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Welcome from the 2018 Program and Conference Chair

Welcome to the 45th annual RCML Conference! We would like to thank all the speakers, attendees and contributors to the conference. We hope you enjoy all the sessions and receive valuable information that you can share with your colleagues. We welcome you to Baton Rouge, Louisiana and the Cook Hotel and Conference Center located on the LSU campus. We anticipate you will have a wonderful experience. Please let us know if we can assist you in any way. Enjoy the conference!



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Special Thanks

Program Materials: A special thank you to the School of Education in the College of Human Sciences & Education at Louisiana State University for donating the materials for the program booklets. Thanks also to the University of North Texas for providing resources to assist in offering a successful program.

Conference Materials: We also wish to offer a special thank you to *Tarleton State University* for their generous donation of projectors that were used last year and this year for presentations.



College of
Human Sciences & Education
School of Education



Proposal Reviewers: A special thank you to all the proposal reviewers for reading and scoring so many proposals for this year's conference.

Kansas Conrady
Colleen Eddy
Melanie Fields
Luke Foster

Ryan Fox
David Kirshner
Eloise Kuehnert
Hope Marchionda

Bill McGalliard
Cynthia Orona
Barba Patton
Sarah Pratt

Proceedings Reviewers: A special thank you to all of the proceedings reviewers for reading and scoring the immense amount of proceedings for this conference.

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CONFERENCE EVENTS AT A GLANCE

Thursday, February 22, 2018

3:30 – 8:30 PM Registration open
Cain Lobby

4:00 – 5:20 PM **RESEARCH POSTER PRESENTATIONS**
Cain Lobby

5:30 – 6:30 PM Welcome: *David Kirshner*, 2018 Conference Chair, and
Noland/Laborde Hall *Neil Mathews*, Director of School of Education, LSU

FOUNDER'S LECTURE: *Steve Leinwand*
INTRODUCED BY: *William Speer*

6:30 – 8:30 PM Welcome Reception (with heavy hors d'oeuvres)
Cain Lobby
& *Noland/Laborde Hall*

Friday, February 23, 2018

7:30 AM – 4:30 PM Registration open
Cain Lobby

8:00 – 9:30 AM **BREAKOUT SESSION #1**

9:30 – 9:45 AM Morning break

9:45 – 11:15 AM **BREAKOUT SESSION #2**

11:30 AM – 12:45 PM RCML Business Meeting Luncheon

1:00 – 2:30 PM **BREAKOUT SESSION #3**

2:30 – 2:45 PM Afternoon break

2:45 – 4:15 PM **BREAKOUT SESSION #4**

4:30 – 5:30 PM **WILSON MEMORIAL LECTURE:** *Jill Trepanier*
Noland/Laborde Hall **INTRODUCED BY:** *Angela Webb*

Saturday, February 24, 2018

7:30 AM – 11:00 AM Registration open
Cain Lobby

8:00 – 9:30 AM **BREAKOUT SESSION #5**

9:30 – 10:50 AM **KEYNOTE SPEAKER:** *Scott Baldrige*
Noland/Laborde Hall **PANEL RESPONDENTS:** *Pat Herbst & Jill Brody*
SESSION CHAIR: *David Kirshner*

11:00 AM – 12:30 PM Lunch & Closing Comments
Noland/Laborde Hall

FOUNDER'S LECTURE: STEVE LEINWANDThursday, 5:30 pm, *Noland/Laborde Hall*

INTRODUCTION BY WILLIAM R. SPEER

There's a Lot of Powerful and Accessible Research that Needs to Find its Way into Mathematics Classrooms



Abstract: The gap between research and practice seems only to expand over time as the quality and potential of our research about what works grows at a much faster rate than changes in classroom on practice. But without significant, broadly implemented change in classroom practice, only kids will lose. But the good news is that a large proportion of the research findings are accessible and make sense to typical teachers. Why then do we see so little evidence of these findings in equally typical classrooms?

This Founder's Lecture will explore both the conditions needed to narrow this gap as well as an overview of the particularly important research findings that need to be found in many more classrooms where mathematics is taught.

Biography: Steve Leinwand is a Principal Research Analyst at AIR and has over 35 years of leadership positions in mathematics education. He currently serves as mathematics expert on a wide range of AIR projects that turn around schools, improve adult education, evaluate programs, develop assessments and provide technical assistance. Leinwand's work at AIR has included leadership and change instigator in AIR's school turnaround work in Hazelwood, MO, East St. Louis, IL and Alexandria, VA; developing specifications and an Algebraic Reasoning item pool for the NCES High School Longitudinal Study; serving as Implementation Task Leader for the IES Mathematics Professional Development Impact Study; co-authoring "What the United States Can Learn from Singapore's World-Class Mathematics System (and what Singapore can learn from the United States)"; and co-authoring a comparison of the 2007 Grade 3 assessments administered in Hong Kong and in Massachusetts. In addition, Leinwand has provided school and district-level support and technical assistance for the General Electric Foundation's Ensuring Futures in Education project and the Microsoft Math Partnership. As part of AIR's assessment program, Leinwand has overseen the development and quality review of multiple-choice and constructed response items for AIR's contracts with Ohio, Hawaii, Delaware, Minnesota, South Carolina and the Smarter Balanced Assessment Consortium.

Before joining AIR in 2002, Steve spent 22 years as Mathematics Consultant with the Connecticut Department of Education where he was responsible for the development and oversight of a broad statewide program of activities in K-12 mathematics education including the provision of technical assistance and professional development, the evaluation of Title 1 and K-12 mathematics programs, the assessment of student achievement and teacher competency, and the coordination of statewide mathematics programs and activities. Steve has also served on the NCTM Board of Directors and has been President of the National Council of Supervisors of Mathematics. Steve is also an author of several mathematics textbooks and has written numerous articles. His books, *Sensible Mathematics: A Guide for School Leaders* and *Accessible Mathematics: 10 Instructional Shifts That Raise Student Achievement*, were published by Heinemann in 2012 and 2009, respectively. In April of 2015, Steve was honored to receive the National Council of Supervisors of Mathematics Ross Taylor/Glenn Gilbert National Mathematics Education Leadership Award.

WILSON MEMORIAL LECTURE: JILL TREPANIERFriday, 4:30 pm, *Noland/Laborde Hall*

INTRODUCTION BY ANGELA WEBB

Understanding Extreme Weather Behavior Using Quantitative Geography

Abstract: Extreme weather threatens areas around the world. In an ever-changing climate, the importance of understanding the frequency and magnitude of these events grows. Geographers often use mathematics, such as probability theory, to best describe and understand the physical environment. A variety of statistical techniques, including geographically weighted regression, extreme value threshold modeling, and bivariate copula dependency are used to present the risk of varying hurricane characteristics in the United States and surrounding countries. In addition to these techniques, varying visual tools are displayed including interpolated surfaces and hexagonal tessellations. These tools are unique for geographers and showcase hurricane risk in innovative ways.



