

Where Research and Practice Meet and Learning Begins

36th Annual Meeting of the Research Council on Mathematics Learning

March 5 – 7, 2009



Berry College

Rome, Floyd County, Georgia

Where the Rivers Meet and the Mountains Begin

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Changes in Teaching Styles and Methods: Insights from Project IMPACT**Joyce Swan**, University of Tennessee, Memphis

Project IMPACT (Immersion in Mathematics Pedagogy, Application, Content, and Technology), a professional development program for mathematics teachers in grades 5 – 8, is an ongoing research project. Qualitative data from teachers' reflective journals indicate that patterns of change in teaching styles and methods are clearly emerging. Changes identified thus far include increased use of technology and manipulatives, both concrete and virtual, as well as extended collaboration in partnerships and enhanced personal reflective behavior.

Friday, March 6, 2009

Sessions 10-14

11:00 – 11:45 am

Session 10

Room 102

Teachers' Self-Perceptions of their Journeys toward Exemplary Status**Marilyn Sue Ford** and **Virginia Usnick**, University of Nevada, Las Vegas

Teachers taking a graduate-level mathematics methods course (grades 3 – 5) were asked to compare and contrast "highly-qualified" and "exemplary" in relation to being a teacher of mathematics. After determining characteristics of "highly-qualified" and "exemplary," they were required to reflect on their journeys towards becoming exemplary teachers of mathematics.

Session 11

Room 107

Mathematics Anxiety Among Elementary Education Majors**Thomas Faulkenberry**, Texas A & M University, Commerce, Texas

The literature reveals a fairly consistent finding that elementary teachers tend to possess a fair bit of mathematics anxiety. What is unclear, however, is the effect of this anxiety on teacher efficacy. In joint work with Eileen Faulkenberry, the knowledge of number and operations of a group of pre-service elementary teachers is evaluated. The research explores differential effects of math anxiety as a function of question type. For example, does a more realistic, scenario-based, evaluation temper the effects of math anxiety, providing a more clear window into what the pre-service teachers really know about mathematics?

Session 12

Room 111

Teaching Senior Citizens Mathematics

James Heddens, Kent State University, Professor Emeritus

The teaching of mathematics in past years is reflected in senior citizens today. The fear of mathematics that begins in elementary school is the same fear that is apparent in senior citizens. What can today's elementary school teachers do to prevent fear of mathematics? A small sample of senior citizens provides data that may be applied to the teaching of mathematics to children today.

Session 13

Room 113

Pre-service Elementary Teachers Learn about Teaching in a Mathematics Content Course

Valerie Sharon, Northeastern State University

The undergraduate mathematics classroom provides a setting for pre-service teachers to practice mathematical discourse. This study examined the conversation of three pre-service teachers as they were engaged in a cooperative problem-solving activity. Discourse analysis was applied to the verbal interactions to determine how pre-service teachers learn to communicate their mathematical thinking in order to teach mathematics. All three students learned that communicating understanding requires active participation by both learners and teachers of mathematics.

Session 14

Room 233

Exploring Gender Differences in College Students' Conceptual Understanding of Spread

**Mikhail Turegun, Oklahoma City Community College, and
Stacy Reeder, University of Oklahoma**

This study investigated the gender-related differences in the individual perceptions and conceptual understandings of measures of spread among community college students in an introductory statistics course centered on deemphasizing computational skills and focused rather on developing conceptual understanding. Open-ended questions were developed to explore and assess students' conceptual understanding of spread. Conference attendees in this session will be presented a questionnaire developed as a research instrument. A detailed analysis of the students' responses is presented to reveal the range of students' conceptions of the measures of spread and gender-related differences. Some of the common misconceptions that were revealed should be examined closely to promote students' development of understanding of spread and variation. A set of possible rubrics for use by teachers/researchers will be provided.

Friday, March 6, 2009 Lunch & Business Meeting 12:00 – 1:45 pm

Buffet Lunch

Krannert Center Ballroom

Friday, March 6, 2009 Sessions 15 - 20 2:00 – 2:45 pm

Session 15

Room 103

Changing Content and Pedagogical Content Knowledge of Algebra Teachers

Joy Black, University of West Georgia, and
Kathy Westbrook, University of South Alabama

Weaknesses in both content knowledge and pedagogical knowledge are evidenced in algebra teachers. Professional development can increase both types of knowledge. Research with 65 teachers determined the content knowledge and pedagogical content knowledge of algebra. Four cases further provide insight into changes in both types of knowledge from professional development and implications of changes in instructional practice.

Session 16

Room 106

Mathematical Language Usage of Students with Different Instructional Experiences

Adrienne Redmond, Oklahoma State University

This qualitative study analyzed the mathematical thinking and discourse of three students in 4th through 7th grade who were asked to solve an addition of fractions problem collaboratively. The three students had very different classroom experiences and very different levels of fraction understanding. The role that discourse might play in developing the mathematical proficiency of all students will be discussed.

