



RCML

**Mathematics Education
Then, Now, and the Future**

**Research Council on Mathematics Learning
Annual Conference
February 19-21, 2004
The Westin—Oklahoma City, Oklahoma**

Hosted by:

O *the university of* **KLAHOMA**

College of Education

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RCML 2004 Conference

Schedule of Presentations

Thursday, February 19, 2004

Registration	1:00 PM - 5:00 PM
Board Meeting	12:30 PM - 2:30 PM
Session I	3:00 PM - 4:15 PM

Birds-of-a-Feather Discussions

The three Birds-of-a-feather sessions will provide opportunities for newcomers to meet in an open forum with other RCML members, discuss issues of interest, and share research and ideas. In addition, the BOFs should set the tone for on-going conversations along these themes throughout the conference.

- I.1 Room: Frontier Country**
Technology and Mathematics Education
David Boliver & Dana Craig (facilitators) University of Central Oklahoma
- I.2 Room: Green Country**
Teacher Education Issues and Concerns
Alan Zollman (facilitator) Northern Illinois University
- I.3 Room: Red Carpet Country**
Mathematics Learning and Assessment
Dan Brahier (facilitator) Bowling Green State University

Session II **4:30 PM - 5:30 PM**

Round-table Discussions

- II.1 Room: Frontier Country**
Algebraic and Proportional Reasoning in a Standards-based Elementary Content Course
Angela S. Krebs University of Michigan–Dearborn

This paper reports findings of a research project studying preservice teachers' development of their algebraic and proportional reasoning in a Standards-based content course. The presenter will describe the course, and engage participants in a discussion surrounding what these students know and what they need to know to teach mathematics.

II.2 Room: Kiamichi

Tutoring as a tool: How to assess it in pre-service teachers?

M. Lynn Breyfogle

Bucknell University

This roundtable will pose the following to stimulate discussion and feedback: What are some ways to assess (and measure) the affect engaging in a tutoring relationship has on the mathematical content knowledge of pre-service elementary teachers?

II.3 Room: Red Carpet Country

Teachers' Beliefs about Teaching and Learning Mathematics in Context

Holly Anthony

University of Georgia

This paper reports a pilot study conducted with four mathematics teachers: two middle school and two high school. The purpose of this study was to investigate mathematics teachers' perceptions of and beliefs about teaching and learning "mathematics in context." The paper provides a brief synopsis of current literature related to context-based mathematics, teachers' beliefs, and the influence of these beliefs on pedagogy. Dichotomies are drawn between the beliefs of middle school teachers and high school teachers.

II.4 Room: Green Country

Mathematics Teaching and Learning: Secondary Preservice Teachers' Conceptions

Donna H. Foss

University of Central Arkansas

This paper identifies secondary preservice teachers' conceptions of mathematics teaching and learning in a mathematics methods course and proposes ways of resolving the conflicts that restrict their adoption and implementation of standards-based methods.

Reception – PLAZA BALLROOM 5:30 PM – 6:30 PM

Cherokee Story Teller Rocky Robbins will involve participants in the native tradition of story telling. Light hors d'oeuvres will be served. Conference staff will facilitate groups gathering together to go to dinner in Brick Town.

Information

Abuelos Mexican Food

Embassy
17 E. Sheridan
405-235-1422

**Bricktown Brewery
Restaurant**

1 N. Oklahoma
405-232-2739

**Chelino's Mexican
Restaurant**

15 E. California
405-235-3533

Coach's Restaurant

20 Mickey Mantle
405-232-6224

Gopuram Taste of India

121 E. California
405-230-1323

Lotus Restaurant

100 E. California
405-270-0800

**Mickey Mantle's
Steakhouse**

7 Mickey Mantle
405-272-0777

Mantel Bistro

201 E. Sheridan
405-236-8040

Pearl's Crabtown

303 E. Sheridan
405-232-7227

**Spaghetti Warehouse
Italian Grill**

101 E. Sheridan
405-235-0402

UnCommon Grounds

100 E. Main
405-236-5282

Varsity Sports Grill

115 E. Sheridan
405-235-5525

Zio's Italian Kitchen

12 E. California
405-278-8888

Friday, February 20, 2004

Registration & Information 8:00 AM - 6:00 PM
Open in the morning and between sessions

Continental Breakfast – Cherokee Room 8:00 AM - 8:30 AM

Session III 8:30 AM - 9:15 AM

III.1 Room: Frontier Country

Technological Progress? How far HAVE we come?

Diana S. Perdue

Virginia State University

This presentation will reveal current trends in elementary and middle school teachers' attitudes toward using technology in the mathematics classroom. We will also discuss pre-service teachers' skill and abilities relating to teaching effectively with technology.

III.2 Room: Great Plains Country

Base 5 Operation: Concrete versus Abstract

Winifred A. Mallam

Texas Women's University

One of the topics pre-service educators encounter is conversion and calculations in Bases other than 10. This topic was presented using Base 5 blocks. Pre-service educators were given a pre-test and a post-test. The results will be presented with implications for presenting the topic in the Core Curriculum mathematics course.

.3 Room: Red Carpet Country

Bridging the Departments of Mathematics Education and Mathematics in order to Prepare Graduate Students for Teaching

Serkan Hekimoglu

University of Georgia

Fifteen Mathematics Department doctoral students were interviewed. They were asked questions regarding a graduate certificate program in a Mathematics Education Department for graduate students in mathematics. Although the majority of them supported the idea, their perceptions of such a program ranged from highly favorable to skeptical. They all emphasized the importance of mathematics graduate students to have a good understanding of learning theories.