Biography: Dr. Trepanier received her Ph.D. in Geography from The Florida State University in Tallahassee, Florida in 2012. The title of her dissertation, “Quantifying Extreme Hurricane Risk in the North Atlantic and Gulf of Mexico” and the research she has conducted since regarding statistical applications and geographic theory strive to bridge the gap between the physical science of extreme weather and the citizens threatened by it. Dr. Trepanier’s work under Dr. James Elsner required rigorous training in syntax-based computer programming and statistical probability theory. After graduation, she went to work for the Geography and Anthropology program at Louisiana State University as their hurricane climatologist. She was recently named a fellow by the National Academies of Sciences, Engineering, and Medicine’s Gulf Research Program for her work on the application of hurricane risk methods to oil system infrastructure. She has recently been funded by the National Aeronautics and Space Administration for work on terrestrial gamma flash lightning bursts in Puerto Rico and Panama and by the Louisiana Sea Grant program for work on advancing K-12 education of physical science, climate change, and coastal ecosystems. Dr. Trepanier has graduate students working on topics such as dendroclimatology, air pollution effects on tropical cyclones, and global lightning. Dr. Trepanier’s current research interests include understanding extreme weather events, tropical climatology, climate change, geographic information systems, risk assessment, and statistical methods.

KEYNOTE SPEAKER: SCOTT BALDRIDGE**SESSION CHAIR: DAVID KIRSHNER**Saturday, 9:30 am, *Noland/Laborde Hall**Story Archetypes in Mathematics Curricula*

Abstract: One powerful way to help students navigate at the edge of order and chaos is by submersing them into archetypal stories. Like literature, math curricula have archetypes as old as Euclid. In this talk, I will first describe how mathematics curricula can be thought of as epic stories using the Eureka Math Curriculum as the guiding example: stepping through a curriculum based upon archetypal stories (versus spiral or encyclopedic-based curricula) feels like reading/participating in the narrative of an extended, coherent, well-written, illustrated story. We then investigate some common story archetypes, and I will discuss how I used those archetypes as some of the main organizing principles behind the Eureka Math curriculum. If time, I will touch on how

organizing math curricula around archetypal stories may open up new avenues for math education researchers to explore in their work.

Biography: Scott Baldrige is the lead curriculum writer and lead mathematician for all 14 grades of the Eureka Math/EngageNY, a curriculum that is used by 57% of elementary teachers and 47% of secondary teachers in the U.S. He earned his PhD. in mathematics from Michigan State University and previously held a faculty position at Indiana University before accepting a professorship in mathematics at Louisiana State University in 2004.

His mathematical research is related to current models used in physics that attempt to realize Einstein's goal of unifying general relativity and quantum mechanics—equations that describe all wave-particle (including gravity) interactions in the universe. In 2008, he won an NSF CAREER award for his work in math research and math education.

Baldrige has been involved in math education since the mid-1990s starting with his work on the Connected Mathematics Project. This project made him acutely aware of the need for better teacher preparation programs. Responding to that need, he co-wrote with Thomas Parker two textbooks: *Elementary Mathematics for Teachers* (2004) and *Elementary Geometry for Teachers* (2008).

In 2008, as part of his NSF CAREER award, he implemented an Asian-style curriculum in a high-needs school district in Baker, Louisiana. The program led to a 90% increase in students passing the high stakes state assessment. Partially based upon the success of that program, Baldrige was asked to lead the writing of New York's PK-12 mathematics curriculum in 2012. The lessons learned at Baker heavily informed the writing of the Eureka Math/EngageNY curriculum.

PANEL RESPONDENTS TO KEYNOTE: PAT HERBST & JILL BRODY

Patricio (Pat) Herbst is a professor of education and mathematics at the University of Michigan. His research focuses on the work of mathematics teaching. His earlier empirical work focused on the teaching of geometry in high school, particularly on how teachers engage students in conjecturing and proving. His efforts to elicit the practical rationality of mathematics teaching took him to design and research media and technologies that permit the representation and study of teaching by practitioners and researchers. In recent empirical work he has led the development of scenario-based instruments to measure various aspects of the rationality of mathematics teaching.

Mary Jill Brody is a linguistic anthropologist who has worked for 40 years with the Tojol-ab'al Mayan language and people of Chiapas, Mexico. Her interests include discourse, conversation, narrative, literacy, and legal interpretation. After earning her Ph.D. in Anthropology from Washington University, she joined the faculty of the Department of Geography and Anthropology at Louisiana State University, where she currently works as a full professor.



OVERVIEW OF SESSIONS: THURSDAY AFTERNOON

Research Poster Presentations

4:00 – 5:20 pm, Cain Lobby

1. **Students Learning Multiplication Facts: Challenges for Teachers,**
Barbara Allen-Lyall
2. **A Tale of Two Teachers: Math Content Course experiences for PSTs,**
Natalia Bailey
3. **Remixing Math Class: Transforming Educator Perceptions of Hip-Hop Pedagogy,**
Marti Cason & Jamaal Young
4. **Let the Good Times Roll...or Flip...or Count: Games to Support Math Content,**
Ryan Fox & Cearra Logan
5. **Students Who Struggle to Understand Fractions: Where is the Breakdown?**
Rebecca Gault
6. **Five Sources of Validity and Connections to Effective Assessment,**
Davis Gerber & Jonathan Bostic
7. **Relationship Between Problem Posing and Problem Solving,**
Joash Geteregechi
8. **Pre-Service Teachers' Development of Content-Specific Classification System,**
Min-Joung Kim
9. **International Math Teachers and Perceptions of Interpersonal Relationships,**
Dennis Kombe
10. **Social-Emotional Strategies to Promote Success in Mathematics Classrooms,**
Dennis Kombe
11. **Creating Opportunities to Listen to Students' Algebraic Reasoning,**
Eloise Kuehnert, Colleen Eddy, & Sarah Pratt
12. **Attitude of Regular Math Teachers towards Students with Disabilities,**
Shiv Kumar
13. **Breaking the Cycle of Remediation,**
Alana McAnally
14. **Factors Affecting the Ability to Explain the Invert and Multiply Algorithm,**
Gayle Millsaps
15. **The Deliberate Formation of Mathematics Lesson Study Groups,**
Clinton Petty, Colleen Eddy, & Sarah Pratt
16. **Preservice Teachers' Comments About Division Algorithms,**
Carolyn Pinchback
17. **Teacher Views on Open Approach Lesson Study,**
Julia Porcella & Gabriel Matney
18. **Authenticity: A Student Perspective,**
Cacey Wells

