We’ve Come a Long Way Since the “New Math” of the 50s

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Educational reform follows the socio-political tide.

Schools are often held captive.
REFORM/COUNTER-REFORM
Mathematics Education in U.S. Schools

- 1957: Launch of Sputnik “New Math” of the early 1960s
- Late 1960s & Early 1970s: Humanistic Era
- 1970s: “Back to Basics”
- Late 1980s through Late 1990s: Standards-based Education vs Back to Basics
- 2000 and Beyond: Standards-based Education supported by research
Pre-Sputnik Era (prior to 1957)

- Rote calculations
- Focus on developing arithmetic skills
- Behaviorist model of learning
- “Shop-keeper” mathematics
Sputnik Era
(1957 to early 60s)

New Math
- Abstract approach
- Focus on conceptual understanding
- Understanding the “why” of mathematics
- Discovery learning
- The structure of mathematics
  - Set theory and its notation
  - Field properties
  - Number theory
  - Bases other than base 10
  - Logic and proof

The creation of “little scientists”
Sputnik Era
(1957 to early 60s)

- National Defense Education Act of 1958
- College Board
- Advanced Placement
- Gifted and Talented Programs
Humanistic Era 
(mid 60s to early 70s)

- A result of poverty, homelessness, drugs, civil rights movement, women’s movement, and the Vietnam war
- Student-centered classrooms
- Open classrooms
- Rise of educational research
- No accountability for lack of student learning
Back-to-Basics Movement (1970s)

- A result of the decline of test scores and general illiteracy of the “Humanistic Era”
- NAEP (1972) accountability, focus on skills, minimum competency, “excellence in education”
- In Texas, the birth of minimum competency testing, TABS
Forces For Change

- NCTM’s *Agenda for Action* (1980)

- National Defense Education Act of 1980

- *A Nation at Risk* (1983)
Forces For Change

- Poor student performance: NAEP, FIMS, SIMS
- Redundancy in American curriculum
- Changing expectations of business and industry
- Access to technology
- Research on how students learn
- Inequities in opportunities
- Global society
NCTM’s Agenda for Action (1980)

- Problem-solving must be the focus of school mathematics.
- Basic skills in mathematics must encompass more than facility in computation.
- Mathematics programs must take full advantage of computers and calculators.
- Student learning must be evaluated by a wider range of measures than conventional testing.
National Defense Education Act of 1980

- Funded math/science curricular reform as and professional development for teachers as in the 1958 Act
- Learned from the failures of the *New Math*
- Birth of the Rice University School Mathematics Project (RUSMP)
President Reagan commissioned a national study on the state of the schools in the U.S. expecting a positive report. Instead, he received a negative report about U.S. education. U.S. was not competitive internationally. The greatest threat to U.S. boundaries was our uneducated youth.
A Nation at Risk (1983)

- Educational focus again on mathematics/science
- Gifted and Talented
- Accountability and minimum competency for all students
NCTM’s Standards

- 1989  Curriculum and Evaluation Standards for School Mathematics
- 1991  Professional Standards for Teaching Mathematics
- 1995  Assessment Standards for School Mathematics
- 2000  Principles and Standards for School Mathematics
To develop a national consensus:

- core set of expectations for all students
- extended core for those intending a math-intensive university coursework and careers
- serving a diverse constituency
Standards-Based Education

- Problem solving
- Reasoning and proof
- Communication
- Connections
- Representation
Standards-Based Education

- Research based
- Active learning
- Cooperative learning
- Use of technology
- Real-world applications
- Conceptual and procedural knowledge
- Authentic assessment
Math Wars

- Traditional *versus* reform
- Procedural skills *versus* conceptual understanding
NCTM *Principles and Standards (2000)*

- Best from both approaches
- Not “either/or”
- Conceptual understanding *and* fluency in mathematical computations
- Research based
Why did earlier reforms fail?

- Represented top-down reform
- Did not involve all constituents in decision-making and reform process
- Lacked consequences for poor student achievement
- Did not make mathematics accessible to all students
- Did not make use of educational research on how students learn
Why are reforms aligned to the NCTM *Principles and Standards* more successful?

- Learned from the failures of *New Math*
- Involved all constituents in decision-making and reform process
- Promoted mathematics access for *all*
- Grounded on research on teaching and learning
Next Steps…

No Child Left Behind Act of 2001

Building upon NCTM’s Principles and Standards
How do we stop this cycle of reform/counter-reform that occurs every 12-14 years?

- Knowledgeable teachers stop the cycle at the classroom level.
- An informed society stops the cycle for good.
This presentation appears on the Rice University School Mathematics Project web site:
http://rusmp.rice.edu