III.4 Room: Plaza North

Does Training in Curriculum Integration Influence Teaching and Student Achievement?

Dixie Metheny

Montana State University-Billings

David Davison

Johanna Hadden

Ken Miller

The presenters are investigating whether pre-service preparation in curriculum integration affects how teachers present mathematics, science and social studies. Preliminary results will be presented with implications for the future.

Session Cancelled

III.5 Room: Plaza South

Exploring Techniques for Teaching Mathematics Vocabulary

Carol Lucas

Susan Gay

University of Central Oklahoma

University of Kansas

Strategies, resources, and examples will be presented that have helped middle, secondary, and college students improve their mathematical vocabulary and develop their conceptual understanding. Experiences of misuses of mathematics vocabulary will be shared with a discussion as to how strategies and other techniques could help overcome these misunderstandings.

✓ **III.6 Room: Cherokee #1**

Mathematical Misconceptions and Attitudes of Math Methods Students

Sally Robison

Florida Atlantic University

This presentation will disseminate research data on the content knowledge of elementary and secondary mathematics methods students. We will discuss the state of Florida's alternative certification options for teachers and a local project designed to address the teacher shortage in mathematics and the lack of content knowledge of alternative certified mathematics teachers.

III.7 Room: Cherokee #4

A multimedia Case Study in Mathematics Teacher Preparation

Conrad Van Voorst

State University of New York College at Brockport

Multimedia case studies used in a pre-service teacher preparation methods course are effective in helping teacher candidates think like teachers and see mathematics from the students' perspective. During this presentation, I will share what future teachers in my classes learned from the study and discussion of a 4-day case delivered through CD-ROM, and encourage a dialogue on variations of its use in mathematics teacher education.

Session IV

9:30 AM - 10:15 AM

IV.1 Room: Frontier Country

Preparing Secondary Teachers: A View of Future Classrooms by Way of Case Studies

Mary C. Enderson

Middle Tennessee State University

Azita Manouchehri

Central Michigan University

In this session we will discuss the results of a year long effort at utilizing data compiled from a year long teaching experiment in a sequence of courses designed for preservice elementary teachers in a secondary teacher preparation. We will share with the audience video-based instances of classroom interactions from the experimental class and will illustrate how we use the data in our methods courses for secondary mathematics teachers. We will illustrate examples of students' ways in which the use of this data has allowed us to engage future secondary mathematics teachers in the analysis of mathematics, learning, and curriculum.

IV.2 Room: Great Plains Country

Touching the Future through the Efficacious Preparation of Pre-Service Math Teachers

Martha Parrott

Northeastern State University

This study examines through quantitative and qualitative research paradigms the mathematics teaching self-efficacy beliefs and outcome expectancy beliefs of pre-service elementary and secondary teachers. How a personal mathematics teaching efficacy belief system develops over time will also be a topic for discussion. Study findings yield implications for teacher education programs.

IV.2 Session Moved to Saturday

Time: 10:30 AM

Room: Plaza North

IV.3 Room: Red Carpet Country

Examination of the Effectiveness of a Computer-based Algebra Curriculum

Jeffrey Shih
Tim Thomas

University of Nevada, Las Vegas
Clark County School District

This session will provide the results of quantitative analysis of the effect of a computer-based algebra curriculum on student achievement for eighth grade students in an urban school district. Research design issues and university/school district collaboration will also be discussed.

VI.4 Room: Green Country

Study of an Elementary Teacher's Mathematical Instructional Strategies

Joyce H. Swan

University of Memphis

The focus was an examination of a teacher's thought processes with initial changes in instructional strategies. The results suggest that case studies of individual teachers may yield insight into the conditions necessary to encourage and facilitate instructional change.

IV.5 Room: Plaza North

Secondary Preservice Mathematics Teacher Research: What Have We Learned?

Pat Lamphere Jordan

Oklahoma State University

What have we learned about preservice secondary mathematics teachers' content, procedural, and conceptual knowledge? This discussion will focus on the research studies that have been conducted over the past 30 years, the information that has been uncovered, the influences, if any, that the have the results have had, and what we still might want to know. Participants will have the opportunity to discuss their own research interests and ways collaborative efforts might be encouraged.

IV.6 Room: Plaza South

Guided Notes: An Interactive Method for Success in Secondary and College Mathematics Classrooms

Kristine K. Montis

Minnesota State University, Moorhead

Guided Notes: An interactive Method for Success in Secondary and College Mathematics Classrooms. Guided notes can increase time available for problem solving and student interaction while providing a structure for improved student note-taking and engagement with content material.

IV.7 Room: Cherokee #1

Challenge and Possibility: A Proposal for an Exploration of Mathematics Teacher Cultures in Cameroon

Megan Che

University of Oklahoma

This presentation describes a proposed critical ethnography of Cameroonian mathematics educators. The context of Cameroon as a newly-independent, post-colonial nation is discussed in relation to the challenges and possibilities for mathematics educators in this situation. Obstacles embedded in the process of undertaking such research, and potential prospects for hearing the silenced, invite the audience to ponder what the academic community might be missing in its predominantly industrialized orientation.

IV.8 Room: Cherokee #4

P-16 Education Partnership: No Child Left Behind

Carolyn Pinchback
Carolyn C. Williams

University of Central Arkansas

The speakers will discuss two modules: (1) designing action research on students and how they learn and (2) improving mathematics content knowledge; and share parts of videos for the third module, managing and monitoring student learning of mathematics.