FRIDAY MORNING

	Breakout Session #1		Break	Breakout Session #2	
	8:00 AM	8:45 AM	9:30 AM	9:45 AM	10:30 AM
Noland/ Laborde Hall	101: Increasing Recruitment and Retention of Math Teachers in Deprived Areas, <i>Alan Zollman</i>	102: Filling the Gap with Excellence: Study of High Achieving Teacher Candidates, <i>Dana Franz</i>		201: Current Trends: Improving Test Development and Implementation Practices, <i>Jonathan Bostic & Gabriel Matney</i>	202: Draw Yourself Doing Mathematics: Validating an Instrument and a Rubric, <i>Rachel Bachman & Cora Neal</i>
Abell Boardroom	103: Preservice Elementary Teachers' Conceptions of Equitable Math Teaching, <i>Thomas Roberts</i>	104: Using Culturally Relevant Pedagogy in a Math Methods Course, <i>Natalia Bailey</i>		203: Predictors of Academic Achievement and Retention of First-time Freshmen, <i>Karl Kruczek & Juliana Utley</i>	204: Connecting Beliefs and Teaching Practices Among Teachers of Algebra, <i>Trena Wilkerson, Ryann Shelton, & Keith Kerschen</i>
Cook Conference Room	105: Confidence and Readiness for Teaching Elementary School Mathematics, <i>Vivian Moody & Kanita DuCloux</i>	106: The Impact of Classroom Experiences on Pre-Service Teachers' Mathematics Self-Efficacy, <i>Eileen Faulkenberry</i>		205: Learning Mathematical Proof: Conceptual Challenge or Esoteric Cultural Practice? <i>David Kirshner & Michaela Stone</i>	206: Purposefully Playing the Believing Game in a College Mathematics Classroom, <i>Bethany Noblitt & Shelly Harkness</i>
Anderson Conference Room	107: Impacts of Number Talks on Pre-service Teachers' Number Sense, <i>Alyssa Lustgarten & Gabriel Matney</i>	108: Mathematical Discourse: Implementation by Elementary Preservice Teachers, <i>Lynn Columba</i>		207: Exploring Professional Identity of Preservice Elementary Teachers, <i>Jennifer Cribbs, John Weaver, Adrienne Sanogo, & Latoya Johnson</i>	208: Preservice Teachers' Reflections and Transformation of Beliefs, <i>Roland Pourdavood</i> 209: Pre-Service Teachers' Perception of Their Mathematics Learning Experience, <i>Roland Pourdavood</i>
Shelton 1	109: Preservice Teachers' Learning of Fraction Multiplication and Division, <i>Shawn Broderick, Marlise Weyburn, Boston Workman, & Ryan Fox</i>			210: Decimals and Fractions: Pre-Service Teachers' Conceptions of Their Density, <i>Michael Muzheve</i>	211: PSTs' Self-Authored Story Problems for Fraction Number Sentences, <i>Nesrin Sahin, James Fetterly & Sirin Budak</i>
Shelton 2	111: College Remedial Mathematics Students' Fraction Concept, <i>Taro Ito</i>	112: Computers and Constructivist Learning: Pedagogy & Achievement, <i>Rachel Bates</i>		212: The Development of the Concept of Rates of Change and its Impact on Students' Understanding of Functions, <i>Pragati Bannerjee, Faye Bruum, & James Dogbey</i>	213: Developing a Strong Conception of Function, <i>Jayleen Wangle</i>
Achord Library	113: Learning from Others: Support through an Online Community, <i>Christopher Parrish</i>	114: Comparison of Formats of Teaching Entry Level Probability and Statistics, <i>Jack Jackson & Garin Bean</i>		214: Context Matters: Supports and Barriers to Formative Assessment, <i>Carolyn Mitten</i>	215: Preparing Pre-service Teacher to Provide Feedback in Mathematics, <i>Tony Thompson & Kwaku Adu-Gyamfi</i>

FRIDAY AFTERNOON

	Breakout Session #3		Break	Breakout Session #4	
	1:00 PM	1:45 PM		2:45 PM	3:30 PM
Noland/Laborde Hall	301: Action Research in Undergraduate Teacher Education, <i>Daniel Brahier, Jonathan Bostic, & Gabriel Matney</i>	302: Efficacy of Learning Trajectory-Based Computer Games for Young Children, <i>Candace Joswick</i>	2:30 PM	401: Investigating Middle Grades Teachers' Curricular Reasoning, <i>Travis Olson</i>	402: Out-Of-School Time and Black Student Achievement in Mathematics, <i>Jamaal Young</i>
Abell Boardroom	303: Impacts of Abroad & Exchange Experiences on Elementary Math Teachers' CRP, <i>Tyrette Carter & Nakeshia Williams</i>	304: Developing Equitable Practices by Assessing Students' Understandings, <i>Kerri Richardson, Tyrette Carter, & Nakeshia Williams</i>		403: "AWFUL" & "Fun": Teachers' Mixed Perceptions of Content-Focused PD, <i>Christopher Parrish & Jacob Dasinger</i>	404: Design of Professional Development to Support Primary Grades' Teachers of a Formative Assessment Tool, <i>Drew Polly & Christie Martin</i>
Cook Conference Room	305: Mathematics Immersion: An investigation of Problem Solving Perceptions, <i>Michael Warren, Melissa Eubank, Brandy Crowley, Katelyn Hamilton, & Trena Wilkerson</i>	306: Interactive Whiteboards in an Urban Mathematics Classroom, <i>Jamaal Young & Marti Cason</i>		405: An Inquiry Approach to Teaching and Learning Mathematics, <i>Shelia McGee Ingram & Tommy Smith</i>	406: Justification in Elementary Students' Mathematical Argumentative Writing, <i>Karl Kosko</i>
Anderson Conference Room	307: Becoming Involved with <i>Investigations in Mathematics Learning</i> , <i>Drew Polly</i>	308: A Case Study of Writing in the Secondary Math Classroom, <i>Melissa Gunter</i>		407: Models of Influence on Mathematics Instructional Coaches, <i>Sue Brown & Sandra Browning</i>	408: Algebra I Teachers' Beliefs and Knowledge of Algebra for Teaching, <i>Travis Mukina & Juliana Utley</i>
Shelton 1	309: The Influence of Combined Math/Science Methods courses on Math Educators, <i>Kim McComas</i>	310: A Classroom Laboratory for Studying Curriculum, Teaching, and Learning, <i>Linda Venenciano & Seanyelle Yagi</i> 311: Investigating Place Value Concepts Within a Measurement Context, <i>Seanyelle Yagi & Fay Zenigami</i>		409: Proportional Reasoning: Student Thinking and Implications for Teaching, <i>Suzanne Riehl & Olof Steinhorsdottir</i>	410: Investigating Prospective Teachers' Development of Numerical Reasoning, <i>Nesrin Sahin & Sinan Kanbir</i>
Shelton 2	312: Increasing Student Motivation and Interest in Calculus Courses, <i>Enes Akbuga</i>	313: Premonitions about Inquiry-Based Learning and Large Class Sizes, <i>Devon Gunter</i>		411: Inverse Teaching: Miscommunication in a Collectivist Culture, <i>Summer Bateiha</i>	412: Introducing STEM in the Elementary Classroom with Three Act Tasks, <i>Cynthia Orona</i>
Achord Library	314: Examining Longitudinal Outcomes of Blended Professional Learning, <i>Georgia Cobbs & Jennifer Luebeck</i>	315: Programmatic Effects on High Stakes Measures in Secondary Math Preparation, <i>Jeremy Zekowski & Jim Gleason</i>		413: Building Fluency in a Mathematics for Elementary Teachers Course Sequence, <i>Rachel Bachman & C. David Walters</i>	414: Meaning-Making with Curriculum Materials: A Case Study of One School, <i>Kate Raymond</i>

