

RESEARCH PRESESSION

(Final Program)

The 72nd Annual Meeting of the
National Council of Teachers of Mathematics

Monday-Wednesday, 11-13 April 1994

Westin Hotel/Convention Center
Indianapolis, Indiana

Sponsored by

Research Advisory Committee of the
National Council of Teachers of Mathematics

Special Interest Group for Research in Mathematics Education
of the American Educational Research Association

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Announcements

No registration or fee is required to attend the pre-session.

The Monday evening session and most Tuesday sessions will be held in the Westin Hotel. The NSF Workshop on Tuesday afternoon and the Wednesday sessions will be held in the Convention Center.

Informal meetings may be held Tuesday afternoon in the Cabinet Room.

Please Note: Attendance is limited at the R³ME session (8:30-12:00, Capitol 2). A sign-up sheet will be provided at the door.

To preserve the interactive nature of the pre-session, we remind each organizer/moderator to allow a minimum of 15 minutes per session for general discussion.

Acknowledgment

Sincere gratitude to Gale Watson for her expert help and invaluable support in the preparation of this program.

Monday, 11 April 1994

7:30 - 9:00 pm

Capitol 1 & 2 (Westin)

Welcome

Organizers: Susan Jo Russell, TERC
Chair, NCTM Research Advisory Committee

Sigrid Wagner, Ohio State University
Co-Chair, SIG/RME of AREA

NAEP at 20: Changing Large-Scale Assessment

(Opening Plenary Address)

Speaker: John Dossey, Illinois State University and
U. S. Military Academy, West Point

A retrospective view of the Mathematics Assessments conducted by National Assessment of Educational Progress (NAEP), with special emphasis on recent and upcoming changes. What does, and could, NAEP tell us about mathematics education and its current condition?

A reception will be held in Capitol 3 (Westin) following this session.

Tuesday, 12 April 1994

(See back cover for overview of Tuesday's schedule)

8:30 - 10:00 am

Capitol 1 (Westin)

Classrooms That Promote Understanding: Common Components

Chair: Thomas Romberg, University of Wisconsin-Madison

Presenters: Elizabeth Fennema, University of Wisconsin-Madison
James Kaput, University of Massachusetts-Dartmouth
Richard Lehrer, University of Wisconsin-Madison
Judith Sowder, San Diego State University

The mission of the National Center for Research in Mathematical Sciences Education (NCRMSE) is to provide a research base for the reform of school mathematics. This session will focus on six components of classrooms that promote understanding in the teaching and learning of mathematics.

8:30 - 12:00 noon

Capitol 2 (Westin)

Recognizing and Recording Reform in Mathematics Education: Clarifying the Issues

Organizers/ Karen Graham, University of New Hampshire
Presenters: Joan Ferrini-Mundy, University of New Hampshire

Presenters: Mark Driscoll, Education Development Center
Beverly Ferrucci, Keene State College
Loren Johnson, University of New Hampshire
Linda Levine, Orange County Public Schools
Geoff Mills, Southern Oregon State College
Lois Moseley, Region IV Educational Service Center
Pat Tinto, Syracuse University
Terry Wood, Purdue University

A forum for discussion of critical issues emerging from an ongoing project to document mathematics reform efforts with emphasis on the influence of the NCTM *Standards*. Goals are to: (1) foster an appreciation for the complexity of the change process, (2) identify contextual features that promote or hinder change, and (3) encourage practitioners, researchers, and policymakers to engage in the discourse critical to reform.

8:30 - 12:00 noon

Council (Westin)

What Does Mathematics Practice in Everyday Situations Have to Do With Teaching and Learning Mathematics in the Classroom?

Organizer/Presenter: Joanna Masingila, Syracuse University

Presider: Gloria Gilmer, Math Tech, Inc.

Presenters: Susana Davidenko, Syracuse University
Ewa Prus-Wisniowska, Syracuse University

Discussants: Ubiratan D'Ambrosio, Universidade Estadual de Campinas
Frank Lester, Indiana University-Bloomington

A thematic presentation on mathematics practice in several everyday contexts, a comparison of how persons in these contexts solve problems and how secondary students solve problems in the same contexts, and proposal of a model for connecting everyday and school mathematics. The model and related issues will be examined by the two discussants.

8:30 - 10:00 am

Chamber (Westin)

The Difficulty of Equivalent Fractions: Part-Whole Relationships and Multiplicative Thinking

Organizer/Presenter: Constance Kamii, University of Alabama-Birmingham

Presenter: Faye Clark, Samford University

Discussants: Merlyn Behr, Louisiana State University
Carol Larson, University of Arizona
Leslie Steffe, University of Georgia

The difficulty of equivalent fractions will be explained in light of Piaget's constructivism, and educational implications of research will be discussed. The research highlights the difference between empirical knowledge and the logico-mathematical knowledge of equivalent fractions.