Session V

10:30 AM - 11:15 AM

V.1 Room: Frontier Country

Pre-service Elementary Teachers and Mathematics Understanding: the Influence of Technology

Keith Adolphson

Eastern Washington University

This session discusses a preliminary study regarding the influence of technology on the development of pre-service elementary teachers' mathematics understanding and the appropriate uses of technology to construct meaningful learning contexts.

V.2 Room: Great Plains Country

Teachers Visualizing and Manipulating Geometry Ideas in a No Child Left Behind Workshop

Phyllis Bolin

Oklahoma Christian University

Darlinda Cassel

Oklahoma State University

The presentation will provide discussion of situations that enhanced teacher understanding and allowed teachers to apply geometric concepts in solving problems. Workshop activities fostered development of geometric reasoning and promoted visualization of relationships. Participants used manipulatives in hands-on problem solving activities that support the implementation of NCTM standards.

V.3 Room: Red Carpet Country

Professional Development's Impact on Teacher/Student Knowledge of Proportional Reasoning

Jean J. McGehee

University of Central Arkansas

Linda K. Griffith

The Professional Development and Curriculum Alignment Project (PDCA) has studied changes in teacher practice and knowledge and has connected these changes to student achievement data both in the classroom and in large scale assessments. The focus in this presentation is the impact on the teachers in one middle school and their students particularly in the area of proportional reasoning.

V.4 Room: Green Country

Learning Trigonometry through Projects with Sound

Jennifer Wilhelm

Texas Tech University

This study describes a project-enhanced classroom. Focus will be on two students' development of trigonometric reasoning through both benchmark lessons and their own project research regarding sound waves. Both qualitative and quantitative evidence showed increased understandings.

V.5 Room: Plaza North

Democratic Learning Communities and Inquiry-Based Mathematics: What's the Connection?

Andy Carter

Roosevelt University

The paper presented in this session uses a case study of two beginning teachers and their implementation of the *Math Trailblazers* curriculum to investigate the connections between social climate and inquiry in elementary school classrooms. Specifically we look at the role of democratic learning communities in these teachers' preservice experiences and their current instructional practices.

V.6 Room: Plaza South
Preservice teachers' subject matter knowledge of mathematics

Rama Menon

California State University, Los Angeles

About 50 preservice teachers taking a mathematics methods class for middle schools were given 3 math problems: multiply a three digit number by a two digit number; divide a whole number by a fraction; and compare the volume of two cylinders made in different ways from the same rectangular sheet. They were to a) solve them, explaining their solution, b) classify them as easy, c) of medium difficulty, or difficult, explaining the rationale for their classification, and d) explain how they would teach/help children to solve them. Responses were classified under three categories of subject matter knowledge, namely traditional, pedagogical, and reflective. Implications of these categories to effective math teaching are then discussed.

V.7 Room: Cherokee #1
Teaching Algebra for Understanding to Inservice Teachers

Sheryl A. Maxwell

University of Memphis

Inservice teachers experienced a three-pronged focus designed to strengthen their algebraic knowledge. This presentation highlights insights learned about how individuals increased their algebraic thinking and translated this into more effective teaching tactics. The case studies of three teachers shows them (1) struggling to connect theoretical content to topics taught, (2) striving to implement a problem solving approach, and (3) confirming the importance of student thinking.

V.8 Room: Cherokee #4
Workshops that work: Generating understanding, enthusiasm, and quality mathematical thought and teaching among Elementary School Teachers

John M. Woods

Southwestern Oklahoma State University

Jan Sands

Putnam City School

The presentation will give an overview of mathematical workshops for elementary teachers that have worked well. We invite mathematics educators with a strong interest in research to work with us in determining the factors that result in these workshops having significant impact on elementary teachers and their mathematics classrooms. The workshops provide content, pedagogy, inexpensive materials, knowledge of PASS and standards based instruction, and overcome mathematics anxiety.

Lunch and Annual Business Meeting
Grand Pavillion – Lower Level

11:30 PM - 1:15 PM

Business Meeting Agenda

Welcome - Sheryl Maxwell, RCML President

Report of the Secretary – Sue Brown

Approval of the Posted 2003 Minutes

Report of the Treasurer -- Jayne Fleener

Report on Membership – Jayne Fleener

Report of the Past President – Virginia Usnick

Report of the Vice President for Conferences – Kay Wohlhuter

Conference 2005 Announcement

Report of the Vice President for Publications -- Alan Zollman

Website Information

FOCUS

Intersection Points – Dan Brahier

Outgoing Presentations – RCML Officers

Old Business

New Business

From the Floor

Adjournment

Session VI

1:30 PM - 2:30 PM

VI.1 Room: Frontier Country

Off to See the Wizard: The Emerging Mathematics of GCF and LCM

Elaine Young

Texas A&M Corpus Christi

A one-act play exploring greatest common factors and least common multiples, with an accompanying Problem of the Week, was developed for use in a mathematics content course for pre-service elementary teachers. During the development of the play and POW, new patterns in mathematics emerged. Research will be shared about the mathematical understandings and connections of the students with this new mathematics.

VI.2 Room: Great Plains Country

Teachers' Personal Epistemological Beliefs and Their Relationship to the NCTM Standards

Clare Banks

University of Northern Colorado

The purpose of this study is to determine what the relationship is between preservice teachers' epistemological beliefs and their beliefs in the NCTM Principles and Standards.