Session 17

Room 107

Teacher as Engineer/Researcher/Leader: Enhancing STEM Education

Alan Zollman, Northern Illinois University

Greater numbers of majors are needed in the areas of science, technology, engineering and mathematics (STEM) fields. However, ability, knowledge, or motivation impedes public school students from pursuing STEM majors. The quality of public school teachers has a great impact on nurturing abilities, developing knowledge, and increasing motivation of students. Enhancing the quality of teachers improves the quantity and quality of STEM students. Quality teachers are engineers, researchers, and leaders of learning. Through an interdisciplinary, synergistic partnership among Arts & Science, Engineering, Education Colleges, and public schools, participating teachers developing skills and knowledge in engineering applications—integrated with classroom pedagogy expertise; student identity formation and motivation; and STEM literacy and numeracy.

Session 18

Room 111

Addressing Diversity in the Classroom

Carolyn Pinchback, University of Central Arkansas

Based upon comments from 15 elementary teachers who completed the assigned work for a partnership between a university and a school district, results will be presented that answer the following questions:

- What did the teachers learn from the guest speaker's presentation on the achievement gap between African American males and other students at the elementary level?
- How did the teachers implement what they learned?
- What were the teachers' results after implementation?

Session 19

Room 113

Assessing Pre-service Elementary Teachers' Mathematical Dispositions

Juliana Utley, Oklahoma State University

For teachers to have a complete picture of what a student knows, teachers must not only assess a student's conceptual and procedural knowledge, but also their process skills and dispositions toward mathematics. How students think and feel about mathematics influences their learning of mathematics. Also a teacher's thoughts and feelings about mathematics can play an influential role in the development of student attitudes toward mathematics. Ways of assessing pre-service elementary teachers' thoughts and feelings about learning mathematics will be presented, along with results of those assessments. Session participants will be encouraged to share ways in which they assess their students' mathematical dispositions.

Session 20

Room 233

The Teaching and Learning of Probability Concepts Using TI-73 Simulations with Sixth-Grade Students

Kim Hartweg, Western Illinois University
Laverne Logan, Western Illinois University
Molly Lilja, 6th-grade Teacher

This presentation is the result of an action research project created by a sixth-grade teacher after participating in an integrated math and science content course for middle school teachers. TI-73 calculators were used as an instructional tool. Three TI-73 probability simulation tasks were implemented. The response of students to the tasks will be described. The use and understanding of experimental and theoretical probability will be addressed. Student work samples will be shared.

Friday, March 6, 2009 Sessions 21 - 25

3:00 – 3:45 pm

Session 21

Room 106

Developing Pre-Service Teachers' Mathematical Knowledge for Teaching Algebra

Janet Andreasen, University of Central Florida, and
Erhan Haciomeroglu, University of Central Florida

The need for preparing prospective teachers to implement standards-based mathematics instruction and curriculum presents great challenges to teacher educators. In a semester-long methods course, a mixed-methods study was conducted to explore the influence of the use of practice-based materials along with instruction emphasizing multiple solutions and representations on prospective secondary mathematics teachers' understanding of algebra. In addition to taking algebra pre- and post-tests, the prospective teachers solved algebraic reasoning problems and analyzed student work samples and written or video cases of teachers implementing the same problems. They began to recognize the value of understanding mathematics from a student's point of view and to understand instructional decisions promoting conceptual learning. Results and pedagogical implications will be discussed.

Session 22

Room 107

Developing Mathematics Knowledge for Teaching through Japanese Curriculum Materials

Tad Watanabe, Kennesaw State University

Some mathematics teacher educators advocate the use of curriculum materials to deepen prospective teachers' understanding of mathematics that they are expected to teach, and many of them use various NSF-supported curricula in mathematics content courses. The Japanese curriculum is often cited as an example of a focused and cohesive curriculum. Japanese students have consistently performed at a high level in various international studies. This session provides a description of how translated Japanese elementary school curriculum materials are incorporated into a series of mathematics content courses for prospective elementary school teachers. These materials have been well received by students. The presentation will focus primarily on examples with rational numbers and geometry.

Session 23

Room 111

Emergent Proportional Reasoning: Investigating Learners' Strategies in Single-Sex Mathematics ClassroomsS. Megan Che, Clemson University, and
Elaine Wiegert, Clemson University

This presentation is an update on a study first discussed at RCML last year. At the time of last year's meeting, the authors presented findings from task-based individual interviews with 23 middle grades students in a single-gender public charter school. This year the researchers have collected written problem-solving processes from 161 students at the school. Each of the students was asked to solve a problem involving proportional reasoning, and the students' strategies were analyzed according to the types of reasoning used to solve the problem. The following questions will be addressed:

What problem-solving strategies were common, and what mathematical thinking is involved in these strategies?

Are there patterns in the problem-solving strategies? If so, are there relationships between gender and these patterns?

Session 24

Room 113

Identifying Problems with Students' Mathematical Ability in Science and Engineering Courses

Wendy James, Oklahoma State University

Although mathematics is an essential tool for the fields of science and engineering, it is also a confounding variable tripping students' successful learning. Engineering faculty members have reported projects or interventions investigating solutions to students' problems with mathematics. The first part of this presentation reports patterns in engineering faculty's perceptions of the problem with students' use of mathematics, the interventions faculty have tried, and a summary of their findings. The second part of the presentation provides a report on how mathematics courses may not be preparing students for the use of vectors and literal equations in physics and engineering courses based on observations of course lectures.

