Research Presession

The 69th Annual Meeting of the National Council of Teachers of Mathematics

Monday, 15 April to Wednesday, 17 April 1991

Convention Center
New Orleans, Louisiana

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
NCTM RESEARCH ADVISORY COMMITTEE

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University of Maryland

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ANNOUNCEMENTS

All Monday and Tuesday sessions are in the Convention Center.

Informal gatherings may be held in Room 11. The room is available from 9:00AM to 5:00PM on Tuesday.

Provision of refreshments is gratefully acknowledged:

Morning:  Harcourt, Brace, Jovanovich
Afternoon: Lawrence Erlbaum Associates, Inc.

Notes: (1) All organizers are reminded to allow a minimum of 15 minutes per session for general discussion.

(2) There may be a limit to the number of participants allowed into worksessions. Check to see if there are sign-up sheets at the doors.

Monday, 15 April 1991

7:15-7:30PM WELCOME
Convention Center Rooms 13, 15, 17

Patricia Campbell, University of Maryland Chair, NCTM Research Advisory Committee

Merlyn J. Behr, Northern Illinois University Co-Chair, AERA Special Interest Group for Research in Mathematics Education

7:30-9:00PM INTERPLAY BETWEEN MATHEMATICS LEARNING IN AND OUT OF SCHOOL
Convention Center Rooms 13, 15, 17

Speaker Geoffrey Saxe, University of California at Los Angeles

Discussants Paul Cobb, Purdue University
Judy Sowder, San Diego State University

Following the Talk
Wine and Cheese Reception courtesy of Dale Seymour Publications

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### Conferences Overview (Tuesday)

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<td>The Importance of community and collaboration in making mathematics work for minority students</td>
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<td>Teacher and researcher collaborations; Implementing the NCTM standards</td>
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**Tuesday, April 16, 1991**

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<td>8:15-8:45AM</td>
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<td>9:00-12:15PM</td>
<td><strong>ASSESSMENT - CHANGING THE RULES OF THE GAME</strong></td>
<td>Jean Kerr Stenmark - University of California-Berkeley, David Clarke - Australian Catholic University</td>
<td>Work in California and Australia has recently focused on assessment alternatives to support a thinking curriculum in mathematics education. What can research contribute to the reshaping effort? This session will explore the &quot;wisdom of practice&quot;, research efforts to date, and future research possibilities.</td>
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<td><strong>CONTRIBUTIONS OF NEW TECHNOLOGIES TO RESEARCH</strong></td>
<td>Sherry Fraser - University of California-Berkeley, Lynn Alper - University of California-Berkeley</td>
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<td>9:00-12:15PM</td>
<td><strong>II</strong></td>
<td>Paul Goldenberg - Educational Development Center</td>
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<td><strong>CC4</strong></td>
<td>Glenn Klein, Educational Development Center, Rina Zazkis, Northern Illinois University, Doug Clements, State University of New York, Ed Dubinsky, Purdue University, Ann Rubin, TURK, Cynthia Chao, Educational Development Center</td>
<td>Research results are influenced by the medium through which they are obtained. In assessing learning, the medium is influential at two junctures: learning and assessment. This symposium will explore some of these influences.</td>
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9:00-10:30AM  RESEARCH ON THE LEARNING AND TEACHING OF FUNCTIONS
III  C5
Organizer  Orit Zaslavsky, Technion, Haifa
Presenters  M. Kathleen Held, Pennsylvania State University
Alan H. Schoenfeld, Univ. of California-Berkeley
Judah L. Schwartz, Harvard Grad School of Educ.
Shlomo Vinner, Rutgers University
Discussant  Orit Zaslavsky
Work Session  The session will focus on ways in which students learn and reason with various aspects of the function concept (e.g., its definition, properties of linear functions, the notion of increasing on a certain domain). Different settings in which students develop the function concept will be presented (e.g., a computer aided environment, a mathematical modeling context). A function-based approach to the secondary mathematics curriculum will be proposed.

9:00-10:30AM  ASSESSING CHANGE IN TEACHER BEHAVIORS:
IV  C6
Organizer/Presenter  Linda Ruiz Davenport, Portland State University
Deborah Schifter, Mount Holyoke College
Lynn Hart, Georgia State University
Virginia Stimpson, Mercer Island, Washington
Discussant  Richard Lesh, Educational Testing Service
Research Symposium  The NCTM Curriculum and Evaluation Standards have implications for changes in the way mathematics is taught. Efforts are underway to help teachers make these recommended changes. This symposium will explore useful research methodologies for describing and assessing change in teacher behaviors that specifically support the NCTM Standards.

9:00-10:30AM  THE IMPORTANCE OF COMMUNITY AND COLLABORATION IN MAKING MATHEMATICS WORK FOR MINORITY STUDENTS
V  C7
Organizer/Presenter  Charlene Morrow, Mount Holyoke College
Lyn Taylor, University of Colorado-Denver
Rose Ascera, University of California-Berkeley
Robert Johnson, St. Cloud State University
Discussant  Gilah Leder, Monash University - Australia
Research Symposium  The impact of community and collaboration on the attitudes and behaviors of blacks, hispanics, American indians, and white females toward mathematics within the context of four specific programs will be discussed. Implications for mathematics curricula and classrooms will be explored.