SATURDAY MORNING

Breakout Session #5		
	8:00 AM	8:45 AM
Noland/Laborde Hall	501: An Investigation of Pre-service Teachers' Problem Solving Skills , <i>Kathy Horak Smith, Eileen Faulkenberry, & Michael Warren</i>	502: Lesson Studies on Model Eliciting Activities , <i>Rachel Wiemken & Gabriel Matney</i>
Abell Boardroom	503: Varied Field Experiences for Preservice Teachers Teaching in a Math Academy , <i>Sandi Cooper, Trena Wilkerson, Keith Kerschen, Ryann Shelton, & Brandy Crowley</i>	504: Changes in Preservice Elementary Teachers' Problem-Solving Ability , <i>James Telese & Jair Aguilar</i>
Cook Conference Room	505: Fraction Learning with iPads in Middle School , <i>Tarah Donoghue, Darlinda Cassel & Lydia Buntin</i>	506: Math Teachers' Technology Integration Practices: The SAMR Model , <i>Kwaku Adu Gyamfi & Tony Thompson</i>
Anderson Conference Room	507: Elementary Teachers' Content Knowledge: Impact of Two MSP Projects , <i>Gregory Chamblee & Georgia Cobbs</i>	508: Impacting Anxiety in Mathematics with Creative and Alternative Approaches , <i>James Fetterly</i>
Shelton 1	509: Mathematics Teacher Efficacy and Mathematics Anxiety in Preservice Teachers , <i>Gina Gresham</i>	510: Accessibility Experiences in Online College Mathematics Courses , <i>Michaela Stone</i>
Shelton 2	511: Impact of Mathematics Progressions on In-Service Teacher Content Knowledge , <i>Alice Steimle & Julie James</i>	512: Failure to Launch: Teacher Perceptions of State Standards in Mathematics , <i>Kate Raymond & Stacy Reeder</i>
Achord Library	513: Scaffolding Struggle for Mathematics Learning , <i>Thomas Ricks</i>	514: Characterizing Prospective Mathematics Teachers' Productive Struggle , <i>Kanita DuCloux & Hope Marchionda</i>