Session 25

Room 233

Homogeneous Ability Grouping in Mathematics: The Oxymoron

Karla Webb, Mathematics Teacher and Doctoral Student, University of Memphis

Reform efforts in mathematics encompassed a path of enlightenment for equity in all mathematics classrooms. Rooted in constructivism, the reform efforts galvanized student-centered classrooms and innovative teaching and learning strategies. This study investigates student-centered homogeneous ability grouping in a high school mathematics course. The study focuses on an urban high school teacher who encourages student-centered learning in her homogeneous ability-grouped mathematics class. The framework of the study allows for the interrogation and analysis of the ways in which the teacher modified the curriculum and employed various teaching and learning techniques. Through inductive analysis, the substantive findings illustrate the participant's relationship with the students, the autonomy given to the students, modification of the curriculum, and alternate methods of evaluation.

Friday, March 6, 2009

Sessions 26 – 31

4:00 – 4:45 pm

Session 26

Room 103

Number Sense and Number Operations: Improving Teacher Content and Pedagogical Knowledge in the Intermediate and Middle Grades

Stacy Reeder, University of Oklahoma

The results of research conducted as part of a professional development project for intermediate and middle level teachers focused on the improvement of number sense and number and operations content and pedagogical knowledge will be presented. Additionally, participants will be involved in discussion about the development of the tasks, activities, and curriculum used as part of this professional development activity.

Session 27

Room 106

“Seeing” the Picture: Using Imagery and Representation in Mathematics Teaching and Learning

Kerri Richardson, The University of North Carolina at Greensboro,
Sarah Smitherman Pratt, The University of North Carolina at Greensboro, and
Stephanie Kurtts, The University of North Carolina at Greensboro

The presenters describe how teachers can help students with diverse learning needs connect the use of imagery to understanding multi-digit multiplication and division. Imagery is critical to students' understandings of the mathematics curriculum as they develop conceptual understanding, computational fluency, and problem-solving skills. Students identified as having mathematics learning disabilities, and students who, while not specifically receiving special education services, struggle with mathematics, need effective instructional approaches to ensure that their educational needs are met.

Session 28

Room 107

Metacognition and Secondary Mathematics Education

Kansas Pope, Doctoral Student, Oklahoma State University

This study examined a teacher's use and modeling of metacognition in a secondary mathematics classroom. Data included three semi-structured interviews, a classroom observation, and document analysis of teacher-created lesson plans and assessments. Findings from the analysis of qualitative data will be discussed.

Session 29

Room 111

Out with the Old, In with the New—Observations of Two Fifth-Grade Math Classes

Thomas Spall, Student, University of Central Oklahoma, and
Darlinda Cassel, University of Central Oklahoma

Observations in two fifth-grade mathematics classrooms led an education major to personal struggles and to many questions, such as "Why are the students in one classroom excited about learning while the students in the second classroom do not care about learning?" Similarities and differences between the two classrooms will be discussed. The education major's personal struggles and changes in attitude and perception about the teaching of mathematics will also be discussed.

Session 30

Room 113

Classroom Culture and Mathematics Teaching

Marijane Kuback, Cleveland State University, and
Roland Pourdavood, Cleveland State University

This research compared students' attitudes toward mathematics in a student-centered, hands-on classroom and in a teacher-directed, traditional classroom. Two ninth-grade algebra classes were chosen. Data from the teacher-directed class were also analyzed to determine if there was a change in attitude with the more traditional method. The findings suggest that although there were not significant differences between the two classes in terms of student performance on the semester grades, there were critical differences between classes regarding students' attitudes and beliefs about mathematics learning. The implications for teacher preparation and teacher professional development will be discussed.

The Japanese Lesson Study Model in Middle and High School Mathematics**Sally Robison, University of Arkansas**

The Japanese Lesson Study model has been used in many secondary mathematics classes within the Little Rock School District for the past three years. This presentation is related to a project involving university professors, district administration, public school faculty, and middle and high school students. Sample lessons, methods and instruments used, lessons learned, as well as short video vignettes will be shared.

Friday, March 6, 2009

Activities

4:45 – 6:00 pm

Check e-mail in Science 233
Campus Tours
Walking on campus or in Cage Center
Trip to Mt. Berry Square Mall
Art Exhibit

Friday, March 6, 2009

Dinner

6:00 – 6:50 pm

Krannert Center Ballroom

Friday, March 6, 2009

Keynote Speaker

7:00 – 8:00 pm

Science Auditorium

Dr. Jim Wilson

University of Georgia

“Geometry, Problem-solving, and Technology”

Saturday, March 7, 2009

Breakfast

7:30 - 8:45 am

Krannert Center Ballroom

Saturday, March 7, 2009

Sessions 32 – 37 9:00 – 9:45 am

Session 32

Room 103

Co-Teaching: What Goes on Between Instructors and Students

Michael Mikusa, Kent State University, and
Anne Reynolds, Kent State University

Personal experiences working with mathematicians in co-teaching content (mathematics) courses for middle grades teachers will be shared. These experiences include working with faculty colleagues outside the classroom as well as during classes and discussions about content, assessment, and connections between what practicing teachers needed to learn and what they are responsible to teach. Specific processes and procedures used in classes and examples of lessons that were developed and used will be included.

Session 33

Room 106

Writing in Algebra to Promote Reflection and Mathematical Understanding

Lynn Columba, Lehigh University, and
Carol Smith Reed, Lehigh Carbon Community College

This presentation discusses the research findings on the relationship between writing and developing learners' mathematical understanding. Specifically, the presentation describes the mathematical learning of high school algebra students when writing to explain their solutions while solving open-ended problems in a mathematics classroom. In addition, the research included the effect of using a blog as a writing tool. Impact on problem-solving ability and retention of concepts was examined using pre- and posttests, student and teacher interviews, and writing samples.