8:30 - 10:00 am

Caucus (Westin)

Catalysts and Constraints for Teacher Change: Implementing the Standards — An Inquiry Approach

Organizer/Participant: Patricia Brosnan, The Ohio State University

Participants: Thomas Edwards, The Ohio State University
David Erickson, The Ohio State University
Jeffrey Smith, The Ohio State University

Discussant: William Bush, University of Kentucky

This symposium seeks to explore factors contributing to or detracting from the process of teacher change. A year-long project focused on assisting 18 middle school mathematics teachers to implement the NCTM *Standards* through an inquiry approach.

8:30 - 10:00 am

Cabinet (Westin)

Teacher Learning: Dimensions and Ethics

Organizer/Presenter: Norma Presmeg, Florida State University

Presenters: Ken Shaw, Florida State University
Tony Thompson, Florida State University

Discussants: Lynn Hart, Georgia State University
Elizabeth Jakubowski, Florida State University

Three presenters will focus on moral issues, reflectiveness, and personal imagery of teachers and prospective teachers as these concern learning and changed practice. Issues such as empowerment, commitment, and societal constraints will be discussed.

10:30 - 12:00 noon

Capitol 1 (Westin)

***Systemic Change in Assessment:
Symbiotic Links to Curriculum and Teaching***

Organizer/Presenter: David Clarke, Australian Catholic University
Presider/Discussant: Judit Moschkovich, Inst. for Research on Learning
Presenters: Carolyn Maher, Rutgers University
Max Stephens, Victorian Ministry of Education
Sandra Wilcox, Michigan State University
Discussant: Thomas Romberg, University of Wisconsin-Madison

A restructured mathematics curriculum demands reconceptualized assessment. Presenters offer perspectives on language, tools, content, and consequences and suggest that the relationship between assessment, curriculum goals, and teaching practices is inherently symbiotic.

10:30 - 12:00 noon

Chamber (Westin)

Non-Representationist Views on Fraction Learning

Organizer/Presenter: Leslie Steffe, University of Georgia
Presider/Discussant: Paul Cobb, Vanderbilt University
Presenters: Adalira Saenz-Ludlow, Purdue University
Thomas Kleren, University of Alberta

Samples of fraction knowledge constructed by children in teaching experiments along with descriptions of the situations and social interaction that occasioned the constructive activity. Samples will be compared/contrasted and explanations offered for divergence/convergence.

10:30 - 12:00 noon

Caucus (Westin)

***The Anatomy of a Curriculum Development Project:
Issues, Dilemmas, Frustrations, and Rewards in CMP***

Organizer/Discussant: Diana Lambdin, Indiana University
Panel Discussants: Frances Curcio, Queens College
Jenny Jorgensen, Michigan State University
Glenda Lappan, Michigan State University
Rossana Perez, Louis Armstrong Middle School
Marlene Posner, Baker Demonstration School
Judith Zawojewski, National-Louis University
Reactor: Paul Trafton, University of Northern Iowa

A panel of individuals who are midway through the five-year NSF-funded Connected Mathematics Project (CMP) to write, pilot test, and evaluate a middle school curriculum will discuss their efforts in research and development with an outside reactor and the audience.

10:30 - 12:00 noon

Cabinet (Westin)

***Use of Multiple Representations
in Algebra, Pre-Calculus, and Calculus***

Organizer/Presider: William Davis, The Ohio State University
Presenters: Enrique Galindo, Indiana University
Susann Mathews, Wright State University
Donald Porzio, The Ohio State University
Agnes Tuska, California State University-Fresno
Discussant: James Kaput, University of Massachusetts-Dartmouth

The goal of this symposium is to examine the role of cognitive style, use of multiple representations of concepts, and use of transformations within a symbolic system in students' understanding of algebra, pre-calculus, and calculus.

