



Program for the Research Preession

The 78th Annual Meeting of the National Council of Teachers of Mathematics

10–12 April 2000

**Navy Pier
Chicago, Illinois**



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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Committee*
East Carolina University

Announcements

Informal meetings can be held Tuesday and Wednesday in Room 313, 8:00 a.m.–5:00 p.m.

A brown bag discussion for graduate students will be held Wednesday, 12:00 noon–1:30 p.m., in Room 316-317 during the lunch break. Graduate students will have an opportunity to gather informally to meet and chat with one another (or with anyone else who cares to join them).

The Call for Papers for the next Research Pre-session, to be held in Orlando, Florida, in April 2001, will be available at the registration table.

Special thanks to
Lawrence Erlbaum Associates, Inc., for support for Tuesday's

Monday, 10 April 2000, 7:00 p.m. (Welcome)

Organizers

Deborah Schifter, Education Development Center
Chair, NCTM Research Advisory Committee

Diana V. Lambdin, Indiana University—Bloomington
Cochair, SIG/RME of AERA

Navy Pier 201-205

7:30 p.m. (Opening Address)

Applications of Research to Classroom Practice

Presenter

Judith Sowder, San Diego State University

Navy Pier 201-205

Reception follows.

Navy Pier, Grand Ballroom

Tuesday, 11 April 2000, 8:30 a.m.–10:00 a.m.

New Directions for NSF Support of Mathematics Education Research

Organizer/Presenter

Eric R. Hamilton, National Science Foundation

Presenter

Anthony Eamonn Kelly, National Science Foundation

Discussants

Les Steffe, University of Georgia

Jere Confrey, University of Texas at Austin

Diane Spress, National Science Foundation

NSF's new programs, Research on Learning and Education (ROLE) and the Inter-Agency Education Research Initiative (IERI), increase education research funding. This session seeks to stimulate strong mathematics education proposals to them and to gather advice from researchers on longer-term agenda.

Navy Pier, 318-319

What Are We Learning from Evaluations of Local Systemic Change Projects?

Organizer/Presenter/Presenter

Diana V. Lambdin, Indiana University—Bloomington

Presenters

Catherine Brown, Indiana University—Bloomington

Beatriz D'Ambrosio, Indiana University—Purdue University at Indianapolis

Ron Preston, East Carolina University

Reactor

Iris R. Weiss, Horizon Research, Inc., Chapel Hill, North Carolina

Evaluators from Local Systemic Change projects describe work with NSF's mandated core evaluation. They engage others in reflecting how the core evaluation informs, supplements, enhances, or interferes with local research needs and desires or with more global efforts to study reform.

Navy Pier, 309-310

Shaping the Standards: Collecting, Analyzing, and Using the Feedback from the *Principles and Standards* Discussion Draft

Organizer/Presenter

Gary Martin, National Council of Teachers of Mathematics

Presenters

Joan Ferrini-Mundy, Michigan State University

Mary M. Lindquist, Columbus State University

Dawn M. Berk, University of New Hampshire

In creating its updated *Standards*, NCTM collected extensive feedback from a preliminary discussion draft during the 1998–99 academic year, which was then used in creating the final *Principles and Standards* document, to be released on 12 April. This session will present this process as a large-scale research study in which methods drawn from qualitative research were used to analyze the data and will then discuss what we can learn from this experience in future endeavors.

Navy Pier, 311-312

Inquiry into Student Thinking: Exploring the Overlap between Teachers' and Researchers' Practices

Organizer/Presenter

Deborah Schifter, Education Development Center

Presenters

Tom Carpenter, University of Wisconsin—Madison

Mazie Jenkins, Madison Public Schools, Madison, Wisconsin

Annie Keith, Madison Public Schools, Madison, Wisconsin

Cliff Konold, University of Massachusetts

Karen Schweitzer, Williamsburg Elementary School,

Williamsburg, Massachusetts

Given a pedagogical practice based on inquiry into student thinking, teachers are well positioned to contribute to research. In this session, teachers and researchers from two projects—Cognitively Guided Instruction and Teaching to the Big Ideas—will discuss the advantages, tensions, and accommodations involved in bringing their practices together.