Session 34

Room 107

Building Communities of Practice

Eileen Faulkenberry, Texas A & M University at Commerce, Texas

Communities of Practice are groups of people with common interests or needs who deepen their understanding through interactions with others in the group on an ongoing basis. The infrastructure provides support for the participants as they address their common needs. Teachers continuously look for new and better ways to teach. Through a community of practice, they can share their questions, answer others' questions, and provide support for continual growth. This presentation examines the creation of a community of practice both during the face-to-face phase and the online phase. The ongoing analysis of the benefits of the community of practice for the participants will also be discussed.

DMP Learning Experiences Survey

Learning Experiences in Class

Please indicate how frequently you engaged in the following activities *during* your ECE math course this semester. (Mark one response for each row)

	Not at All	About Once a Month	Once or Twice a Week	Three or More Times a Week
I listened to and evaluated other students' ideas, solutions, or points of view				
I was challenged to defend, extend, clarify, or explain how I derived my answers or ideas				
I was expected to "investigate" or "discover" mathematical principles and ideas				
I worked with other students to explore new ideas/concepts through problem examples				
I shared strategies with other students for approaching or solving a problem				
I justified my reasoning in a problem or steps in a proof				
I discussed connections between mathematical ideas/concepts with other students				
I worked with other students to evaluate or construct proofs or make conjectures/propositions				
When students were working together, we were encouraged to admit confusion and ask questions				
I taught a particular mathematical idea to the class				
I directed questions to other students about mathematical ideas/concepts				
I put individual or group work on the board for classmates to examine or comment on				
I worked in groups with other students on projects to be turned in for a grade or extra credit				

Mathematics Content Knowledge

Please mark your level of agreement with the following **relative to your experiences prior to taking this course**. (Mark one response for each row)

	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
I feel more comfortable with elementary mathematics content				
I am more knowledgeable about pedagogical issues related to teaching elementary mathematics content				
I feel more comfortable discussing mathematics with others				
I feel more confident in my ability to do mathematics				

Table 1: End-of-Course Reported High Levels of In-Class Active-Learning Experiences

	<u>Freq</u> (n=77)	<u>Percent</u>
1. "I listened to and evaluated other students' ideas, solutions, or points of view."	74	96.1
2. "I was challenged to defend, extend, clarify, or explain how I derived my answers or ideas."	68	88.3
3. "I was expected to 'investigate' or 'discover' mathematical principles and ideas."	74	96.1
4. "I worked with other students to explore new ideas/concepts through problem examples."	69	89.6
5. "I shared strategies with other students for approaching or solving a problem."	69	89.6
6. "I justified my reasoning in a problem or steps in a proof."	58	75.3
7. "I discussed connections between mathematical ideas/concepts with other students."	66	85.7
8. "I worked with other students to evaluate or construct proofs or make conjectures/propositions."	54	70.1
9. "When students were working together, we were encouraged to admit confusion and ask questions."	66	85.7
10. "I taught a particular mathematical idea to the class."	9	11.6
11. "I directed questions to other students about mathematical ideas/concepts."	43	55.8
12. "I put individual or group work on the board for classmates to examine or comment on."	28	36.4
13. "I worked in groups with other students on projects to be turned in for a grade or extra credit"	39	50.6

Table 2: End-of-Course Responses to Mathematical Power Items

	<u>Freq</u> (n=77)	<u>Percent</u>
1. "I feel more comfortable with elementary mathematics content."	66	85.7
2. "I am more knowledgeable about pedagogical issues related to teaching elementary mathematics content."	62	80.5
3. "I feel more comfortable discussing mathematics with others."	66	85.7
4. "I feel more confident in my ability to do mathematics."	65	84.4

Session 35

Room 111

A Professional Development Model: Working with Sixth-Grade Algebra Teachers

Angela Krebs, University of Michigan, and
Kathy Burgis, University of Michigan

The researchers are developing a framework for a model of professional development. Data have been collected from teacher interviews, classroom surveys, pre- and posttests, and teacher journals. The presenters will share their current thinking on their work with regular and special education sixth-grade algebra teachers and will solicit feedback from participants.

Session 36

Room 113

The Effect of a Fundamentalist View of Definitions on the Learning of Mathematics

David Boliver, Professor Emeritus, University of Central Oklahoma

Through many years of experience teaching prospective teachers and reviewing research on teaching and learning mathematics, the presenter has concluded that much of that research is related to student belief about the nature of definitions. The intent of this session is to suggest a common theme to unite many studies in mathematics education and propose methods for introducing a more nuanced view of what is done in defining words in mathematical contexts.

Session 37

Room 233

Relationship of Professional Development to Observed Changes in Teacher Practice

Harriet Lamm, TEES Research Scientist

This presentation discusses a partnership including two institutions of higher education and nine rural and suburban school districts in South Texas. Over five years, 2,854 hours of professional development were offered covering math content, curriculum, technology, and mentoring. Research examined whether there is a relationship between the differing levels of teacher engagement in professional development and observed changes in teacher practice as evidenced by student engagement in the classroom. Teacher observations were conducted using the Mathematics and Science Classroom Observation Protocol Survey (MASCOPS) on changes in teacher practice. Student engagement was positively correlated with hours of professional development, especially for more than 30 hours.

