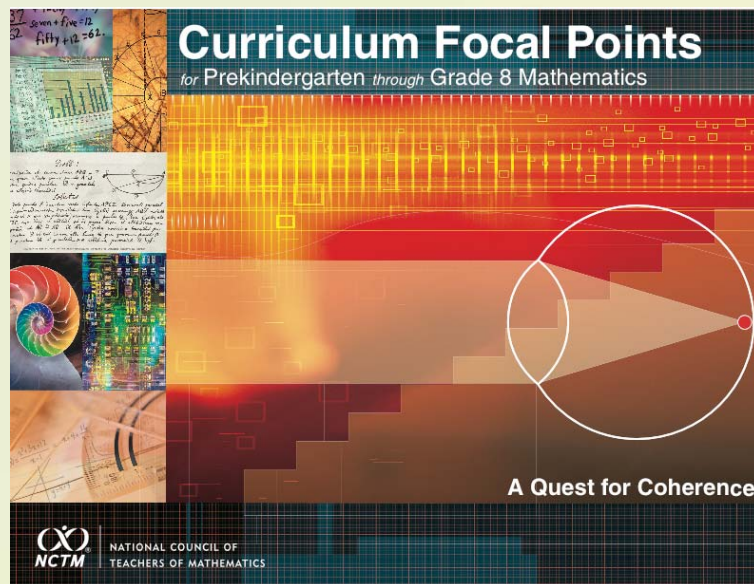
- Teaching to the big ideas
- Rethinking what it means to understand
- Teaching for conceptual understanding
- Requiring communication that focuses on understanding
- Assuring that strategies are transferable to the classroom



Curriculum Focal Points

for Prekindergarten *through* Grade 8 Mathematics:

A Quest for Coherence





CRESMET's Project Pathways*

Research on functions course

- High school mathematics and science teachers
- Piloted and revised several times
- Focused curriculum on big ideas and
 - Proportionality
 - Covariation and rate of change in linear and exponential functions
- Requiring adherence to *Rules of Engagement*
- Using knowledge and experiences to revise/pilot college algebra course

* Funded by NSF



CRESMET's Project Pathways*

Rule of Engagement:

Speaking with Meaning

- conjectures are based on logic
- conclusions are supported by a mathematical argument
- explanations are given using the quantities involved
- responses are conceptually based

* Funded by NSF



Addressing Equity

- Soft approach
- Bold approach



A Soft Approach

Every student should have equitable and optimal opportunities to learn, free from any bias on the part of schools, communities, and teachers. Every student should be taught by teachers in schools where expectations are high, regardless of the community where the school is located.