VI.3 Room: Red Carpet Country

Promoting Increases in the Level of Cognition of Students in Mathematics Courses

Rochelle Beatty

Hutchinson Community College

This presentation introduces Perry's levels of cognitive development and discusses the importance of teaching to raise the level of cognition of students in any mathematics course. It will also address teaching methods that can be used to promote increased levels of cognition.

VI.4 Room: Green Country

Preparing Elementary Teachers to Foster Conceptual Mathematical Understandings

Babette M. Benken

Oakland University

Nancy Brown

Preliminary findings from a design experiment (Brown, 1992) that examines changes in prospective elementary teachers' conceptions related to mathematics and develops students' conceptions as a systemic objective are presented. Our vision is being realized by incorporating efforts early in the program and across traditionally distinct departments of mathematics and education.

VI.5 Room: Plaza North

Developing Pedagogical Content Knowledge: A Methods Course Adventure

Kay A. Wohlhuter

University of MN Duluth

This session will describe one mathematics educator's attempt to answer the question: "How do we help secondary mathematics teachers learn the mathematics they need to know?". The discussion will address the pedagogical content knowledge project and lessons learned from its implementation and feedback from preservice teachers

VI.6 Room: Plaza South

Mathematics and Technology: Shotgun Marriage or Connubial Bliss?

Kate Popejoy

Western Washington University

Chris Ohana

Western Washington University

Oddmund Myhre

California State University, Stanislaus

NO LIMIT!, an E^2T^2 statewide initiative with the goal of improving mathematics learning of middle grade students through the integration of technology, has entered into its third year. This session will describe successes and challenges of the first two years, while looking ahead to the potentially dramatic changes in the implementation for Years Three and Four. Session Participants will engage in critical analysis of evaluation data, change implementation in the classroom, and professional development, among other topics.

VI.7 Room: Cherokee #1

Students Pose Problems within Their Community: An After School Mathematics Curriculum Is Born

Judith McVarish
Tricia Brikmeier
Michelle Lenichek
Kerry Lynch

New York University
New York City Public Schools
New York University
New York University

This project documented how a non-traditional after school mathematics program created a community of learners who worked together to pose problems in the real life context of their surrounding community. In Addition, it was founded as a research project based on the belief that all children have an innate curiosity about the world around them. Students were encouraged to ask questions during community walks in the after school mathematics program. These student ponderings became the curriculum, as groups of students developed units of study based on what they wanted to know.

VI.8 Room: Cherokee #4

Passion for Teaching/Learning Mathematics: A Story of Two Fourth Grade African American Students

Belvia Martin
Roland Pourdavood
Nicole Carignan

Cleveland State University

The intent of this study was to investigate the experiences and reflections of two African American children, their teachers, and their parents concerning mathematics learning and what these experiences imply for educators as they attempt to reform mathematics education to help all students gain a deeper mathematical disposition. Through the study, it is hoped that a better understanding about mathematics teaching and learning, grounded in the experiences of people of color, can be added to scholarship, thereby strengthening the chorus of "other" voices increasingly present.

Session VII

2:45 PM - 3:45 PM

VII.1 Room: Frontier Country

Developing Future Mathematics Teachers: One pre-service Teacher's Story

Stacy Reeder

Oklahoma State University

Research will be presented that focuses on one preservice teacher and her experience as she worked in a middle school classroom wherein an emergent mathematics curriculum is enacted. The findings of this research suggest the importance of preservice teachers having experiences in classroom with mentor teachers and their students that allow them to participate in a constructivist environment. The experience for this student teacher had a profound impact on her beliefs about mathematics teaching and learning and on her emerging teaching practices.

VII.2 Room: Great Plains Country

Secondary Mathematics Preservice Teachers' Conceptions of Rational Numbers

Eileen Durand Faulkenberry

Texas A&M University-Commerce

This paper examined secondary mathematics preservice teachers procedural knowledge, conceptual knowledge and pedagogical content knowledge with regard to rational numbers. The study found that secondary mathematics preservice teachers exhibited a high level of procedural knowledge, a moderate level of conceptual knowledge, and a low level of pedagogical content knowledge. Implications for teacher preparation programs will be discussed.

VII.3 Room: Red Carpet Country

A Reform-Based Geometry Course: Characteristics and Student Attitudes

Juliana Utley

Oklahoma State University

Research will be presented that focuses on characteristics of a reform-based geometry content course designed for preservice elementary teachers and the impact of such a course on preservice elementary teachers' attitudes towards geometry. Preliminary findings regarding preservice elementary teachers' mathematics attitudes and how such experiences may affect their future teaching will be discussed. The findings of this research can be use to inform curriculum developers and mathematics instructors in the development of reform-based mathematics content courses for preservice elementary teachers.

VII.4 Room: Green Country

Teacher Exploration of Instructional Methods to Foster Algebraic Thinking

Cynthia Hernon

University of Nevada, Las Vegas

Jeffrey Shih

The presentation will highlight the preliminary results of a research study that documents and describes the learning experiences of teachers as they work to facilitate student development of algebraic thinking in the elementary mathematics classroom.**Room: Plaza North**

VII.5 Room: Plaza North

Measure Up: An elementary mathematics curriculum focusing on algebraic ideas using measurement as a context

Judith Olson

Western Illinois University

Melfried Olson

Measure Up seeks to build on big ideas first through exploration of continuous quantity. Concepts are developed over time with ideas revisited and extended. Problem solving is used as method of instruction and as a vehicle for introducing new topics. Teacher questioning leads to extensive oral and written communication opportunities regarding mathematical ideas and representations. Examples of students' thinking will be shared.