Session 38

Room 103

Mathematics Learning: The Effects of Activity-Based Adventures**Sheryl Maxwell**, Retired, University of Memphis

Teacher candidates and in-service teachers in Grades K – 8 need to not only learn mathematics concepts they will teach, but also strengthen their understanding of the connections of mathematics topics with life adventures, literacy and language aspects, and critical thinking experiences. This presentation shares the use of the Center for Research on Education, Diversity, and Excellence (CREDE) Standards through activity-based centers. Samples will be shared, along with a list of suggested math concepts. This method of having learners investigate mathematical connections will be discussed.

Session 39

Room 106

Math Anxiety and the Freshman Student**Martha Tapia**, Berry College

This study examined attitudes toward mathematics of 45 freshmen enrolled in mathematics courses at a private liberal arts college by use of the Attitudes Toward Mathematics Inventory (ATMI). Data were analyzed using a multivariate factorial model with four factors of mathematics attitudes as dependent variables (self-confidence, value, enjoyment of mathematics, and motivation) and sex and mathematics anxiety as independent variables. Math anxiety was found to be statistically significant on self-confidence, enjoyment of mathematics, and motivation.

Session 40

Room 107

An Examination of Pre-Service Teachers' MKT and Mathematical Power in Content Courses**Kadian Callahan**, Kennesaw State University,
Amy Hillen, Kennesaw State University, and
Tad Watanabe, Kennesaw State University

Mathematics teachers draw upon a unique knowledge base, identified as *mathematical knowledge for teaching* (MKT) in order to provide their students with opportunities to learn meaningful mathematics. In addition, teachers need *mathematical power*, including an ability to do mathematics with fluency and confidence, as well as a capacity to communicate mathematics to others. Research has indicated that elementary school teachers have limited MKT, and there has been little research that has examined teachers' mathematical power and how it develops. In this session preliminary findings are shared from an examination of the relationship between pre-service elementary teachers' learning experiences in a four-course mathematics content sequence and their development of MKT and mathematical power.

Session 41

Room 111

Assessing Math Concepts**Bea Babbitt**, University of Nevada at Las Vegas

Math concepts form the foundation for development of math strategies and problem-solving. This session will explore assessment items from a variety of K-6 math topics that are designed to reveal students' understanding and possible misunderstanding of mathematical topics.

Session 42

Room 113

Mathematics Academy: Professional Development for Teaching Algebra**Kay Wohlhuter**, University of Minnesota, Duluth

The presenter will describe the initial stages of a project that is examining the impact of middle school teachers' participation in a year-long mathematics teaching academy. Two defining characteristics of the academy are the focus on algebra and the establishment of professional learning communities.

Session 43

Room 233

Engaging Students in College Mathematics/Mathematics Education Courses and Beyond**Winifred A. Mallam**, Texas Woman's University

Grant activities across a ten-campus collaborative are discussed. Activities relate to course reform in mathematics, recruitment to science and mathematics teaching, support of pre-service and novice teachers, and strengthening systemic connections. Hands-on, mind-provoking Course Enhancement Components developed at the collaborative level are highlighted. At the campus level, students were surveyed to identify their perceptions and attitudes toward various instructional strategies. Results are presented relating to strategies such as making models, solving real-world problems, cross-curricular connections, data collection/analysis, grouping, and using technology.

Four-course sequence for elementary

course	1	whole number & int operations
course	2	rational number
course	3	Geometry & measurement
course	4	Algebra

- developing mathematical ideas - Deborah Schifter videos

Session 44

Room 103

Social Studies, PE, or English Teacher: How Much Math Do They Know?

Kathy Westbrook, University of South Alabama, and
Joy Black, University of West Georgia

Beginning with 2008 graduates, the state department of education of one southeastern state required that all college of education students meet an established level of proficiency on six pre-algebra mathematics standards in order to receive certification. In lieu of a common mathematics course, independent online computer modules were developed for content review and assessment. The focus of this session will be to report on an analysis of pre-service teachers' mathematics content knowledge by major and course taking. It will address the common mistakes made by pre-service teachers and how assessment results compare by student major and mathematics course-taking patterns. The feasibility of using computer modules for mathematics learning will be discussed.

Session 45

Room 106

Sustaining Secondary Mathematics Students' Dispositions through Problem-Solving and Communication

Roland Pourdavood, Cleveland State University,
Patrick Wachira, Cleveland State University, and
Raymond Skitzki, Secondary Mathematics Teacher, Shaker Heights High School

This study focuses on the beliefs and attitudes towards mathematics learning of students in two twelfth-grade classrooms. A major goal of the study is to use social constructivist theory to understand and interpret students' mathematical dispositions as they solve non-routine problems and communicate their solutions in their pre-calculus class. The primary research questions are: (1) What is the relationship between mathematical discourse and students' mathematical dispositions? (2) How may students' mathematical dispositions be sustained and advanced as they take more challenging mathematical courses? Data sources include survey questionnaires developed by the presenters, classroom observations, students' problem-solving records, one-on-one interviews with some participating students, field notes, and relevant school documents.