Navy Pier, 307-308

Teaching and Learning Mathematics in Poor Communities: Issues for Research, Practice, and Policy

Organizer

Edward A. Silver, University of Pittsburgh

Presenters

Patricia F. Campbell, University of Maryland

Idorenyin Jamar, University of Pittsburgh

Carol Malloy, University of North Carolina

Jeannie Oakes, University of California at Los Angeles

Improving the quality of mathematics teaching and learning in schools in poor rural and urban communities is a matter of great national importance. Yet it has not been a topic of sustained interest and attention within the mathematics education research community. At this session, presenters will offer their perspectives on some of what we know and what we need to know about a range of issues that impinge on the quality of mathematics teaching and learning amidst poverty. In preparation for the session, all participants are encouraged to read the report of a recent NCTM conference on this theme; the report can be found at www.nctm.org/committees/rac/TFPC/index.htm. Participants may also find it useful to peruse the report of the Leadership Conference sponsored by the Benjamin Banneker Association.

Navy Pier, 305-306

Reasoning and Representing with Dynamic Geometry®

Organizer/Presenter/Presenter

Rose Mary Zbiek, University of Iowa

Presenters

Teresa M. Finken, University of Iowa

Brad Glass, University of Iowa

M. Kathleen Heid, Pennsylvania State University

Discussant

Daniel Chazan, Michigan State University

Atypical uses of Dynamic Geometry environments provide a novel setting for representing algebraic and geometric ideas. This session compares and contrasts the impact of these environments on the mathematical work and understanding of secondary school students and prospective mathematics teachers.

Tuesday, 11 April 2000, 10:30 a.m.–1:00 p.m.

Mathematics Education Reform in Ohio Middle Schools: Four Case Studies

Organizer/Presider

Michael T. Battista, Kent State University

Presenters

Caroline Borrow, Kent State University

Kelly Costner, Ohio State University

Sigrid Wagner, Ohio State University

Discussant

Steven P. Meiring, Former Director of Mathematics Education,
Ohio Department of Education

We will discuss the progress of mathematics reform in four Ohio middle schools and, with audience participation, the issues that should be examined in assessing reform. That is, what exactly are the research issues and how should they be framed?

Navy Pier, 311-312

Examining the Interdependence of Teaching and Learning

Organizer/Presider/Presenter

David Clarke, University of California at Los Angeles

Presenters

Deborah Ball, University of Michigan

Maarten Dolk, Freudenthal Institute, The Netherlands

Megan Franke, University of California at Los Angeles

Discussants

Jo Boaler, Stanford University

Les Steffe, University of Georgia

Our research into teaching assumes the active presence and participation of a learner. Much of our research into learning anticipated the application of our findings in instructional settings. This symposium examines the interdependence of teaching and learning from several complementary research perspectives.

Navy Pier, 305-306

Innovative Instructional Approaches for Supporting Students' Development of Multiplicative Reasoning

Organizer/Presenter

Kay McClain, Vanderbilt University

Presenters

Robbie Case, Institute of Child Study, University of Ontario

Joan Moss, Institute of Child Study, University of Ontario

Jere Confrey, University of Texas at Austin

Paul Cobb, Vanderbilt University

Steve Smith, Northwestern University

Bruce Sherin, Northwestern University

Discussant/Presenter

Ricardo Nemirovsky, TERC

During this symposium, four different research groups will report findings from design projects in which the investigators have been concerned with the teaching and learning of multiplicative reasoning in different domains. In each case, efforts have been informed by innovative instructional approaches. Video-based cases will form the basis of the symposium.

Navy Pier, 309-310

Research on Mathematics Education in Asia: What Can We Gain from It?

Organizer/Panelist

Tad Watanabe, Towson University

Panelists

Jinfa Cai, University of Delaware

James Hiebert, University of Delaware

Wei Sun, Towson University

Jane-Jane Lo, Cornell University

Yeping Li, University of New Hampshire

Lynn Paine, Michigan State University

What are potential benefits and issues in studying mathematics education practices in the Far East? Panelists will present findings and implications from their studies, and reactions from both within and beyond the mathematics education community will be discussed.

