

Research Preession

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

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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, Javonovich*

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

Convention Center
Rooms 13, 15, 17

**INTERPLAY BETWEEN MATHEMATICS
LEARNING IN AND OUT OF SCHOOL**

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

OVERVIEW
(Tuesday)

| | 9:00-10:30 | 10:45-12:15 | 1:30-3:00 | 3:15-4:45 |
|---------------------------|--|---|---|---|
| Convention Center Room 2 | Assessment - Changing the Rules of the Game | | Technology education for teachers of mathematics | |
| Convention Center Room 4 | Contributions of new technologies to research | | Reasoning algebraically in arithmetic: Bridging the gap between arithmetic and algebra | |
| Convention Center Room 5 | Research on the Learning and Teaching of Functions | An Examination of NCTM's New Teaching Standards | Ethnomathematics: Emerging Methodologies & Theoretical Structures | Novice middle school mathematics teachers: knowledge, beliefs, thinking, and actions |
| Convention Center Room 6 | Assessing change in teacher behaviors: Teacher Implementation of the Standards | | The Rational Number Project: Research in the Teaching and Learning of Multi-plicative Structures-Part I - Invariance, Operator and Assessment | The Rational Number Project: Research in the Teaching and Learning of Multi-plicative Structures-Part II - Teacher Cognitions |
| Convention Center Room 7 | The importance of community and collaboration in making mathematics work for minority students | Theory, Practice and Research in the design of teaching | Constructs found in teacher change | Children's Procedures for Multi-Digit Computation |
| Convention Center Room 9 | 10:45-12:45PM Program evaluation in mathematics education | | Teacher and researcher collaborations: Implementing the NCTM standards | |
| Convention Center Room 11 | Empty | Empty | Empty | Empty |

Tuesday 16, April 1991

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|-------------|----------------|-------------------|
| 8:15-8:45AM | Coffee and Tea | Conference Center |
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| 8:45-9:00AM | Announcements | Conference Center |
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|--------------------------|---|--|
| 9:00-12:15PM I | ASSESSMENT - CHANGING THE RULES OF THE GAME CC2 | |
| Organizer/ Presenters | Jean Kerr Stenmark - U of California-Berkeley David Clarke - Australian Catholic University | |
| Presiders | Sherry Fraser - University of California-Berkeley Lynn Alper - University of California-Berkeley | |
| Work Session | <i>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 "wisdom of practice", research efforts to date, and future research possibilities.</i> | |

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|---------------------------|--|--|
| 9:00-12:15PM II | CONTRIBUTIONS OF NEW TECHNOLOGIES TO RESEARCH CC4 | |
| Organizer | Paul Goldenberg - Educational Development Center | |
| Presenters | Glenn Kleiman, Educational Development Center Rina Zazkis, Northern Illinois University Doug Clements, State University of New York Ed Dubinsky, Purdue University Ann Rubin, TURK Cynthia Char, Educational Development Center | |
| Moderator | Paul Goldenberg | |
| Work Session | <i>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.</i> | |

9:00-10:30AM **RESEARCH ON THE LEARNING AND TEACHING OF FUNCTIONS**
III CC5

Organizer Orit Zaslavsky, Technion, Haifa

Presenters M. Kathleen Heid, 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:
TEACHER IMPLEMENTATION OF THE STANDARDS**
IV CC6

Organizer/ Presenters 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 CC7

Organizer/ Presenters Charlene Morrow, Mount Holyoke College
Lyn Taylor, University of Colorado-Denver
Rose Asera, 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 CC5

Organizer/ Presenters 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
TEACHING**
VII CC7

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.*

10:45-12:45P **PROGRAM EVALUATION IN MATHEMATICS EDUCATION**
VIII CC9

Organizer/ Presenters Jack Bookman, Duke University
M. Kathleen Heid, 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**
X CC4 **THE GAP BETWEEN ARITHMETIC AND ALGEBRA**

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 &**
XI CC5 **THEORETICAL STRUCTURES**

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**
XII CC6 **TEACHING AND LEARNING OF MULTIPLICATIVE STRUCTURES - PART I INVARIANCE, OPERATOR AND ASSESSMENT**

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/ Presenters Kenneth L. Shaw, Florida State University
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:**
XIV CC9 **IMPLEMENTING THE NCTM STANDARDS**

Organizer/ Presenters Barbara W. Grover, University of Pittsburgh
Alice Gill, South Euclid, OH
Margaret Kaduce, Chippewa Falls, WI

Discussants Mark Driscoll, Education Development Center
Joan Ferrini-Mundy, National Science Foundation
Greta Morine-Dershimer, 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 **NOVICE MIDDLE SCHOOL MATHEMATICS TEACHERS:**
XV CC5 **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 **THE RATIONAL NUMBER PROJECT: RESEARCH IN THE**
XVI CC6 **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 **CHILDRENS PROCEDURES FOR MULTI-DIGIT**
XVII CC7 **COMPUTATION**

Organizer Sharon H. Ross, California State University

Presenters Birch Burghardt, Northwestern University
James Heibert, 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 Seidenstein |
| 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 |

Wednesday 17, April 1990

8:30-10:00AM **REACHING OUT TO THE UNDERREACHED: DISCUSSION OF**
CC39 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**
CC9 TEACHERS: APPLYING RESEARCH TO EDUCATIONAL
PRACTICE
(Research Extended Workshop)

Presenters Rochelle G. Kaplan, William Paterson College
KiKi Sweigert, 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.