Session 46

Room 111

Engineering-Based Activities and Middle School Students' Knowledge

Pat Lamphere Jordan, Oklahoma State University, and
Adrienne Redmond, Oklahoma State University

This study focused on the impact of engineering-based instructional activities on middle school students' perceptions of their ability to become engineers. During middle school, students' interest can be piqued to consider careers in mathematics and science. This study also looks at math content knowledge, attitudes toward math and science, and perceptions of technology, engineering, and what defines engineering. The components included in-class, integrated engineering-based activities conducted in the sixth- and seventh-grade science classes, an after-school mentoring program for middle school girls, and a summer engineering camp opened to both girls and boys.

Session 6

Room 102

Improving Mathematics Methods Students' Lesson Plans**Sue Brown**, University of Houston at Clear Lake

Lesson plan data regarding the procedure for checking for understanding were used to improve the mathematics education program.

Session 7

Room 106

The Role of Emotion in Mathematical Problem Solving**Elaine Young**, Texas A & M, Corpus Christi, Texas

Emotion has a large role to play when pre-service and in-service teachers explore mathematical problem-solving. A pre- and post-questionnaire about positive and negative emotions informs the research beyond the existing issues of attitudes and beliefs. Data and analysis from both pre-service elementary teachers and secondary in-service teachers will be presented.

Session 8

Room 107

John Wilson and His Ideas – Relevant for Today: A Personal Perspective**Robert Ashlock**, Covenant College (Retired)

The Wilson Memorial Lectures honor the legacy of John Wilson, a founding member of RCML. Wilson's clinic programs at Syracuse University and the University of Maryland were among the university clinic programs which influenced the early years of RCML. Wilson's ideas are relevant for assessment and instruction, even today. They illustrate one way that math curriculum content can be viewed to facilitate data-gathering, such as interviews. Although RCML began during a time when education was greatly influenced by behaviorism, many of Wilson's ideas have a cognitive focus which is more in keeping with much of education today.

Session 3

Room 111

NCRM- RCDPM – RCML: A Look Back as We Move Forward

William Speer, University of Nevada, Las Vegas, and
James Heddens, Kent State University, Professor Emeritus

This session will present an overview of the circumstances and impetus for the establishment of the series of conferences that focused on issues of remediation in mathematics that then led to the establishment of the Research Council on Mathematics Learning. In that sense, the session presents an organizational history lesson for those who believe our past can inform our future.

Session 4

Room 113

Middle School Algebra I Research and the National Mathematics Panel's Findings

Pat Lamphere Jordan, Oklahoma State University

This presentation reviews the research, discusses the results, and discusses the successes and difficulties that middle school Algebra I students encounter. The National Mathematics Panel's report will be compared to the results of this body of research. New areas for research will also be discussed. In the twenty years since publication of the *Standards*, what results and changes have there been? Have there been gains in student understanding and achievement in Algebra I? Are there differences in the approaches that bring success for students in middle school Algebra I and 9th-grade Algebra I?

Session 5

Room 233

Parent Perspective: A Rural Mathematics Teacher's Action Project

Linda Goeller, Oklahoma State University

This presentation reports on an action research project that compares the views of one rural school district's parents, teachers, and administrators on mathematics education. The research served as a starting point for developing communication between the school faculty/administration and parents concerning mathematics education and addressed the belief that rural parents do not desire academic excellence. The presentation includes responses to the survey, as well as reactions of educators and parents to the results. The information presented will assist mathematics educators in the formation of professional development for K-12 rural teachers.

Friday, March 6, 2009

Friday, March 6, 2009

Breakfast

7:30 - 8:45 am

Krannert Center Ballroom

Friday, March 6, 2009

Sessions 1-5

9:00 - 9:45 am

Session 1

Room 103

First Year Middle and High School Teachers' Mathematical Content Proficiency and Attitudes in the Teach for America (TFA) Program

Brian Evans, Pace University

The purpose of this study was to understand what mathematical content knowledge exists both before and after the first year for Teach for America (TFA) teachers, as well as what attitudes TFA teachers hold. TFA teachers were given a mathematical content test and two additional questionnaires that measured their attitudes toward mathematics and teaching at the beginning and end of their first year of teaching and enrollment in teacher preparation classes. Considering the large number of alternative certification teachers teaching in the United States, and New York City in particular, this research is highly relevant. This means understanding what mathematical content knowledge these new teachers have and what attitudes toward the subject area and teaching they hold is highly relevant.

Session 2

Room 107

Learning to Teach in Multiple Environments: A Comparison Study

Janet Andreasen and **Erhan Haciomeroglu**, University of Central Florida

This study examines the merits of microteaching and TeachME—an innovative environment for teacher training—in teacher education programs. It extends previous studies by enhancing microteaching methods and proposes an alternative preparation process through the use of virtual environments. In a semester-long methods course, prospective teachers, randomly divided in groups of three, developed and taught lessons in micro or virtual environments. As a result of different teaching experiences in these ostensibly similar environments, the Micro or Virtual groups focused on different aspects of teaching and lesson planning as they watched their own videos, reflected on their teaching, and revised their lesson plans in preparation for the next cycle of teaching. Results of the study with pedagogical implications will be discussed.