Navy Pier, 314-315

A Research Symposium on Equity: Some Solutions and Challenges Related to Raising the Mathematics Achievement of Students from Urban School Districts

Organizer/Moderator

Marilyn E. Strutchens, University of Maryland

Presenters

Rochelle Gutierrez, University of Illinois at Urbana-Champaign

Eric (Rico) Gutstein, DePaul University

Beatrice L. Logan, Georgia State University

Rodney E. McNair, University of Delaware

Deborah H. Najee-ullah, Georgia State University

William F. Tate, University of Wisconsin—Madison

Reactor

Martin L. Johnson, University of Maryland

This symposium will focus on research related to programs and curricula that have been successful in raising the mathematical achievement of Latinos, African Americans, and children of poverty in urban districts. An analysis of what we have learned and what we must continue to study will also be rendered.

Navy Pier, 307-308

Tuesday, 11 April 2000, 2:00 p.m.–4:30 p.m.

Linking Research and New Early Childhood Mathematics Standards

Organizer/Presenter

Douglas H. Clements, State University of New York at Buffalo

Organizer/Presenter/Presenter

Julie Sarama, Wayne State University

Presenters

Arthur J. Baroody, University of Illinois at Urbana-Champaign

Alice Klein, University of California at Berkeley

Les Steffe, University of Georgia

Discussants

Karen Fuson, Northwestern University

Mary M. Lindquist, Columbus State University

Maggie Myers, Dana Center, University of Texas at Austin

Mathematics standards are focusing on the earliest years for the first time. We will synthesize what is known about learning and teaching specific topics of mathematics in early childhood and discuss how this research supports (or challenges) standards and provides guidelines for more specific frameworks and curricula.

Navy Pier, 309-310

Linking Conjectures, Justification, and Analytical Proof in a Dynamic Geometry® Environment

Organizer

Barbara J. Pence, San Jose State University

Presenters

Lulu Healy, Pontificia Universidade Catolica de Sao Paolo,
Brazil

Colette Laborde, Laboratoire Leibniz, Institut IMAG, France

Maria Alessandra Mariotti, Universita Pisa, Italy

Discussant

Paul Goldenberg, Education Development Center

This symposium will reflect on relationships among conjecturing, justifying, and proving in school geometry. Research from France, UK, and Italy will identify critical issues and questions in the teaching and learning of these processes in a Dynamic Geometry environment.

Teachers' Experiences with Creating Cases: The Interplay of Research and Practice

Organizer

Tracy Noble, TERC

Presenters

Susan Jo Russell, Education Research Collaborative, TERC

Margie Singer, Maria Hastings School, Lexington,
Massachusetts

Jan Szymaszek, Smith College Campus School

Copresenters

Apolinario Barros, Jeremiah E. Burke High School, Boston,
Massachusetts

Paul Harrison, Jeremiah E. Burke High School, Boston,
Massachusetts

Janice Ross, Jeremiah E. Burke High School, Boston,
Massachusetts

Emily Sedgwick, Jeremiah E. Burke High School, Boston,
Massachusetts

Mweusi Willingham, Jeremiah E. Burke High School, Boston,
Massachusetts

Grace Kelemanik, City on a Hill Public Charter High School,
Boston, Massachusetts

Jesse Solomon, City on a Hill Public Charter High School,
Boston, Massachusetts

Teresa Lara-Meloy, TERC

Ricardo Nemirovsky, TERC

Discussant

Steve Monk, University of Washington

Teachers who have created cases based on research on their own classrooms will work with audience members to analyze the cases and the roles that developing cases have played in their professional development.

Navy Pier, 307-308

Proof Understandings by Undergraduates and In-Service Teachers

Organizer/Presider

Larry Sowder, San Diego State University

Presenters

Stacy Brown, CRMSE, San Diego State University

Guershon Harel, Purdue University

Sonia Hristovitch, Purdue University

David Housman, Goshen College

Eric J. Knuth, University of Wisconsin—Madison

Mary K. Porter, Saint Mary's College, Notre Dame, Indiana

Reactor

Laurie D. Edwards, Saint Mary's College of California, Moraga, California

Proof understandings and their relationships to the learning of mathematics are particularly important among in-service and preservice teachers. The speakers will give findings and implications from their investigations.