RESEARCH POSTER PRESENTATIONS

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #1: Students Learning Multiplication Facts: Challenges for Teachers	
Barbara Allen-Lyall	Manhattanville College
<p>Memorizing multiplication facts is a challenging process for many elementary school students. Nonetheless, time and attention allocated to teaching multiplication facts acquisition is well spent given that facts automaticity has a significant impact on students' flexible computation, mathematics self-concept, and understanding of more advanced mathematical concepts throughout schooling. Problematic in this scenario is a dearth of available instructional assistance for teachers in published mathematics programs. Teachers who strive to assist students may simply resort to systematic reliance upon acquisition methods that they themselves experienced, successfully or unsuccessfully, as young learners. This study examines challenges facing Grade 3 and 4 teachers who want to help their students memorize facts. A qualitative approach is used to examine instructional methodologies embraced by teachers, areas of concern and success with methods they employ, and the kinds of support teachers seek for teaching this component of elementary mathematics.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #2: A Tale of Two Teachers: Math Content Course experiences for PSTs	
Natalia Bailey	University of Central Missouri
<p>In this session I examine the beliefs about mathematics, mathematics teaching, and mathematics learning of two Teaching Assistants for a mathematics content course for elementary teachers. I then examine how these beliefs may influence the learning experiences of the preservice teachers (PST) who are students in the course. Using classroom observations and interviews, I documented the experiences of the preservice teachers enrolled in each section of the course. The Teaching Assistants' views of the PSTs influenced the classroom interactions, which in turn influence the PSTs' perspectives about learning mathematics.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #3: Remixing Math Class: Transforming Educator Perceptions of Hip-Hop Pedagogy	
Marti Cason Jamaal Young	University of North Texas University of North Texas
<p>How do educators make space for students who identify with hip-hop culture to be successful in mathematics? Hip-hop pedagogy provides teachers a wide range of tools they can utilize within the classroom. For teachers who do not identify with the culture, it requires that they consider the expertise of students and be willing to shift the knowledge that holds privilege in the classroom. The objective of this session is to present how elements of hip-hop culture can be integrated into a mathematics methods course to develop pedagogical knowledge that challenges pre-service teachers to explore the benefits of utilizing hip-hop as a tool in the classroom. Goals for this presentation include: 1) determine strategies to integrate hip-hop into educator preparatory programs and 2) identify a framework to mathematize the pillars of hip-hop culture, which include rapping, DJ-ing, breakdancing, and graffiti. This work adds to the growing body of research about the utilization of hip-hop pedagogy in teacher preparatory programs, as well as brings a greater focus to applicability in mathematics classrooms. The ideas presented in this research will provide additional resources for teacher educators that are attempting to implement strategies that reflect hip-hop prowess. This will in turn benefit students who are traditionally marginalized in the classroom and help beginning teachers create positive spaces for their students to engage more authentically in the classroom.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #4: Let the good times roll...or flip...or count: Games to support math content	
Ryan Fox	Belmont University
Cearra Logan	Belmont University
<p>Mathematics instruction has often been viewed historically in terms of direct instruction, but recent emphases have included teaching and learning through mathematical problems and engaging tasks. We propose an additional consideration to contemporary mathematics teaching: games. The presenters include a mathematics educator and novice elementary and middle school teachers. The games presented here are a modification of the British game show Countdown, the game of Nim, and a modification of an activity from the nRich website. We do not present games because the students enjoyed the game-playing aspect of these activities, but we present the games because the games have strong connections to elementary and middle-grades mathematics curricula and practices advocated by professional organizations. We present the games, the associated mathematics content for each game, and the pedagogical reflections in implementing the mathematical games. What happens when students figure out how to beat the teacher and the professor at his or her game? How can games that encourage speed and accuracy support students who struggle with mathematics? How does the same game get modified to work with middle school students one day and elementary school students the next? We discuss our answers to these questions, reflecting back on our work as teachers implementing these games. As we share our work, we welcome discussion and comments on our games and their implementations!</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #5: Students Who Struggle to Understand Fractions: Where is the Breakdown?	
Rebecca Gault	University of West Georgia
<p>This presentation covers qualitative research conducted by the presenter that sought to identify the misconceptions related to fractions of three third-grade students in a small-group remediation and to describe how these students ultimately made sense of these concepts. The points of difficulty for the students were found to fall into three broad categories: students who had underdeveloped conceptual understandings, students who struggled with visualization, and students who had difficulty organizing and reporting information.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #6: Five Sources of Validity and Connections to Effective Assessment	
Davis Gerber	Bowling Green State University
Jonathan Bostic	Bowling Green State University
<p>The purpose of this poster is to inform mathematics educators about the five sources of validity. A description of each source, as well as how validity affects assessment in mathematics education will be shared. We intend to educate mathematics teachers and scholars about the sources of validity in ways that will promote effective assessment in mathematics instruction and research.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #7: Relationship Between Problem Posing and Problem Solving	
Joash Geteregechi	Syracuse University
<p>Many studies on the relationship between problem-solving and problem posing suggest that the skills are positively correlated. Students who are good at problem posing are also good at problem-solving and vice versa. What is not well understood is how problem posing skills support students' problem-solving skills. To study this, I analysed the problem-solving behaviors of six preservice mathematics teachers, examining the kinds of problems they posed during problem-solving and the role of these posed problems in enhancing the solution process. Findings indicate that the solvers posed problems for understanding/sensemaking, problems for exploration, and problems for solution verification. Some of the posed problems were solved while others were not. The study found that the posed problems (whether solved or not) played a crucial role in the solvers' choice of strategy.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #8: Pre-Service Teachers' Development of Content-Specific Classification System	
Min-Joung Kim	Louisiana State University
<p>The paper reports on a qualitative study investigating twelve elementary pre-service teachers' categorization of students' work on word problems to learn effective formative assessment practices. Black and Wiliam (1998) define formative assessment as "encompassing all those activities undertaken by teachers, and/or by their students, which provide information to be used as feedback to modify teaching and learning activities in which they are engaged" (1998, pp.7-8). There is a consensus among researchers that formative assessment is very powerful for student learning (Black & Wiliam, 1998; Furtak et al., 2008), but there is not much work done in thinking about how to support pre-service teachers learn formative assessment practices. To disrupt the historically developed classification system for assessment in modern schooling (i.e., right or wrong), the instructor used Carpenter et al.'s Cognitively Guided Instruction (2015) in her math methods course. The CGI framework categorizes the strategies that students tend to use: direct modeling, counting, and derived/number facts. The paper discusses different forms of pre-service teachers' classification system of students' work and their implications in designing math methods course.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #9: International math teachers and perceptions of interpersonal relationships	
Dennis Kombe	California State University, Monterey Bay
<p>There has been an uptick in the recruitment of international teachers to U.S. public schools to teach subject areas that experience perennial teacher shortages, including mathematics, in hard-to-staff, high needs urban and rural K-12 schools. Such recruitment is predicated on staffing deficits, especially in schools with high teacher turnovers. This study uses a concurrent, dominant status mixed-methods research design to examine interpersonal relationships in international teachers' secondary mathematics classes. 8 teachers, and 362 of their students participate in the study. Findings indicate that adapting to U.S. schools' functional structures and to teaching American students is a challenge for international teachers. Teachers walk a fine line between exerting dominant interpersonal behaviors, and the need to develop closer relationships with students by being sensitive to students' needs, establishing collaborative classroom structures, and exhibiting more cooperative behaviors. Readjusting their attitudes and beliefs about ways to better interact with students required support, often from other ITs, and is integral to perceived success U.S. classrooms. Findings suggest teacher expertise and practices might not be definitively portable across cultures and posit the need for uniquely tailored orientation and induction programs that offer a better understanding of student-teacher interactions to help ITs address the needs of all students in their mathematics classes.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #10: Social-Emotional Strategies to Promote Success in Mathematics Classrooms	
Dennis Kombe	California State University, Monterey Bay
<p>School programs and classroom cultures play an important role in students' social and emotional learning (SEL) as they help develop the capacity to integrate thinking, emotion, and behavior to deal effectively with everyday personal and social challenges. With the advent of Common Core State Standards for Mathematics, there are increasing calls for shifts in expectations for educator performance, reflecting the need for schools and teachers to think holistically about students' learning experience. However, there is currently a dearth of research that explores SEL and Mathematics experiences at the Middle and Secondary school levels. This presentation discusses how middle and secondary math teachers can promote SEL in their classrooms as a way to increase students' math achievement, feelings of self-efficacy, and desire to engage in mathematics learning. Further, this presentation examines teachers' perceptions of the use of SEL strategies in their classroom and feelings of teacher self-efficacy in engaging students in SEL practices during mathematics learning. Student academic outcomes (e.g., grades and GPA) are also measured to quantitatively assess the impact of SEL in the math classroom.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #11: Creating Opportunities to Listen to Students' Algebraic Reasoning	
Eloise Kuehnert	University of North Texas
Colleen Eddy	University of North Texas
Sarah Pratt	University of North Texas
<p>The purpose of this qualitative instrumental case study was to describe how middle grades mathematics teachers created opportunities to listen during classroom conversations after engaging in three rounds of Lesson Study with Open Approach (LSOA) This smaller study is part of an ongoing larger study which focuses on the impact of a professional development model on middle grades mathematics teachers' use of formative assessment strategies. The way in which middle grades mathematics teachers modify the structure of a lesson, including how teachers anticipate student responses to intentionally listen and responsively question students, was one such impact on teachers' use of formative assessment strategies. This study focuses primarily on the possibilities and necessities of teaching that occurs in the public education classroom rather than centering on public education teachers. Findings indicate teacher understanding of how an inquiry-based approach, such as the 5E model, affords the teachers opportunities to ask open-ended questions. Thus, creating opportunities to listen to students' algebraic reasoning.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #12: Attitude of Regular Math Teachers towards Students with Disabilities	
Shiv Kumar	Southern University and A&M College
<p>Mathematics educators who teach regular education mathematics classes view students with disabilities in multiple ways depending upon their own attitudes and experiences. Some mathematics teachers may be more comfortable teaching these students; others may be skeptical about their mathematical skills. The purpose of this paper is to examine the impact that mathematics teachers' attitudes and perceptions have on students with disabilities success in an inclusion classroom. Research in this study posits that the attitude of the teacher plays an important role in the success of his or her students. In addition, the teacher's professional development training and preparedness for teaching students with disabilities in an inclusion setting may boost the confidence of the teachers. Many teachers have reported that they are not prepared to teach students with disabilities and have concerns about the success of such students. This paper provides a literature review of several research studies which advance understanding of how to improve the achievement of students with disabilities enrolled in inclusion mathematics classes.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #13: Breaking the Cycle of Remediation	
Alana McAnally	The University of Oklahoma
<p>What does authentic teaching and learning mean to students? Authenticity has been researched for many years and there is much value in incorporating it into classroom. The issue is, however, that oftentimes authentic teaching and learning is well understood from teachers' perspectives, but not from that of students. This presentation outlines an ongoing research project around better understanding authentic teaching and learning from students' perspectives. The presentation will consist of an overview of ongoing research and methods used to carry out said research, while also allowing space for productive dialogue between scholars and practitioners interested in incorporating student voice into their work.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #14: Factors Affecting the Ability to Explain the Invert and Multiply Algorithm	
Gayle Millsaps	Eastern Washington University
<p>While PSTs remember and apply the invert and multiply algorithm for fraction division procedurally, they rarely are able to explain its meaning using a context (situation). This study examines the use of ratio tables to support and reveal PSTs' abilities to relate the invert and multiply algorithm to its representation with fair sharing contexts. PSTs' responses to an assessment task that requires them to explain the invert and multiply algorithm for fraction division using a ratio table are examined. Their responses to the assessment task reveal the following fraction and proportional reasoning concepts that PSTs must develop to be able to explain the invert and multiply algorithm using fair sharing contexts:</p> <ul style="list-style-type: none"> • The multiplicative relationship between a multi-unit fraction and its related unit fraction, • The multiplicative relationship between a unit fraction and its related whole, • Coordination of units in a proportional relationship, • Multiplicative relationships between equivalent ratios, • Contextual representations of proportions, and • Fair sharing situations represent proportions. <p>This report will examine a set of student responses to the assessment task to demonstrate how and why the preceding concepts or lack thereof contribute to PTs' ability to explain the invert and multiply algorithm for fraction division using fair sharing contexts and ratio tables.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #15: The Deliberate Formation of Mathematics Lesson Study Groups	
Clinton Petty Colleen Eddy Sarah Pratt	University of North Texas University of North Texas University of North Texas
<p>Due to the steady increases in school accountability, many public-school administrators are choosing to support student achievement by implementing high-quality and effective professional development for their teachers. Although there is a myriad of approaches to training and supporting in-service teachers, the use of Lesson Study should be considered as a potentially effective form of staff development. The strength of this approach is derived by the cooperative interactions among teachers working together to achieve a common goal. While this approach has been studied by researchers, relatively little attention has been placed on studying the deliberate formation of individuals in order to promote effective interpersonal relationships in teacher learning groups. As a result, this study examined the predictive nature of forming collaborative learning groups based on teacher efficacy, content knowledge, and teacher preference. The preliminary results from the Teamwork Quality Survey suggested that the intentional design encouraged a positive progression through the stages of group development. This purposeful design can aid in the formation of Lesson Study groups, or a variety of professional development programs that use collaborative learning.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #16: Preservice Teachers' Comments About Division Algorithms	
Carolyn Pinchback	University of Central Arkansas
<p>Participants are students in two of the presenters classes for preservice elementary education majors. The students have been presented various algorithms for division. Their comments will be presented. These comments will include their favorite one, the strengths, weaknesses, and changes they would make.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #17: Teacher Views on Open Approach Lesson Study	
Julia Porcella	Bowling Green State University
Gabriel Matney	Bowling Green State University
<p>The objective of this poster is to communicate research on Open Approach Lesson Study. An overview of Open Approach Lesson Study, including the process, will be presented. The poster will also illustrate teachers' views on the benefits and obstacles of their Open Approach Lesson Study experiences. The hope in sharing this information is that mathematics teachers will become aware of the value in Open Approach Lesson Study and be willing to implement it in their own schools.</p>	