Conference Sessions

Room 103	Room 106	Room 107	Room 111	Room 113	Room 233
(26) Stacy Reeder - Number Sense and Number Operations: Improving Teacher Content and Pedagogical Knowledge in the Intermediate and Middle Grades	(27) Kerri Richardson, Sarah Smitherman Pratt, and Stephanie Kurtis - "Seeing" The Picture: Using Imagery and Representation in Mathematics Teaching and Learning	(28) Kansas Pope: Metacognition and Secondary Mathematics Education	(29) Thomas Spall & Darlinda Cassel - Out with the Old, In with the New -- Observations of Two 5th Grade Math Classes	(30) Marijane Kuback and Roland Pourdavood - Classroom Culture and Mathematics Teaching	(31) Sally Robison - The Japanese Lesson Study Model in Middle and High School Mathematics
Friday 4:00 - 4:45					
Room 103	Room 106	Room 107	Room 111	Room 113	Room 233
(32) Michael Mikusa and Anne Reynolds - Co-Teaching: What Goes on Between Instructors and Students	(33) Lynn Columba and Carol Smith Reed- Writing in Algebra to Promote Reflection and Mathematical Understanding	(34) Eileen Faulkenberry - Building Communities of Practice	(35) Angela Krebs and Kathy Burgis - A Professional Development Model: Working with 6th Grade Algebra Teachers	(36) David Boliver - The Effect of a Fundamentalist View of Definitions on the Learning of Mathematics	(37) Harriet Lamm - Relationship of Professional Development to Observed Changes in Teacher Practice
Saturday 9:00 - 9:45					
Room 103	Room 106	Room 107	Room 111	Room 113	Room 233
(38) Sheryl Maxwell - Mathematics Learning: The Effects of Activity-Based Adventures	(39) Martha Tapia - Math Anxiety and the Freshman Student	(40) Kadian Callahan, Amy Hillen, and Tad Watanabe - An Examination of Pre-Service Teachers' MKT and Mathematical Power in Content Courses	(41) Bea Babbit - Assessing Math Concepts	(42) Kay Wohlhuter: Mathematics Academy: Professional Development for Teaching Algebra	(43) Winifred A. Mallam - Engaging Students in College Mathematics/Mathematics Education Courses and Beyond
Saturday 10:00 - 10:45					
Room 103	Room 106	Room 111	Room 113	Room 233	
(44) Kathy Westbrook and Joy Black - Social Studies, PE, or English Teacher: How Much Math Do They Know?	(45) Roland Pourdavood, Patrick Wachira, and Raymond Skitski - Sustaining Secondary Mathematics Students' Dispositions through Problem Solving and Communication	(46) Pat Lampere Jordan and Adrienne Redmond - Engineering-based Activities and Middle School Students' Knowledge	(47) Harriet Lamm - Relationship of Professional Development Participation to Student Achievement	(48) Rebecca Ortiz and Bibi Ganesh - Pre-Service Teachers Engage in Contextual Mathematics	
Saturday 11:00 - 11:45					

Conference Sessions

Time	Room 103	Room 107	Room 111	Room 113	Room 233
Friday 9:00 - 9:45	(1) Brian Evans - First Year Middle and High School Teachers' Mathematical Content Proficiency and Attitudes in the Teach for America (TFA) Program Room 102	(2) Janet Andreasen and Erhan Haciomeroglu - Learning to Teach in Multiple Environments: A Comparison Study Room 106	(3) William Speer and Jim Heddens- NCRM - RCDPM - RCML: A Look Back As We Move Forward Room 107	(4) Pat Lamphere Jordan - Middle School Algebra I Research and the National Mathematics Panel's Findings Room 233	(5) Linda Goeller - Parent Perspective: A Rural Mathematics Teacher's Action Project Room 233
Friday 10:00- 10:45	(6) Sue Brown - Improving Mathematics Methods Students' Lesson Plans Room 102	(7) Elaine Young - The Role of Emotion in Mathematical Problem Solving Room 107	(8) Robert Ashlock - John Wilson and His Ideas - Relevant for Today: A Personal Retrospective Room 111	(9) Joyce Swan - Changes in Teaching Styles and Methods: Insights from Project IMACT Room 113	
Friday 11:00 - 11:45	(10) Marilyn Sue Ford and Virginia Usnick - Teachers' Self-Perceptions of their Journeys Towards Exemplary Status Room 103	(11) Thomas Faulkenberry - Mathematics Anxiety Among Elementary Education Majors Room 106	(12) James Heddens - Teaching Senior Citizens Mathematics Room 107	(13) Valerie Sharon - Pre-Service Elementary Teachers Learn About Teaching in a Mathematics Content Course Room 111	(14) Mike Turegun and Stacy Reeder - Exploring Gender Differences in College Students' Conceptual Understanding of Spread Room 113
Friday 2:00 - 2:45	(15) Joy Black and Kathy Westbrook - Changing Content and Pedagogical Content Knowledge of Algebra Teachers Room 106	(16) Adrienne Redmond - Mathematical Language Usage of Students with Different Instructional Experiences Room 107	(17) Alan Zollman - Teacher as Engineer/Researcher/Leader: Enhancing STEM Education Room 111	(18) Carolyn Pinchback - Addressing Diversity in the Classroom Room 113	(19) Juliana Utley - Assessing Preservice Elementary Teachers' Mathematical Dispositions Room 233
Friday 3:00 - 3:45	(21) Janet Andreasen and Erhan Haciomeroglu - Developing Preservice Teachers' Mathematical Knowledge for Teaching Algebra Room 106	(22) Tad Watanabe - Developing Mathematics Knowledge for Teaching through Japanese Curriculum Materials Room 107	(23) Megan Che and Elaine Wiegert - Emergent Proportional Reasoning: Investigating Learners' Strategies in Single-Sex Mathematics Classrooms Room 111	(24) Wendy James - Identifying Problems with Students' Mathematical Ability in Science and Engineering Courses Room 113	(25) Karla Webb - Homogeneous Ability Grouping in Mathematics: The Oxymoron Room 233
					(20) Kim Hartweg, Laverne Logan, and Molly Lija - The Teaching and Learning of Probability Concepts Using TI-73 Simulations with Sixth-Grade Students Room 233