VII.6 Room: Plaza South

Empirical Impact of Standards-based Instruction on Math Achievement

Carla Thompson

Tulsa Community College

Saeed Sarani

Oklahoma City Public Schools NSF Urban Systemic Program

Results of the impact of Standards-based instruction in math and Science in Oklahoma City Public Schools NSF Urban Systemic Program from the first three years of this on-going project will be presented relative to teacher preparation, classroom practices, and student performance. Empirical evidence from data retrieved from the OCPS NSF USP Model will provide statistical framework strategies for accountability for promoting Standards-based education in systemic reform.

VII.7 Room: Cherokee #1

The Professional development milieu: Teacher Appropriations

Helen Gerretson

University of Northern Colorado

We describe the emergence of our model from our interactions with teachers and formative feedback. Next, we present descriptions of three case studies, using the model. We conclude with implications for the design and implementation of mathematics professional development.

VII.8 Room: Cherokee #4

Word-Problem Context and Visualization Strategies

Sue Brown

University of Houston, Clear Lake

Virginia Usnick

University of Nevada, Las Vegas

Do mathematical word problem contexts affect a student's ability to solve the problem? This session will report the results of a study designed to answer this question. The study was conducted with 300 fourth and fifth grade students.

Session VIII

3:45 PM - 4:30 PM

VIII.1 Room: Grand Pavillion Lower Level Oklahoma City Student Robotics Demonstration

Students from Santa Fe South High School, a charter school in Oklahoma City, will demonstrate their robotics activities. Teacher, Gabriel Matney, will discuss their participation in the national Botball competition and extensions to botball activities, including hover crafts and flight academies.

VIII.2 BREAK: Cherokee Lounge

Session IX

4:45 PM - 5:45 PM

PROBLEM CENTERED LEARNING SYMPOSIUM

IX.1 Room: Pavillion Lower Level

Problem Centered Learning Discussion Panel: A celebration of the Contributions of Professor Emeritus Grayson H. Wheatley to Mathematics Education through the Eyes of Some of His Former Doctoral Students

Anne Reynolds
Panel Coordinator

University of Oklahoma

We will provide a retrospective of problem centered learning, a perspective on Dr Grayson Wheatley's impact in mathematics education research, particularly as it has been articulated in our own research, and some thoughts on future directions.

- ✓ Jane-Jane Lo Western Michigan University
Topic: Problem centered learning for prospective elementary school teachers
Examine the variety and depth of mathematical reasoning prospective elementary school teachers developed through problem centered learning.
- ✓ Sandy Trowell Valdosta State University
Topic: Problem centered learning at the college level
Explores how college students respond to a problem-centered-learning mathematics classroom.
- ✓ Candice Ridlon Brigham Young University
Topic: Low achieving students (particularly in middle school)
Studying low achievers in public school classrooms, including curriculum issues, remediation efforts, and teaching strategies.
- Vic Cifarelli University of North Carolina, Charlotte
Topic: Reasoning and structuring by solvers in problem solving situations
Explores the ways that solvers make sense of problematic situations they face and develop their problem solving activity. Drawing from case studies of undergraduate and graduate mathematics education students, the presentation will summarize and explain the ways that solvers structure and transform their interpretations of problems into goals of action.
- Anne Reynolds, University of Oklahoma
Topic: Imagery and mathematics learning.
Explores the importance of imagery in problem solving and the learning of mathematics.

**Session X DINNER and KEYNOTE – PLAZA BALLROOM
6:00 PM - 8:00 PM**

Keynote:

Mathematics Learning from a Philosophic and Psychological Perspective: Roots

Grayson H. Wheatley

Emeritus Professor -Florida State University

Our practice is overtly or tacitly influenced by what we believe. There is a sharp contrast in the beliefs about knowledge, reality, and learning that shape what we do in the classroom. This talk will compare the historical viewpoints, both philosophic and psychological that under gird various instances of mathematics teaching.

**OPTIONAL EXCURSION – GUTHRIE, OKLAHOMA
DOUBLESTOP SHOP – BYRON BERLINE BAND
VANS LEAVE AT 8:20**

Saturday, February 21, 2004

Registration 8:00 AM - 11:00 AM

Continental Breakfast 8:00 AM - 8:30 AM

Session XI 8:30 AM - 9:15 AM

XI.1 Room: Frontier Country

Basic Fact Mastery / Fluency: Historical and Contemporary Perspectives

Virginia Usnick

University of Nevada, Las Vegas

Marilyn Sue Ford

This session will provide an historical overview of the teaching of basic facts and present data concerning current pre- and inservice teachers' knowledge of how to teach basic facts.

XI.2 Room: Great Plains Country

"Normal" Teacher Preparation: Development of Teacher Education from 1910-1920

Janna Walters

University of Oklahoma

During the early 1900's, qualifications for teachers varied. Many schools, states and regions of the country were developing standards for prospective teachers. These standards included requirements for the specialized training of teachers both in their subject matter and pedagogy. Many of the education journals of this time period elaborated on the concern for standardization in teacher education programs. David E. Cloyd, Dean of the Highland Park Teachers College, in the article *Unifying Forces in the Education of the American Teacher*, states "Never before has the subject of the training of teachers been so important as it is in the present day." (Education, 1910). The purpose of this paper is to present the condition of teacher preparation during the years 1910 to 1920. The audience will be invited to make comparisons with the Standard movement in teacher preparation almost a century later.