Time: 4:00–5:20 pm	Location: Cain Lobby
Session #18: Authenticity: A Student Perspective	
Cacey Wells	University of Oklahoma
<p>What does authentic teaching and learning mean to students? Authenticity has been researched for many years and there is much value in incorporating it into classroom. The issue is, however, that oftentimes authentic teaching and learning is well understood from teachers' perspectives, but not from that of students. This presentation outlines an ongoing research project around better understanding authentic teaching and learning from students' perspectives. The presentation will consist of an overview of ongoing research and methods used to carry out said research, while also allowing space for productive dialogue between scholars and practitioners interested in incorporating student voice into their work.</p>	

BREAKOUT SESSION #1

Time: 8:00–8:45 am	Location: Noland/Laborde Hall
Session #101: Increasing Recruitment and Retention of Math Teachers in Deprived Areas	
Alan Zollman	Indiana University Southeast
<p>This unique implementation research project seeks to increase the recruitment, retention and availability of mathematics teachers in underserved schools. The project's two primary purposes are to fill the gap between the adoption of rigorous standards and the enactment of practices, policies, programs, and actions required for successful implementation of such standards by:</p> <p>(a) Increasing the recruitment of highly qualified new pre-service teachers from the content areas of mathematics into teacher education through a newly state approved accelerated post-baccalaureate secondary education program. These second-career post-baccalaureate pathway prepares new teachers for an initial license in secondary mathematics education.</p> <p>(b) Increasing the percentage of qualified dual credit credentialed mathematics teachers to meet Indiana's Higher Learning Commission requirements mandating dual credit teachers to have a Master's degree and have at least 18 credit hours in the subject area they teach as dual credit (high school courses that also can be used for college credit). The School of Education collaborated across campus with other STEM-related disciplines to develop new Master's programs for Dual Credit teachers that are attuned to the new requirements. This newly approved Master's degree has both a strong mathematics content requirement with effective pedagogy knowledge of the learning and teaching of mathematics with mentoring by partner schools and industries.</p>	

Time: 8:45–9:30 am	Location: Noland/Laborde Hall
Session #102: Filling the Gap with Excellence: Study of High Achieving Teacher Candidates	
Dana Franz	Mississippi State University
<p>Does recruiting high achieving students into teacher education contribute to filling the void of our secondary mathematics teacher shortage? We are in the fifth year of a collaborative program geared at attracting high-achieving students into the teaching profession. Through this study we examined teacher candidates who entered college as freshmen with demonstrated academic excellence and quantitatively examined whether their high school successes were sustained throughout their teacher preparation, what teacher candidate characteristics influence post-graduation decisions, and to what extent do these teacher candidate aptitudes meet the needs of diverse learners. Currently our first cohort has graduated, and our program enrollment has significantly increased. However, during these formative program years we have experienced unforeseen challenges. We will share preliminary information on these successes and challenges followed by a discussion on similar efforts in other settings.</p>	

Time: 8:00–8:45 am	Location: Abell Boardroom
Session #103: Preservice Elementary Teachers' Conceptions of Equitable Math Teaching	
Thomas Roberts	Bowling Green State University
<p>How preservice teachers conceptualize equity in the mathematics classroom provides an important insight into their beliefs and instructional practices. This study examined preservice elementary teachers' conceptions of equity in the mathematics classroom and how they changed during their mathematics methods course. Using prompts and five vignettes with reflective questions, preservice teachers shared their conceptions of equity and reactions to equitable dilemmas that many teachers face in their classrooms. Preliminary results suggest the preservice teachers previously held beliefs about diverse populations, their cooperating teachers' perceptions in field experiences, and their own ambivalence toward mathematics contribute to their conceptions of teaching mathematics equitably. However, through intentionally planned activities and discussions focused on teaching mathematics equitably, their conceptions can broaden.</p>	

Time: 8:45–9:30 am	Location: Abell Boardroom
Session #104: Using Culturally Relevant Pedagogy in a Math Methods Course	
Natalia Bailey	University of Central Missouri
<p>In this session we share our experiences in learning to teach a mathematics methods course for future elementary teachers using Culturally Relevant Pedagogy. Rather than offering the traditional methods course assignments, we created options for our students to allow for them to explore areas of mathematics teaching of personal interest to them. In doing so we empowered our students to take ownership of their learning as well as stimulating discussion for alternative assessments and non-traditional assignments in the elementary mathematics classroom.</p>	