10:45-12:15P  AN EXAMINATION OF NCTM'S NEW TEACHING STANDARDS
VI  C5
Organizer/Presenter  Thomas L. Good, University of Missouri
Deborah Loewenberg Ball, Michigan State University
Joan Ferrini-Mundy, National Science Foundation
Research Symposium  This symposium will analyze the teaching standards proposed in the NCTM document, Professional Standards for Teaching Mathematics. It will provide a historical perspective on their development, key recommendations, and problems that teachers will face in their implementation. In addition, research opportunities, particular lines of research, and funding policy implications will be discussed.

10:45-12:15P  THEORY, PRACTICE AND RESEARCH IN THE DESIGN OF MATH TEACHING
VII  C7
Organizer/Presenter  Alan Bell, Shell Centre for Mathematical Educ.
Discussants  Merlyn J. Behr, Northern Illinois University
Paul Cobb, Purdue University
Thematic Presentation  A review of the current state of knowledge and practice in the design of teaching and its relation to research on students' understanding with discussion of questions needing further research.

10:45-12:15P  PROGRAM EVALUATION IN MATHEMATICS EDUCATION
VIII  C9
Organizer/Presenter  Jack Bookman, Duke University
M. Kathleen Held, Pennsylvania State University
Presider  Tom Berger, National Science Foundation
Discussant  Richard Lesh, Educational Testing Service
Work Session  The purpose of this work session will be to discuss assessment of curricular reform in mathematics education. Two examples of evaluations will be presented in order to stimulate a discussion of the methods and issues involved.
1:30-4:45PM TECHNOLOGY EDUCATION FOR TEACHERS OF MATHEMATICS
IX CC2
Organizer George W. Bright, University of North Carolina
Presenters Sharon Senk, Michigan State University
Alan Osborne, Ohio State University
Tommy Eads, North Lamar Independent School Dist.
John G. Harvey, University of Wisconsin-Madison
Discussant Carole Lacampagne, National Science Foundation
Work Session This work session will synthesize experiences from existing education projects (mainly representing work with calculators) into questions to guide future research. The first 1.5 hours will be presentations of four projects; the second 1.5 hours will be discussion between presenters and audience.

1:30-4:45PM REASONING ALGEBRAICALLY IN ARITHMETIC: BRIDGING THE GAP BETWEEN ARITHMETIC AND ALGEBRA
X CC4
Organizers/ Presenters Patrick W. Thompson and Alba G. Thompson,
San Diego State University
Presider/ Discussant Sigrid Wagner, University of Georgia
Work Session What does it mean for students to reason "algebraically" in the arithmetic curriculum? What are the implications for pedagogy, curriculum, and teacher education of taking "algebraic" reasoning as a cognitive objective? Discussions of these and other questions will be grounded in examples from a project investigating the development of middle-school students' abilities to reason algebraically.

1:30-3:00PM ETHNOMATHEMATICS: EMERGING METHODOLOGIES & THEORETICAL STRUCTURES
XI CC5
Organizer Patrick (Rick) Scott, University of New Mexico
Presenters Jerome Turner, St. Francis Xavier University
Marilyn Frankenstein, Univ. of Massachusetts
Discussant Rick Scott
Work Session Freire’s Critical Education Theory and Bohr’s Complementarity, and how they connect with and extend our conception of, research in and application of Ethnomathematics. Audience will discuss in dyads the ideas presented.

1:30-3:00PM THE RATIONAL NUMBER PROJECT: RESEARCH IN THE TEACHING AND LEARNING OF MULTIPLICATIVE STRUCTURES – PART I INVARIENCE, OPERATOR AND ASSESSMENT
XII CC6
Organizer Thomas R. Post, University of Minnesota
Presenters Guershon Harel, Purdue University
Merlyn J. Behr, Northern Illinois University
Richard Lesh, Educational Testing Service
Presider Thomas R. Post
Research Symposium The current goal is to better understand the mathematical, cognitive, assessment and instructional aspects of the multiplicative structure. These presentations will address these issues from a formative perspective hoping to involve participants in discussion.

1:30-3:00PM CONSTRUCTS FOUND IN TEACHER CHANGE
XIII CC7
Organizer Kenneth L. Shaw, Florida State University
Presenters Elizabeth H. Jakubowski, Florida State U
Mary Ann Denney, Everitt Middle School
Reactor William S. Bush, University of Kentucky
Research Symposium Presenters will discuss how practicing teachers’ beliefs, myths, and their use of metaphors affect their ability to make significant conceptual and pedagogical changes.