✓ **XI.3 Room: Red Carpet Country**
Discrete Mathematics in Deaf Education

Karen L. Kritzer

University of Pittsburgh

Claudia M. Pagliaro

This presentation will share the results of a national survey conducted to determine deaf education teachers' (K-12) familiarity with discrete mathematics topics and related terminology, as well as the frequency with which they include them in instruction. Results will be considered within the context of teachers' background variables such as grade level taught, experience, and mathematics preparation. This session has implications for those involved in mathematics education, deaf education and teacher preparation.

XI.4 Room: Plaza North

Standards-based Curriculum and Middle School Students Attitudes toward Mathematics

James Telese

University of Texas

This Paper presents findings of an attitudinal and classroom activity survey administered to middle school students who experienced the implementation of a standards-based curriculum.

XI.5 Room: Plaza South

Exploring the Resiliency of the Mathematics Educator through the Guise of a Self-Referent
Vicki Flourmoy
University of Oklahoma

This presentation will explore the implementation of resiliency in the professional role of the mathematics educator. The presentation will focus on resiliency and the self as a referent for instituting change and thriving within the context of the role of the mathematics educator. The concept of meta-processing will be explored as the educator develops the ability of referencing the self for surviving and thriving.

XI.6 Room: Cherokee #1

Preservice Elementary Teacher's Understanding of Perimeter and Area
Dana Craig
University of Central Oklahoma

This research looked at the conceptual understanding of fifty preservice elementary teachers in writing explanations of perimeter and area as if they were teaching.

XI.7 Room: Cherokee #4

The Emergence of Mathematical Fluency in Young Adolescents
George E. Abshire
Jenks Middle School

This presentation will provide insights and analysis of the interactions and collaborative experiences that occurred in a seventh-grade mathematics classroom. The young adolescents participating in this investigation interacted using a Problem Centered Learning (PCL) approach and curriculum materials from *Developing Mathematical Fluency*. Specifically, this session will examine the relationship of the tasks used within the classroom and the building processes by which young adolescents develop mathematical fluency.

Session XII

9:30 AM - 10:15 AM

XII.1 Room: Frontier Country

Provocative Teacher Questioning

✓ Darlinda Cassel
Anne Reynolds
Oklahoma Christian University
University of Oklahoma

To probe how a teacher facilitates sense-making in a problem-centered mathematics classroom. Specifically, exploring questions she used to initiate dialogue during the ebb and flow of children's argumentation process as they made sense of the mathematics.

XII.2 Room: Great Plains Country

Understanding Students' Constructions in the Multiplicative Domain through Balance Scale Experiments

Elizabeth Goldthwait
Kent State University

This presentation will report results of a study with five elementary children in a Montessori school. The purpose of the study was to understand (a) how students construct an understanding of measure spaces; (b) how students develop multiplicative reasoning; and (c) how students used multiplicative reasoning to construct an understanding of proportionality. Results of the study and a review of the relevant research will be offered.

XII.3 Room: Red Carpet Country

High Tech (TI) vs Higher Tech (Palm)

David E. Boliver
University of Central Oklahoma

The Palm Co. has become very interested in the educational market now dominated by Texas Instruments and is providing free machines and software to professionals in math and science education through grants. This is a first report on Palm use with students in College Algebra, a required course for Ed. majors, and a summer academy for teens.

XII.4 Room: Plaza North

Geometric and Spatial Reasoning in a Standards-based Elementary Content Course

Kathy Burgis

Aquinas College

Aquinas College bases its mathematics courses for elementary teachers on "Standards-based" K-8 curricula. This session will include a report and discussion of attempts to measure long-term growth in geometric reasoning and spatial visualization among students enrolled in this sequence; and issues in developing pedagogical content knowledge.

XII.5 Room: Plaza South

Lessons Learned While Teaching in a School

Daniel J. Brahier

Bowling Green State University

In this session, we will explore the rich discussions that are possible in the preparation of mathematics teachers that rely on "real" classroom experiences. The presenter will discuss experiences from teaching an 8th grade mathematics and spending a sabbatical year teaching mathematics full-time.

XII.6 Room: Cherokee #1

Learning Mathematics from Inquiry Activities for Preservice Teachers

Sandi Cooper

Jennifer Wilhelm

Texas Tech University

How can students learn math from inquiry activities? This research study examined the level of understanding of preservice teachers as they were engaged in inquiry activities, the design of inquiry activities for their own students, and appraisal of their learning experiences.

XII.7 Room: Cherokee #4

Algebra by Inquiry: Rethinking the Modal Curriculum

Jeffrey P. Smith

Otterbein College

note these

Applying conceptualization theories typically associated with learning geometry, a new approach to teaching linear equations will be presented. Results from students using interactive web pages indicate a need to reconsider the traditional sequencing of algebraic notions such as ordered pairs and slope.

Session XIII

10:30 AM – 11:15 AM

XIII.1 Room: Frontier Country

Embedding eManipulatives in Preservice K-8 Teacher education

William Speer

Eugene Paik

University of Nevada, Las Vegas

eManipulatives provide interaction with computer-generated objects on the screen so that the learner may observe the effect of user-initiated changes in parameters on the object's image. As an instructional tool for preservice teachers of K-8 mathematics, these online manipulatives offer a "hands-on" environment in which abstract concepts can be explored and in which pictorial models spring to life. It is this cause-and-effect dynamic that is central to the learning experience offered by eManipulatives.