12:00 - 1:00 pm

Lunch

1:00 - 2:00 pm

Capitol 2 (Westin)

***Evolving Standards for Judging the Quality
of Research Reports***

(Plenary Session Honoring the 25th Anniversary of JRME)

Organizer: Frank Lester, Indiana University-Bloomington
Editor, Journal for Research in Mathematics Education
Moderator: Martin Johnson, University of Maryland
Chair, JRME Editorial Panel
Participants: The JRME Editorial Panel:

Raffaella Borasi, University of Rochester
Thomas J. Cooney, University of Georgia
Joan Ferrini-Mundy, University of New Hampshire
M. Kathleen Heid, Pennsylvania State University
Doug Jones, University of Kentucky
Patricia S. Wilson, University of Georgia

Over the past year and a half, the JRME Editorial Panel has been engaged in substantive discussions about criteria for judging the quality of research reports based on a variety of ideological and methodological traditions. Eight preliminary "standards" will be proposed for reaction from the audience. The session will close with consideration of suitable mechanisms for extending/promoting the discussion of standards for quality of research reports.

2:15 - 3:45 pm

Capitol 1 (Westin)

Calculators in Primary Mathematics

Organizer/Presenter: Kaye Stacey, University of Melbourne

Presenter: Susie Groves, Deakin University-Burwood

Discussants: Grayson Wheatley, Florida State University
Erna Yackel, Purdue University-Calumet

Report on a long-term investigation of the effects of children having free access to calculators throughout their early school years. Issues include appropriate use of calculators, the effects on achievement and number sense, and the implications for curriculum change.

2:15 - 5:30 pm

Capitol 2 (Westin)

Teachers' Conceptions of Mathematics and Mathematics Teaching

Organizer/Presenters: Peter Kloosterman, Indiana University
Sue Mau, University of Notre Dame

Presenters: Charles Emenaker, Miami University
Ann Leitze, Ball State University
Ron Preston, Indiana University
Anne Raymond, Indiana State University
Lynda Wiest, Indiana University

After a brief symposium of current research about changing teachers' beliefs, there will be small group discussions of initiatives for teacher change. (Potential attendees should contact the organizers prior to the session for copies of short papers to be presented.)

2:15 - 5:30 pm

Council (Westin)

Multiple World Views Along the Road to Reform

Organizer/Presenter: Steven Williams, Brigham Young University

Presenters: Verna Adams, Washington State University
Kathy Ivey, Washington State University
Marvin Smith, University of Wisconsin-Madison
Stephanie Smith, University of Wisconsin-Madison
Sharon Walen, Montana State University

Discussant: Thomas Romberg, University of Wisconsin-Madison

This symposium explores world views and reform efforts from the perspectives of students, teachers, parents, and researchers. Its purpose is to identify what "real" change means and how we will know when reforms have been effective.

2:15 - 3:45 pm

Chamber (Westin)

Reflection on Practice: How Can Researchers Communicate Better at NCTM?

(Sponsored by RAC)

Organizer/Presenter: Susan Jo Russell, TERC
Chair, NCTM Research Advisory Committee

Presenter: Deborah Ball, Michigan State University

At the request of Research Advisory Committee (RAC), a new kind of session format called Reflection on Practice will be inaugurated at the 1995 NCTM meeting in Boston. Two members of RAC will demonstrate a prototype of the kind of session envisioned and engage the audience in a discussion of ways in which research sessions can better connect researchers and teachers.

2:15 - 3:45 pm

Caucus (Westin)

Word Problems and World Problems: Explaining the Mismatch

Organizer/Presenter: Susan Lamon, Marquette University

Presider: Richard Lesh, Educational Testing Service

Presenters: Brian Greer, Queen's University
Roger Saljo, Linkoping University

Discussant: James Kaput, Univ. of Massachusetts-Dartmouth

Report on recent research into the long-standing problem of children's dissociation of sense making from the solution of school mathematics word problems. Explanations for this phenomenon from sociolinguistic, information processing, and mathematical modeling perspectives.

2:00 - 5:00 pm

Rooms 208-209 (Convention Center)

National Science Foundation Workshop

(Co-Sponsored by NCSM)

Organizer/Presenter: Henry Kepner, Teacher Enhancement, NSF

Presenters: Emma Owens, Instructional Materials
Development, NSF
Tina Straley, Division of Undergraduate
Education, NSF

This workshop will begin with a presentation on program directions and priorities at the National Science Foundation (NSF). Following the presentation, the audience will be actively involved in conceptualizing projects rather than "writing proposals."

4:00 - 5:30 pm

Capitol 1 (Westin)

A Research-Practice Collaboration: Reforming Elementary Mathematics by Incorporating Calculators

Organizer/Presenter: Patricia Baggett, University of Michigan

Presenters: Karen Bradley, Springport Elementary School
Linda Bryan, Allen Elementary School
Sue Gallie, Springport Elementary School
Michael Marlow, Jackson County Intermediate School District
Margie Mohr, Springport Elementary School
Marilyn Sprinkle, Springport Elementary School

A project now in year 3 of incorporating calculators into K-5 mathematics. Discussion of principles, videotape of classrooms using calculators, demonstration lessons (with audience participation), and description of calculator use in assessment.