Navy Pier, 311-312

Latinos and Mathematics: Issues of Teaching and Learning

Organizer/Discussant

Lena Licón Khisty, University of Illinois at Chicago

Presenters

Sylvia Celedón-Pattichis, University of New Mexico

Kathryn Chval, University of Illinois at Chicago

Alfinio Flores, Arizona State University

This symposium presents a discussion of the issues and theories of learning mathematics in two languages, one of the defining characteristics of Latinos. Emphasis will be on examples from classrooms and discussion among participants of implications for teaching and research.

Navy Pier, 314-315

Tuesday, 11 April 2000, 5:15 p.m.

Reception

Navy Pier, Terrace D

(Support provided by Lawrence Erlbaum Associates, Inc.)

Wednesday, 12 April 2000, 8:30 a.m.–10:00 a.m.

PDS and a Yearlong Internship: Attempts to Bridge Theory and Practice in Secondary School Mathematics Teacher Education

Organizer/Presider

Daniel Chazan, Michigan State University

Presenters

Sandra Callis Bethell, Holt High School, East Lansing, Michigan

Michael Lehman, Holt High School, East Lansing, Michigan

Jan Gormas, Calvin College

Cesar Larriva, Michigan State University

Bill Rosenthal, Muhlenberg College

This session will allow participants to explore the complexities involved in creating and studying environments for secondary school mathematics practice-based teacher education by presenting five perspectives on a decade-long PDS initiative that was linked to the development of a five-year teacher education program.

Navy Pier, 311-312

(How) Does Teacher Education Matter? Situated Knowledge of Mathematics and Mathematics Teaching

Organizer/Presenter

Dominic Peressini, University of Colorado at Boulder

Presenters

Jeffrey Hovermill, University of Colorado at Boulder

Kate Masarik, University of Colorado at Boulder

Candace Wooley, University of Colorado at Boulder

Lew Romagnano, Metropolitan State College of Denver

Reactor

Deborah Schifter, Education Development Center

Teacher education programs that link the study of undergraduate mathematics with big ideas (e.g., function, rate, proof) and supportive pedagogy (e.g., task, discourse) influence the teacher-learning trajectory in important ways. A situative lens brings this influence into focus.

Navy Pier, 314-315

Calculus Renewal: Issues for Research in Undergraduate Mathematics Education in the Next Decade

Organizer

Susan L. Ganter, Clemson University

Presenters

Alphonse Buccino (retired), University of Georgia

Sheldon Gordon, State University of New York at Farmingdale and Suffolk Community College

Harvey Keynes, University of Minnesota

William McCallum, University of Arizona

David Smith, Duke University

The progress of the mathematics community in reforming calculus and other courses at the undergraduate level implies the need to investigate research questions that focus on “next steps.” This session will focus on a small subset of such questions, including the following: (1) What mathematical skills and knowledge should a student have after completing a first-year collegiate mathematics course? (2) What has been learned about the cognitive processes involved in learning mathematics? (3) What should a first-year collegiate mathematics course contribute to a student’s general mathematics education? (4) What is the appropriate role of colleges and universities in supporting curricular change? (5) What are the appropriate mechanisms by which progress can be evaluated and thereby better inform continuing change?

Navy Pier, 307-308

Redefining Instructional Leadership in Mathematics: New Roles for Administrators

Organizer/Copresenter

Barbara Scott Nelson, Education Development Center

Copresenter

Annette Sassi, Education Development Center

This session uses data from a professional development seminar for administrators to explore new images of instructional leadership in mathematics. Administrative functions such as classroom observation, teacher supervision or coaching, and textbook selection will be considered.

Navy Pier, 305-306

Mentor Teachers, Student Teachers, and Mathematics

Organizer/Presider/Presenter

Patricia S. Wilson, University of Georgia

Presenters

Blake E. Peterson, Brigham Young University

Steven Williams, Brigham Young University

Discussants

Joanne Lobato, San Diego State University

Daniel Siebert, San Diego State University

This session will use data from two studies to better understand the nature of the pedagogical content knowledge that is discussed between cooperating teachers and student teachers. We also explore the perceived relationship between classroom management and mathematical content knowledge.