XIII.2 Room: Great Plains Country
Case Studies of Third Grade Problem Solvers
Kim Hartweg
Mary Swarthout

Western Illinois University

This session will share the findings from a study where third grade teachers committed to using one class period a week to integrate problem-solving tasks based on the NCTM's five content standards. Case studies showing the mathematical and problem-solving development from a variety of students involved in the project will be presented.

XIII.3 Room: Red Carpet Country
The On-Line Mathematics Educator: Three Models for supporting Teachers in Practice
Jennifer Luebeck

Montana State University

In addition to their role in preparing future teachers, mathematics educators are called to communicate with, support, and further educate mathematics teachers in K-12 classrooms. In Montana and elsewhere, Web-based distance learning is proving to be an effective means to connect teachers and mathematics educators for graduate coursework, needs-based professional development, and consultant services to beginning teachers. A description of these three scenarios, an overview of teacher reactions to distance-based support, and a discussion of ways to overcome obstacles of time, distance, and cost in professional development will be the key features of this session.

XIII.4 Room: Green Country
Looking at Representations through the Eyes of Middle Grade Students and Their Teachers
Robert Capraro
Mary Margaret Capraro

Texas A&M University

One positive way to help students understand abstract ideas is to present those ideas using a variety of types of representations. Drawings, diagrams, graphs, analogies, models, and simulations are among the representations that can help students improve their understanding of complex ideas. Through the use of videotaped clips, this presentation will demonstrate both the positive impact of representations in supporting student learning and instances when representations do not always make ideas comprehensible to students.

✓ **XIII.5 Room: Cherokee #1**
Impact of Summer Algebra Camp on End of Course Exam
Annette S. Cornelius

University of Memphis

This research project investigates how a two-week summer Algebra camp impacted student scores on a state mandated end-of-course Algebra exam.

XIII.6 Room: Cherokee #4
DVD Technology in Mathematics Education
Cynthia Miller

Arkansas State University

The session will include discussion of how a DVD technology Algebra I series called *algebra'scool* was pilot tested, and then implemented in St. Emily's Catholic School, Chicago, IL and other schools. Teacher and student reactions to this new teaching method and product, as well as its outcome on student achievement will be discussed.

XIII.7 Room: Plaza North
Martha Parrott - Northeastern State University
See Page 4 for Description

Session XIV

11:30 AM – 12:30 PM

WILSON LECTURE

XIV.1 Room: Plaza Ballroom
Robots and Mathematics Learning
Cathryne Stein

Executive Director of the KISS Institute for Practical Robotics

How can participation with autonomous robots facilitate mathematics learning? Ms. Stein will discuss the Botball Educational Robotics Program, accessible to all mathematics and science teachers and their students. She will be demonstrating a small autonomous robot and showing video clips of students participating in the Botball competition and will invite questions and discussion about the potential impact of robotics activities on mathematics learning.

Cathryne Stein is the Executive Director of KISS Institute for Practical Robotics, a national, nonprofit educational organization. Ms. Stein is also a founder of the organization. Under her direction, KISS Institute has developed several national programs, including KISS Institute's Botball Educational Robotics Program for middle high school and collegiate students, and the Robots in Residence Programs for elementary and middle schools. Over 20,000 students have participated in these programs. She enjoys teaching robotics to young students, and has a particular interest in the factors surrounding girls and technology. Her contact information is cstein@kipr.org.

Conference Ends – Travel Safely

BOTBALL TOURNAMENT INFORMATION - Saturday, February 21st - lasting all day

Botball is played on a 4' x 8' game board where robots score points by placing ping-pong balls into scoring position. The robot must turn itself on and off, perform its programmed task, and utilize no assistance from humans or a remote control.

Tournaments begin with a seeding round portion where each robot runs the game without an opponent. Once those scores are tabulated, teams are ranked and placed in a double-elimination bracket. Double-elimination rounds pit robot against robot in head-to-head competition.

Directions to the Botball Tournament:

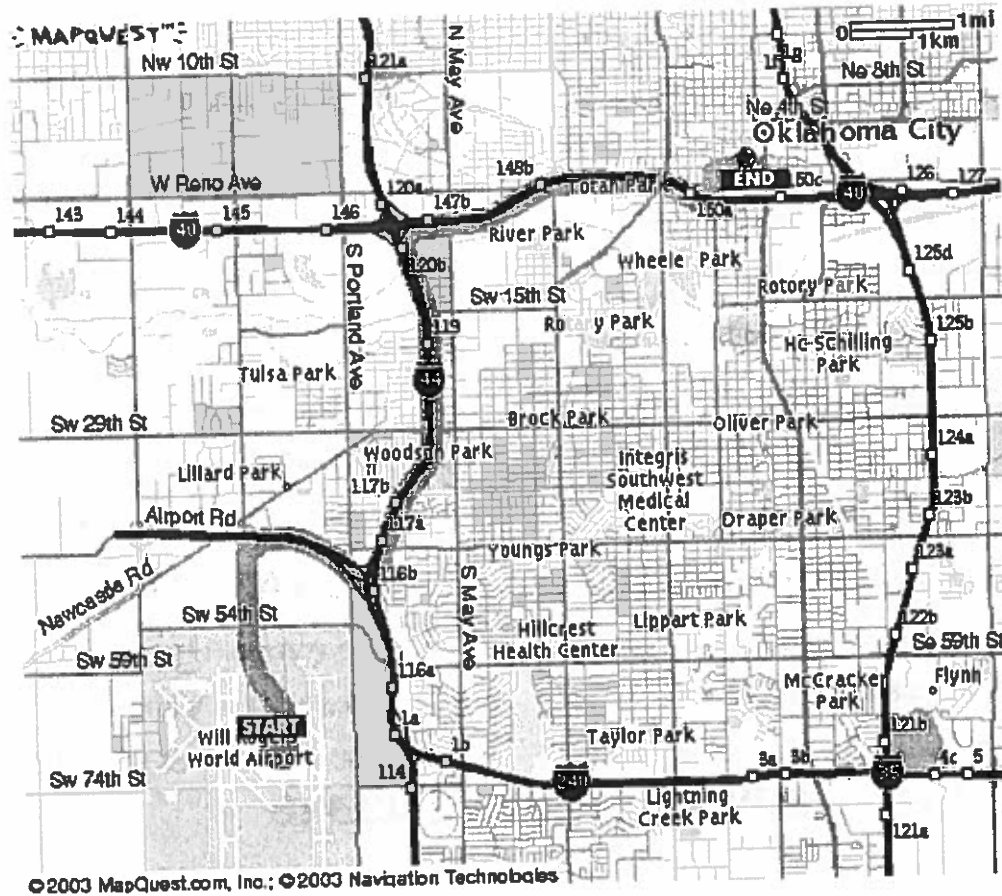
The tournament is located at the Omniplex (2100 NE 52nd Street - Phone: 602-OMNI)

From the Westin Hotel, take I-40E, exit I-35N, I-35N to NE 50th, west on 50th

BOARD MEETING AND LUNCH

1:00 PM – 3:00 PM

Directions



From the Airport

The hotel is 10 miles (approximately 15 minutes) from Will Rogers World Airport

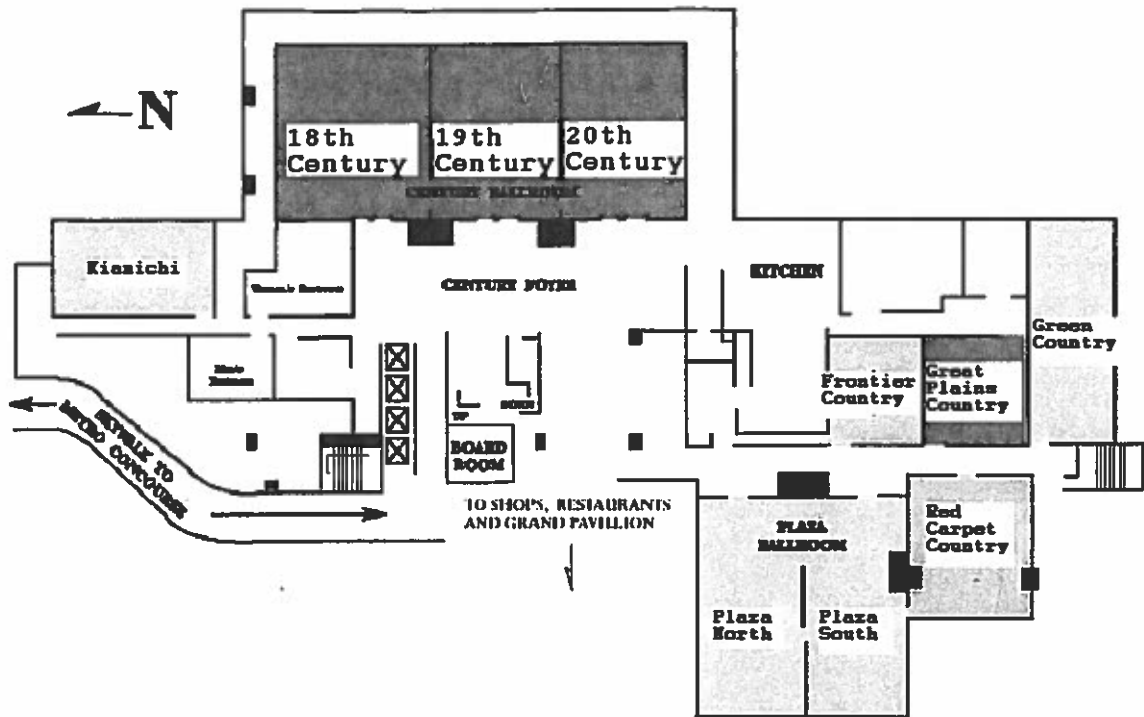
Airport Express is available outside the center doors of the baggage claim area. No reservations are necessary; vans leave the airport every 8 minutes. To the Westin Oklahoma City, the cost is \$10 for the first passenger, \$2 for additional passengers of the same party. Vans accommodate up to seven passengers

Driving Directions

1. TERMINAL DR becomes S MERIDIAN AVE
2. Take the ramp toward I-44/DOWNTOWN
3. Merge onto Airport Rd.
4. Merge onto I-44 E
5. Merge onto I-40 E
6. Exit at 150A toward WALKER AVE
7. Stay straight to go onto SW 3rd St.
8. Turn LEFT onto S WALKER AVE
9. Turn RIGHT onto W SHERIDAN AVE
10. Turn LEFT onto N BROADWAY AVE
11. End at 1 N BROADWAY AVE

OKC PROGRAM COMMITTEE

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GRAND PAVILLION