Time: 8:00–8:45 am	Location: Cook Conference Room
Session #105: Confidence and Readiness for Teaching Elementary School Mathematics	
Vivian Moody Kanita DuCloux	Western Governors University Western Kentucky University
<p>This study examined the perceived confidence and readiness for teaching elementary school mathematics. Pre-service elementary school teachers enrolled in a three-course, three-semester mathematics sequence completed self-efficacy scales at the beginning of the three-course sequence and at the end. The three-course mathematics sequence was taught from a constructivist approach and emphasized a socio-constructivist learning environment in which the pre-service teachers were challenged to construct their own meaning of mathematics. Results showed that the pre-service teachers' confidence and readiness levels for teaching elementary school mathematics increased by the end of their enrollment in the three-course mathematics sequence. This study also revealed that the pre-service teachers' self-efficacy with regards to their beliefs that effective teaching can affect student achievement remained the same, suggesting further research in this area.</p>	

Time: 8:45–9:30 am	Location: Cook Conference Room
Session #106: The Impact of Classroom Experiences on Pre-Service Teachers' Mathematics Self-Efficacy	
Eileen Faulkenberry	Tarleton State University
<p>Pre-service teachers at a regional university participated in a service learning activity by creating a mathematical game, then implementing the game while facilitating mathematical discussions about the game with elementary school children. This study examined the impact of this classroom experience with elementary students on the pre-service teachers' perceptions of their role as the teacher as well as their self-efficacy in that role. Data included qualitative and quantitative measures collected throughout the project.</p>	

Time: 8:00–8:45 am	Location: Anderson Conference Room
Session #107: Impacts of Number Talks on Pre-service Teachers' Number Sense	
Alyssa Lustgarten Gabriel Matney	Bowling Green State University Bowling Green State University
<p>Do you cringe when you see students immediately reach for their cell phones for a calculator when trying to solve everyday calculations? This presentation will share research about pre-service teachers' number sense. Pre-service teachers were engaged in Number Talks over the course of a semester in which the possible benefits in regard to their number sense were analyzed. Factors considered included pre-service teachers' preferred strategies as well as the number and types of strategies they used to solve a problem. The goal was for these pre-service teachers to develop a strong sense of number and prepare them to enact Number Talks in their future classrooms. During the presentation, we will also provide space for discussion about when the field has sufficient research to safely recommend specific teaching methodologies to teachers.</p>	

Time: 8:45–9:30 am	Location: Anderson Conference Room
Session #108: Mathematical Discourse: Implementation by Elementary Preservice Teachers	
Lynn Columba	Lehigh University
<p>Participants will be able to describe how pre-service elementary education teachers apply questioning in a mathematical discourse interview of kindergartners. How novice teachers describe the implementation of mathematical discourse in their teaching, which can be difficult to manage and implement, will be discussed. The study uses the following definition of discourse: an interactive and sustained discourse of a dialogic nature between teachers and students aligned to the content of the lesson that addresses specific student learning issues (Piccolo, Harbaugh, Carter, Capraro, & Capraro, 2008, p. 378).</p>	

Time: 8:00–8:45 am	Location: Shelton 1
Session #109: Preservice Teachers’ Learning of Fraction Multiplication and Division	
Shawn Broderick	Weber State University
Marlise Weyburn	Weber State University
Boston Workman	Weber State University
Ryan Fox	Belmont University
<p>In this session, we will explore how prospective elementary teachers (PSTs) deepen their knowledge of fraction multiplication and division in an arithmetic for elementary teachers course. Historically, PSTs have had difficulties recalling and learning how to explain these topics and misconceptions still persist today. With regard to fraction multiplication, PSTs tend to believe the idea that multiplication always makes things bigger, misapply other procedures like multiplying the reciprocal, and complicate the process by finding a common denominator. Dividing fractions, whether procedurally or conceptually, has also been a challenge for PSTs. Much of the challenge is likely due to the way in which typical textbooks treat division of fractions. They simply state that dividing by a fraction is the same as multiplying by its reciprocal. There is little or no attention given to the meaning of fraction division and no connections are made between division with fractions and division with whole numbers. We will discuss the results of a study in which we used manipulatives, pictures, and real-life examples to fortify PSTs’ knowledge of and confidence in multiplying and dividing fractions and how to apply them to real life.</p>	

Time: 8:00–8:45 am	Location: Shelton 2
Session #111: College Remedial Mathematics Students' Fraction Concept	
Taro Ito	Yeshiva Day School/University of Nevada Las Vegas
<p>Fraction concepts are one of the most important mathematical concepts since they are foundations for other mathematical concepts. However, understanding the concepts is one of the major obstacles for students. One of the major reasons for this is that learners have natural number bias, and they tend to apply natural number reasoning to fractions. This bias is persistent, and even college students carry the bias and approach fraction problems with the reasoning. Another reason is that fractions are taught procedurally and often without manipulatives, models or technology. This is why many college remedial mathematics students struggle with mastering the concepts and they end up retaking the remedial course multiple of times. Although college mathematics departments have been facing this problem, they have not found the answer for it. In these days, technology usage in mathematical learning is one of the major topics in the field of mathematics education and there are so many mathematical learning apps on the market to promote an effective learning of the subject. This study investigates the effectiveness of widely known mathematical learning software program, Spatial Temporal Math (ST Math), in college remedial mathematics students mastering the fraction concepts. Data analysis from the study provide justification for why ST Math is possible solution for the problem college mathematics department has been facing regarding student understandings of fraction concepts.</p>	

Time: 8:45–9:30 am	Location: Shelton 2
Session #112: Computers and Constructivist Learning: Pedagogy & Achievement	
Rachel Bates	Redlands Community College
<p>To what extent can computers be used to help teachers create a constructivist learning environment in the post-secondary mathematics classroom? In this study, data from 46 post-secondary college algebra classes and 3 high school algebra III classes were examined. Additionally, seven college faculty and four high school teachers were examined to determine the extent to which computers can alter pedagogy and student achievement. This study examined two groups of teachers: Experienced users of the new pedagogy and materials and beginning users of the new pedagogy and materials. Results suggest computers can positively alter both pedagogy and student achievement. Implications for using computers in the classroom are discussed.</p>	

Time: 8:00–8:45 am	Location: Achord Library
Session #113: Learning from Others: Support through an Online Community	
Christopher Parrish	University of South Alabama
<p>Many mathematics educators face consistent challenges as related to their professional growth: (1) opportunities for professional development are either not provided or ineffective, and (2) the time needed to collaborate with- and learn from colleagues is not adequately scheduled. Clear improvements in professional development practices are needed as researchers have concluded that both teacher practice and student achievement are affected by professional development. This study uses survey and interview data from members of a specific online learning community, the MathTwitterBlogsphere (MTBoS), to further examine (1) who is engaging with the MTBoS, (2) how do those who engage with the MTBoS characterize the online learning community, and (3) if an online learning community, such as the MTBoS, supports the work of math teachers. Community members' perceptions of support from engaging with the community serve as the primary measure within the study. I hypothesize the study will find that teachers receive professional growth from support received within the MTBoS community. Results from the current study will provide a better understanding of the MTBoS community and how teachers are supported by engagement with the community. This improved understanding will allow math educators to make informed decisions about engaging with the MTBoS as a source of professional growth.</p>	