Navy Pier, 309-310

Wednesday, 12 April 2000, 10:30 a.m.–12:00 noon

Linking the Emerging Practices of Preservice Teachers to an Experienced Teacher's Practice through the Use of Multimedia Case Studies

Organizer/Presenter

Joanna O. Masingila, Syracuse University

Presenter/Presider

Helen M. Doerr, Syracuse University

Presenter

Valerie Teich, Syracuse University

We will present and demonstrate components of a multimedia case study that has been developed for use with preservice teachers. We will discuss how this case study has been used to allow preservice teachers to trace issues in an experienced teacher's practice and to reflect on how those issues arise in their own emerging practice.

Navy Pier, 309-310

The Challenges of Moving Equity Issues into the Mainstream of Mathematics Education Research

Organizer/Presenter

Dorothy Y. White, University of Georgia

Presenters

Martha Alleksaht-Snider, University of Georgia

Yolanda De La Cruz, Arizona State University West

Vivian R. Moody, University of Alabama

Discussant

William F. Tate, University of Wisconsin—Madison

The symposium will present the findings from four research studies on equity in mathematics education. Particular emphasis will focus on the challenges and implications of researching teachers, parents, and students engaged in mathematics reform in ethnically and linguistically diverse communities.

Navy Pier, 305-306

The Essential Role of Quantitative Reasoning in the Development of Algebraic Competence

Organizer/Presider

Patrick W. Thompson, Vanderbilt University

Presenters

Barbara M. Brizuela, Harvard University

Joanne Lobato, San Diego State University

Daniel Siebert, San Diego State University

John P. (Jack) Smith, Michigan State University

Discussant

James J. Kaput, University of Massachusetts Dartmouth

“The transition from arithmetic to algebra” is a common adage. It actually contributes to the problem it describes. It is more productive to think of algebraic reasoning developing over many years as students develop general and systemic ways to express method and relationship.

Navy Pier, 311-312

Multiple Perspectives on the Development of a Mathematical Discourse Community

Organizer/Presenter/Discussion Leader

Edith Prentice Mendez, Sonoma State University

Presenters/ Discussion Leaders

Miriam Gamoran Sherin, Northwestern University

David Louis, The Nueva School, Hillsborough, California

This session examines how mathematical discourse impacts students’ and teachers’ learning. A videotaped mathematics lesson provides the impetus for different analyses of a discourse community-in-action. Breakout discussion groups offer the audience an opportunity to explore one perspective in detail.

Navy Pier, 307-308

Issues in Conducting Curriculum Research

Organizer

Denise R. Thompson, University of South Florida

Presenters

Karen C. Fuson, Northwestern University

Robert Reys, University of Missouri

Harold Schoen, University of Iowa

Discussant

Sharon L. Senk, Michigan State University

In this symposium, three individuals associated with NSF-funded curriculum projects will discuss challenges in conducting curriculum research in schools and ways to address these issues. The discussant will synthesize issues and make recommendations for future research.

Navy Pier, 314-315

Wednesday, 12 April 2000, 12:00 noon–1:30 p.m.

Graduate student brown bag lunch

Navy Pier, 316-317

Wednesday, 12 April 2000, 1:30 p.m.–3:00 p.m.

Assessing Preservice Teachers' Beliefs: A Video-Based Instrument

Organizer/Presenter/Presider

Rebecca Ambrose, CRMSE, San Diego State University

Presenters

Lisa Clement, San Diego State University

Randolph A. Philipp, San Diego State University

Judith Sowder, San Diego State University

Discussant

Denise Mewborn, University of Georgia

In measuring preservice teachers' beliefs about mathematics and its teaching, we face this challenge: "How can we assess a person's 'disposition to act' when he or she isn't in a position to act?" Does our instrument meet this challenge?

Navy Pier, 311-312

Researching the Impact of a Standards-Based Middle School Mathematics Curriculum on Student Achievement

Organizer/Presenter

Mary C. Shafer, University of Wisconsin—Madison

Presider

Thomas A. Romberg, University of Wisconsin—Madison

Presenters

Lesley Wagner, University of Wisconsin—Madison

David C. Webb, University of Wisconsin—Madison

Discussant

Linda Dager Wilson, University of Wisconsin—Madison

In this session, research documenting the impact of Mathematics in Context, a standards-based middle school curriculum, on student achievement will be shared. Complexities of conducting such research and of developing methodologies to analyze multidimensional information will also be discussed.