36th Annual Conference of the Research Council on Mathematics Learning

Where Research and Practice Meet and Learning Begins

Schedule of Sessions

March 5 – 7, 2009

**Berry College
Rome, Georgia**

Thursday, March 5, 2009

Reception

5:00 – 6:30 pm

Martha Berry Museum

Wilson Lecture

7:00 – 8:30 pm

Science Center Auditorium

Towards Assistive Technologies for the Deaf Community

presented by

**Dr. Thad Starner
Georgia Institute of Technology and
Contextual Computing Group**

Projects to improve sign language skills for both deaf children and their hearing
parents using classroom and mobile phone technology
Use of sign language to communicate through brain-computer interfaces with people
paralyzed with ALS

36th Annual Conference of the Research Council on Mathematics Learning

Schedule of Events

Thursday, March 5, 2009

Registration (Martha Berry Museum)	2:00 pm – 6:00 pm
Executive Board Meeting (Red Room in Krannert Center)	1:00 pm – 5:00 pm
Tours of Oak Hill and the Martha Berry Museum	2:00 pm – 5:00 pm
Reception at the Martha Berry Museum	5:00 pm – 6:30 pm
Wilson Lecture (Science Center Auditorium)	7:00 pm – 8:30 pm
<i>Dr. Thad Starner, Georgia Institute of Technology and Contextual Computing Group</i> <i>"Towards Assistive Technologies for the Deaf Community"</i>	

Friday, March 6, 2009

Breakfast (Krannert Ballroom)	7:30 am – 8:45 am
Registration (Science Center Grand Hall)	8:00 am – 5:30 pm
Sessions 1 – 5 (Science Center Classrooms)	9:00 am – 9:45 am
Sessions 6 – 9 (Science Center Classrooms)	10:00 am – 10:45 am
Sessions 10 – 14 (Science Center Classrooms)	11:00 am – 11:45 am
Lunch & Business Meeting (Krannert Ballroom)	12:00 pm – 1:45 pm
Sessions 15 – 20 (Science Center Classrooms)	2:00 pm – 2:45 pm
Sessions 21 – 25 (Science Center Classrooms)	3:00 pm – 3:45 pm
Sessions 26 – 31 (Science Center Classrooms)	4:00 pm – 4:45 pm
Activities	4:45 pm – 6:00 pm
Dinner (Krannert Ballroom)	6:00 pm – 6:50 pm
Keynote Address (Science Center Auditorium)	7:00 pm – 8:00 pm
<i>Dr. Jim Wilson, University of Georgia</i> <i>"Geometry, Problem-solving, and Technology"</i>	

Saturday, March 7, 2009

Breakfast (Krannert Ballroom)	7:30 am – 8:45 am
Registration (Science Center Grand Hall)	8:00 am – 10:00 am
Sessions 32 – 37 (Science Center Classrooms)	9:00 am – 9:45 am
Sessions 38 – 43 (Science Center Classrooms)	10:00 am – 10:45 am
Sessions 44 – 48 (Science Center Classrooms)	11:00 am – 11:45 am
Lunch and Founders' Lecture (Krannert Ballroom)	12:00 pm – 1:45 pm
<i>Dr. Jim Heddens, Kent State University</i> <i>"A Peek at the Past"</i>	
Executive Board Meeting (Red Room in Krannert)	2:00 pm – 4:30 pm

Session 47

Room 113

Relationship of Professional Development Participation to Student Achievement

Harriet Lamm, TEES Research Scientist

This session reports on the relationship between differing levels of teacher engagement in professional development and student achievement as measured on the Texas Assessment of Knowledge and Skills. Longitudinal data were collected for professional development offerings along with cumulative hours by individual.

Session 48

Room 233

Pre-Service Teachers Engage in Contextual Mathematics

Rebecca Ortiz, Texas Tech University, and
Bibi Ganesh, Doctoral Student, Texas Tech University

Pre-service teachers from Australia and the United States were compared as they observed, collected, and analyzed data while observing events in nature. The observations included lunar-related phenomena, with local observations being compared to those of others from around the world. Pre-service teachers were able to examine misconceptions in scaling between the moon and earth, to recognize patterns, to notice specific geometric relationships, and to learn mathematics in contextual ways they had never before encountered.

Saturday, March 7, 2009 Lunch and Founders' Lecture 12:00 – 1:45 pm

Krannert Center Ballroom

Dr. Jim Heddens

Professor Emeritus, Kent State University

"A Peek at the Past"

Saturday, March 7, 2009 Executive Board Meeting 2:00 – 4:30 pm

Red Room

Krannert Center