4:00 - 5:30 pm

Chamber (Westin)

Adapting the Standards to Adult Learners: Exploring What Is and What Could Be

Organizer/Presenter: Bonnie Mullinix, World Education

Presenter/Discussant: John Comings, World Education

Presenters: Mary Jane Schmitt, Massachusetts Department of Education
Members of the Massachusetts ABE Mathematics Team

Efforts in Massachusetts (with federal support) to address the adaptation of the NCTM *Standards* for effective use with adult basic education populations. Integration of parallel research projects, use of collaborative research design techniques, and efforts towards application and reform.

4:00 - 5:30 pm

Caucus (Westin)

Studying Cultural Diversity: Goals, Hurdles, and Productive Approaches

Organizer/Panelist: Patricia Wilson, University of Georgia

Panel Members: Beatriz D'Ambrosio, University of Georgia
Laurie Hart, University of Georgia
Martin Johnson, University of Maryland
Walter Secada, University of Wisconsin
Marilyn Strutchens, University of Kentucky

(Description at top of next page)

4:00 - 5:30 pm

Caucus (Westin)

Studying Cultural Diversity: Goals, Hurdles, and Productive Approaches (continued)

Work session participants and a panel of researchers will build a research agenda by discussing: (1) What do mathematics educators need to know about cultural diversity? (2) What are problems related to investigating this area? (3) What studies, ideas, and strategies offer direction?

Wednesday, April 13, 1994

9:00 - 10:00 am

Ballroom 7 (Convention Center)

Can Students Do Mathematical Problem Solving? Results From the 1992 NAEP Assessment

(Co-Sponsored by NCSM)

Presider: Judith Curran, University of New Hampshire

Speaker: Chancey Jones, Educational Testing Service

A new feature of the 1992 NAEP Mathematics Assessment was the inclusion of extended constructed-response questions. These questions require students to demonstrate--by writing, by giving examples, or by drawing diagrams--their mathematical reasoning and problem-solving abilities. Examples of these questions, which were scored at five generic levels of performance, will be presented. Additionally, scoring guides, sample student responses, and national results will be discussed.

2:30 - 4:30 pm

Room 162 (Convention Center)

**RESEARCH EXTENDED (K-8) WORKSHOP
(Admission by ticket)**

Developing Alternative Assessment: What We're Learning From NSF Curriculum Projects

Presenters: Jan Mokros, TERC
Tracey Wright, TERC

Participants will review and engage in mathematical tasks used to assess the impact of the Investigations in Number, Data, and Space curriculum. They will examine student interview data and consider mathematical and methodological issues involved in scoring these interviews.

RESEARCH PRESESSION

Overview of Tuesday's Schedule, 12 April 1994, Westin Hotel

	8:30 - 10:00	10:30 - 12:00	1:00 - 2:00	2:15 - 3:45	4:00 - 5:30
<i>Capitol 1</i>	Classrooms That Promote Understanding: Common Components	Systemic Change in Assessment: Symbiotic Links to Curriculum and Teaching		Calculators in Primary Mathematics	Reforming Elementary Mathematics by Incorporating Calculators
<i>Capitol 2</i>	Recognizing and Recording Reform in Mathematics Education: Clarifying the Issues		Standards for Judging the Quality of Research Reports	Teachers' Conceptions of Mathematics and Mathematics Teaching	
<i>Council</i>	What Does Mathematics Practice in Everyday Situations Have to Do With Teaching and Learning Mathematics in the Classroom?			Multiple World Views Along the Road to Reform	
<i>Chamber</i>	Difficulty of Equivalent Fractions: Part-Whole Relationships and Multiplicative Thinking	Non-Representationist Views on Fraction Learning		Reflection on Practice: How Can Researchers Communicate Better at NCTM?	Adapting Standards to Adult Learners: Exploring What Is and What Could Be
<i>Caucus</i>	Catalysts/Constraints for Teacher Change: Implementing Standards An Inquiry Approach	Issues, Dilemmas, Frustrations, Rewards in Connected Mathematics Project		Word Problems and World Problems: Explaining the Mismatch	Studying Cultural Diversity: Goals, Hurdles, and Productive Approaches
<i>Cabinet</i>	Teacher Learning: Dimensions and Ethics	Use of Multiple Representations in Algebra, Pre-Calculus, and Calculus		<hr/> <i>National Science Foundation Workshop</i> 2:00-5:00 pm <i>Convention Center, Rooms 208-209</i>	