Navy Pier, 309-310

Mathematics Reform as a Process of Emergent Change: The Collaborative Efforts of Mathematics Educators and Mathematicians

Organizer/Panelist

Erna Yackel, Purdue University Calumet

Presenter

Michelle Stephan, Purdue University Calumet

Panelists

Catherine M. Murphy, Purdue University Calumet

Marcela Perlwitz, Purdue University Calumet

Chris Rasmussen, Purdue University Calumet

Peter Turbek, Purdue University Calumet

Diana Underwood, Purdue University Calumet

Discussant

Douglas McLeod, San Diego State University

In this session a panel of mathematicians and mathematics educators from one university mathematics department discuss the process of developing collaborations that lead to reform-oriented instruction. Special emphasis is given to the role of mathematics education research.

Navy Pier, 314-315

Mentoring Session for Novice Researchers

Organizer

Diana V. Lambdin, Indiana University—Bloomington

Presenters

A group of experienced researchers will serve as informal mentors.

(The list of mentors will be made available at the conference registration table.)

A group of experienced researchers, representing a diversity of research interests and methodologies, will be available to talk informally with small groups of conference participants about undertaking a personal research agenda. The session will be organized in roundtable format with each mentor assigned to chat with a roundtable of five to ten participants. Participants will switch tables once or twice during the session so that everyone has the opportunity to interact with more than one mentor.

Navy Pier, 305-306

Program at a Glance

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7:00 p.m. (Welcome)

7:30 p.m. (Plenary Address)

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8:30 a.m.–10:00 a.m. (Concurrent Sessions)

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Reasoning and Representing with Dynamic
Geometry®

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10:30 a.m.–1:00 p.m. (Concurrent Sessions)

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Michael T. Battista, Organizer

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David Clarke, Organizer

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Teachers' Experiences with Creating Cases:
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12:00 noon–1:30 p.m.

Graduate student brown bag lunch.
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1:30 p.m.–3:00 p.m. (Concurrent Sessions)

Assessing Preservice Teachers' Beliefs: A Video-Based Instrument
Rebecca Ambrose, Organizer
Navy Pier, 311-312

A Methodology for Developing Electronic Publications in Mathematics Education: The Cases of *Principles and Standards for School Mathematics* and the Illuminations Project
Enrique Galindo, Organizer
Navy Pier, 318-319

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Diana V. Lambdin, Organizer
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Researching the Impact of a Standards-Based Middle School Mathematics Curriculum on Student Achievement
Mary C. Shafer, Organizer
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Studying the Enactment of Case-Based Instruction
Mary Kay Stein, Organizer
Navy Pier, 307-308

Mathematics Reform as a Process of Emergent Change: The Collaborative Efforts of Mathematics Educators and Mathematicians
Erna Yackel, Organizer
Navy Pier, 314-315

3:30 p.m.–4:30 p.m. (Closing Session)

Linking the *Principles and Standards* to Research
Jeremy Kilpatrick, Presenter
Navy Pier, 201-205

A Methodology for Developing Electronic Publications in Mathematics Education: The Cases of Principles and Standards for School Mathematics and the Illuminations Project

Organizer/Presider/Presenter

Enrique Galindo, Indiana University—Bloomington

Presenters

Heréndira Galindo, Indiana University—Bloomington

Rebecca McGraw, Indiana University—Bloomington

Diana Treahy, Indiana University—Bloomington

Eric Hart, Maharishi University of Management

Discussant

David Carraher, TERC

The design of the electronic edition of Principles and Standards for School Mathematics has been influenced by findings from different sources including task-based interviews with users, expert opinion, research on instructional systems and technology, and value judgments and informed opinion from professionals in fields related to mathematics education. In this session we describe the development process and propose a methodology for developing multimedia and Web-based materials for mathematics education. We will discuss the issues that emerge from the specific purposes of different types of electronic publications in mathematics education, and we will outline some considerations for the future of electronic publications in the profession and the role of research in determining that future.

Navy Pier, 318-319

Studying the Enactment of Case-Based Instruction

Organizer/Presenter

Mary Kay Stein, University of Pittsburgh

Presenters

Edward A. Silver, University of Pittsburgh

Margaret Smith, University of Pittsburgh