1:30-3:00PM TEACHER AND RESEARCHER COLLABORATIONS: IMPLEMENTING THE NCTM STANDARDS
XIV CC9
Organizer Barbara W. Grover, University of Pittsburgh
Presenters Alice Gill, South Euclid, OH
Margaret Kaduce, Chippewa Falls, WI
Discussants Mark Driscoll, Education Development Center
Joan Ferrini-Mundy, National Science Foundation
Greta Morine-Dershim, University of Virginia
Thematic Presentation A project which emphasizes extensive collaboration between teachers and researchers as teachers become interpreters and communicators of research ideas among their colleagues is described. Teachers reflect upon their experiences as they implemented changes in instructional practice consistent with NCTM Standards.
3:15-4:45PM
XV
CC5

NOVICE MIDDLE SCHOOL MATHEMATICS TEACHERS: KNOWLEDGE, BELIEFS, THINKING AND ACTIONS

Organizer/Presenters
Catherine A. Brown, Virginia Tech
Hilda Borko, University of Maryland
Patricia Agard, Southgate, Kentucky
Doug Jones, University of Kentucky

Discussant
Frank Lester, Indiana University

Research Symposium
This session will present the results of three related investigations of the knowledge, beliefs, thinking and actions of a cohort of novice middle school mathematics teachers. The presentation will explore the complexities of learning to teach mathematics.

3:15-4:45PM
XVI
CC6

THE RATIONAL NUMBER PROJECT: RESEARCH IN THE TEACHING AND LEARNING OF MULTIPLICATIVE STRUCTURES - PART II: TEACHER COGNITIONS

Organizer/Presenters
Thomas R. Post, University of Minnesota
Robert Orton, University of Minnesota
Susan J. Lamon, Marquette University

Presider
Richard Lesh, Educational Testing Service

Research Symposium
The first presentation will formulate a conception of teacher knowledge (in this case invariance) based on a theory of human action describing teacher reasoning as a practical argument, a syllogism whose conclusion is an action. The second and third will examine the effects of influencing teachers, content and pedagogical knowledge (ratio and proportion) and describe preservice teachers' concept of invariance respectively.

3:15-4:45PM
XVII
CC7

CHILDREN'S PROCEDURES FOR MULTI-DIGIT COMPUTATION

Organizer
Sharon H. Ross, California State University

Presenters
Birch Burghardt, Northwestern University
James Helbert, University of Delaware
Diana Wearne, University of Delaware
Constance Kamii, University of Alabama

Discussant
Sharon Ross

Research Symposium
We will describe and contrast children's invented computational procedure for multi-digit numbers. Examples will be drawn from three current instructional research studies. Discussion will focus on issues relating to instructional goals for number in the early grades.

5:00-6:00PM

AN OVERVIEW OF FEDERAL FUNDING OPPORTUNITIES IN MATHEMATICS

NSF Representatives:
Charles Puglia, Division Director, Preparation and Enhancement
Ray Hannapel, Research in Teaching and Learning
Joan Ferrini-Mundy, Teacher Enhancement
Carole Lacampagne, Teacher Enhancement
Joe Adney, Instructional Materials Development
Chris Hirsch, Instructional Materials Development
Tom Berger, Office of Studies and Program Assessment
Miriam Levia, Teacher Preparation

U.S. Department of Education
Conrad Katzenmeyer, Office of Research
Rebecca Wilt, Coordinator, Eisenhower Math and Science Program

The following have agreed to serve as time monitors in sessions as follows:

- Session I: John Harvey
- Session II: Kim Prichard
- Session III: Diana Wearne
- Session IV: Sid Rachlin
- Session V: Pat Campbell
- Session VI: Anna Graeber
- Session VII: Kim Prichard
- Session VIII: Roslynn Seldenstein
- Session IX: Barbara Reys
- Session X: Pam Schram
- Session XI: Neil Pateman
- Session XII: Brendan Kelly
- Session XIII: Marilyn Hala
- Session XIV: Bob Jensen
- Session XV: M. Kathleen Heid
- Session XVI: TBA
- Session XVII: Honi Bamberger

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Wednesday 17, April 1990

8:30-10:00AM REACHING OUT TO THE UNDERREACHED: DISCUSSION OF TWO PROJECTS BASED IN PUBLIC SCHOOLS (RAC/SIG/NCTM Joint Session)

Presider Marilyn Hala, NCTM

Panel Margaret Schwain Smith, University of Pittsburgh
Charles Allen, University of Pittsburgh
Leslie Salmon-Cox, University of Pittsburgh
Honi Bamberger, University of Maryland

Reactor Dorothy Strong, Chicago Public Schools

10:30-1:30 VIDEO WORKSHOP FOR ELEMENTARY SCHOOL MATH TEACHERS: APPLYING RESEARCH TO EDUCATIONAL PRACTICE (Research Extended Workshop)

Presenters Rochelle G. Kaplan, William Paterson College
Kiki Swigert, Teachers College Columbia University

Presider Richard Lesh, Educational Testing Service

This session will consist of four parts. The first part, lasting about 30 minutes, will introduce the rationale and research behind the project, "Children's Mathematical Thinking: Video Workshops for Educators." The second part, lasting about one and a half hours, will be a demonstration of a sample workshop from the project. Following this there will be a short break. Then a summary of the other available workshops will be presented along with a brief evaluation of the results of the project's impact on teachers who have participated in the workshops. Twenty minutes will be left at the end for group discussion.

Note: The Wednesday sessions are part of NCTM's annual meeting. The workshop requires admission by ticket.