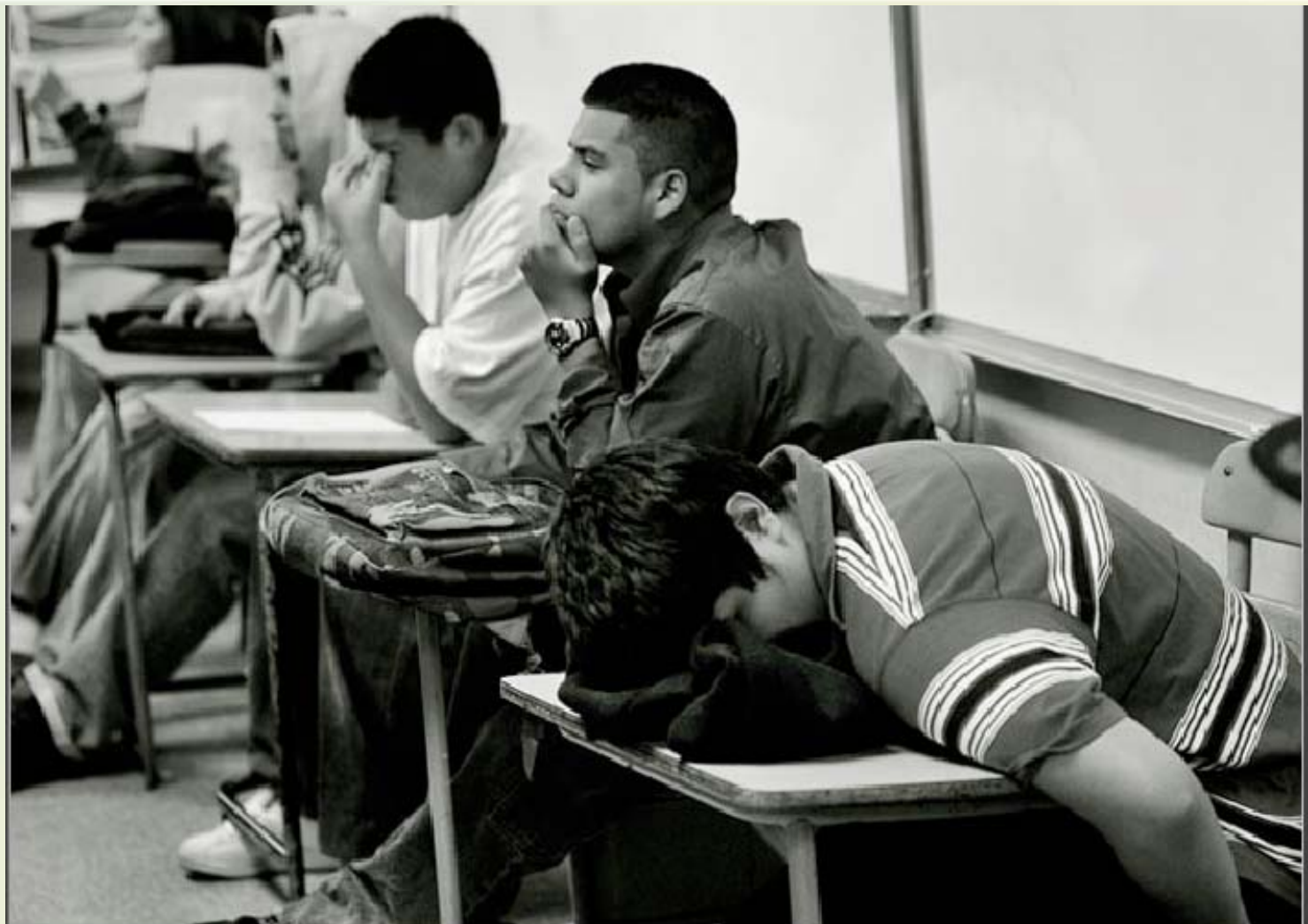
NCTM's Closing the Achievement Gap Position



Addressing Equity

Study says skin tone affects earnings:
Light-skinned immigrants in the United States make more on average than those with darker complexions, and the chief reason appears to be discrimination, a researcher says.

The Associated Press 2007



ASU ARIZONA STATE UNIVERSITY



CRESMET
CENTER for RESEARCH in SCIENCE,
MATHEMATICS, ENGINEERING & TECHNOLOGY



Addressing Equity

Resources

National Coalition for Equity in Education
Julian Weissglass,
University of California, Santa Barbara



How English Language Learners Learn Mathematics

- CEMELA, Center for the Mathematics Education of Latinos/as
 - NSF funded center, AZ, CA, IL, NM
- TODOS: Mathematics for All
 - Synthesis of the research presented to the National Math Panel
- Texas State University System Mathematics for English Language Learners (MELL)
 - Several projects throughout the state of Texas



Unpacking a Mathematical Idea with an English Language Learner in Mind

- What do students need to understand to solve this problem?
- What mathematics do I want to the students to learn from this problem?
- What specific language needs attention?



Unpacking a Mathematical Task

- What are different strategies or different representations students can use?
- What are common misconceptions related to this problem?
- What other mathematics connections can be made?
- What will students say if they are making sense of the problem?



References & Resources

- National Council of Teachers of Mathematics nctm.org
 - Curriculum Focal Points, nctm.org/standards
 - Achievement Gap Position statement, nctm.org/about
 - Analysis, Briefs and Clips: connecting research and practice
- TODOS: Mathematics for All, todos-math.org
- CEMELA, math.arizona.edu/~cemela
- Arizona State University CRESMET, Cresmet.asu.edu
- Texas State University System MELL, www.tsusmell.org/
- Mathematical Knowledge for Teaching, Deborah Ball, www-personal.umich.edu/~dball/
- National Coalition for Equity in Education, ncee.education.ucsb.edu/
- Handbook on Research on Mathematics, March 2007
- *Study says skin tone affects earnings*, Associated Press, Jan. 26, 2007