Time: 8:45–9:30 am	Location: Achord Library
Session #114: Comparison of Formats of Teaching Entry Level Probability and Statistics	
Jack Jackson	University of Arkansas at Fort Smith
Garin Bean	University of Arkansas at Fayetteville
<p>During each semester of the 2017-2018 academic year, Dr. Jackson is teaching three sections of STAT 2503 Probability and Statistics I, one section each offered in the formats of traditional, flipped, and online. Students will have identical assessments, including active learning projects, online homework sets, practice tests, and exams. They will also have access to the same resources: textbook, instructor-prepared class lecture notes (Power Point slides), and instructor-prepared online video lectures. Answers to questions submitted online are shared with all students in that section. Class time in the traditional section is devoted primarily to the lecture notes. Class time in the flipped section is primarily devoted to working on active learning projects in groups and working on homework sets with time for questions and answers. The online section follows the structure as the traditional section but is asynchronous.</p> <p>The researchers will examine differences in attitudes and performances of all students across the three sections. Items analyzed include course completion rates, grade distributions, exam scores, pre- and post-course attitude surveys, and weekly activity evaluations. Preliminary results from the first semester of this data will be shared.</p>	

BREAKOUT SESSION #2

Time: 9:45–10:30 am	Location: Noland/Laborde Hall
Session #201: Current Trends: Improving Test Development and Implementation Practices	
Jonathan Bostic	Bowling Green State University
Gabriel Matney	Bowling Green State University
<p>The purpose of this presentation is stimulate conversations among colleagues about the Standards for Educational and Psychological Testing (AERA, APA, & NCME, 2014) as they relate to research in mathematics education. First, presenters will describe the five sources of validity evidence. Next, we will give examples of ways to address them by drawing upon student and teacher content measures, including observation protocols, within mathematics education contexts. Later, we will provide suggestions for reporting validity evidence as part of a broader validity argument. Finally, presenters will answer audience members’ questions and further discuss challenges related to using the Standards during research activities.</p>	

Time: 10:30–11:15 am	Location: Noland/Laborde Hall
Session #202: Draw Yourself Doing Mathematics: Validating an Instrument and a Rubric	
Rachel Bachman	Weber State University
Cora Neal	Weber State University
<p>Learn about the drawing prompt that asks students to "Draw Yourself Doing Math" and the developed rubric for the instrument. This presentation will also report on the measures taken to validate the instrument and rubric. Statistical analysis will be shared concerning the interrater reliability of scoring rubric categories, item analysis of the rubric categories, and the correlation between drawing prompt scores and attitudinal survey scores. Evidence will also be shared from the participant interviews with students completing the drawing prompts. Participants will be given copies of the rubric to use in their own research of student attitudes and beliefs about mathematics.</p>	

Time: 9:45–10:30 am	Location: Abell Boardroom
Session #203: Predictors of Academic Achievement and Retention of First-time Freshmen	
Karl Kruczek	Northeastern State University
Juliana Utley	Oklahoma State University
<p>First-time freshmen students enter college with varying levels of precollege academic success in mathematics, assorted demographic backgrounds, grit levels, metacognitive awareness, and mindsets (views on the malleability of intelligence). Educational leaders need to understand the academic abilities and non-cognitive traits of these students before academic support strategies and interventions can be created to help serve this group of students. This study at a Midwestern regional university, first examined demographic, cognitive, and non-cognitive characteristics of 159 participants enrolled in three levels of mathematics courses: full-time remediation, part-time remediation (co-requisite college algebra), and college-level mathematics courses that required no remediation. A subgroup comparison on the variables was then conducted to gain an understanding of the differences among the three groups of mathematics students. Lastly, the study investigated variables that predicted academic achievement (final course grades) and retention. The researcher will share differences found among the three groups of mathematics students, as well the variables that predicted academic success and retention of freshmen at the Midwestern regional university.</p>	

Time: 10:30–11:15 am	Location: Abell Boardroom
Session #204: Connecting Beliefs and Teaching Practices Among Teachers of Algebra	
Trena Wilkerson	Baylor University
Ryann Shelton	Baylor University
Keith Kerschen	Baylor University
<p>NCTM (2000, 2014) advocates a strong, engaging curriculum for all students facilitated by teachers engaged in appropriate instruction and planning. One common thread for supporting teachers is providing appropriate professional development (PD) to impact K-12 learning. Specific knowledge is needed to teach math (Shulman, 1986; Ball, Thames, & Phelps, 2008). The NCTM (2014) Mathematical Teaching Practices (MTPs) support educators in their understanding and implementation of this knowledge. Many teachers have intentions to adopt key research, but often misinterpret and merely change surface features (Knapp & Sowder, 2004; Stigler & Hiebert, 1999). Thus it is important to make connections between theory and practice in PD settings (Loucks-Horsley, Stiles, Mundry, Love, & Hewson, 2010). Strengthening teachers' mathematical knowledge and fostering gradual change in classroom instruction are important steps to increase student-learning opportunities (Borko, Jacobs, Koellner, & Swackhamer, 2015). This study investigates the impact of PD on 40 grades 5-12 math teachers in a year-long Math Teacher Academy. Components analyzed included teacher beliefs, instructional practices, and pedagogical content knowledge around algebra. Impact was assessed using the Algebra Teacher Self Efficacy Instrument, MTPs Q-sort activity, MTPs vignette analysis, participant action plans and reflections. Findings will be shared and implications for teacher and student learning will be discussed.</p>	

Time: 9:45–10:30 am	Location: Cook Conference Room
Session #205: Learning Mathematical Proof: Conceptual Challenge or Esoteric Cultural Practice?	
David Kirshner	Louisiana State University
Michaela Stone	Louisiana State University
<p>This paper addresses the question of whether the challenges of learning mathematical proof are best theorized as challenges of conceptual understanding in the Piagetian constructivist tradition or as challenges of cultural transmission in the Vygotskian sociocultural tradition. Drawing on a crossdisciplinary framework that relates theories of learning to practices of teaching, we show how the instructional method that best supports learners hinges on this question.</p>	

Time: 10:30–11:15 am	Location: Cook Conference Room
Session #206: Purposefully Playing the Believing Game in a College Mathematics Classroom	
Bethany Noblitt	Northern Kentucky University
Shelly Harkness	University of Cincinnati
<p>Believing is an endeavor to find virtues and strengths, no matter how unlikely an idea might seem to the listener or reader, and doubting is an attempt to find flaws or contradictions. The research study presented in this session examined classroom discourse and environment when the teacher purposefully played the believing game in a college mathematics classroom, a place where doubting often pervades. The class observed for this study was an Introduction to Higher Mathematics course where students learn mathematical proof techniques. This session will focus on one specific example of how the instructor played the believing game and what happened as a result. The content of the specific example to be discussed in this session is an algorithm in which students can use their fingers to do simple multiplication. The students were asked to explore the algorithm, to determine why and when it works and to write a mathematically sound proof of why it works.</p> <p>In this session, presenters will describe the believing and doubting games as well as the research study. Participants will watch videos of a teacher believing and describe the discourse patterns that resulted, examine the videos to look for methods the teacher used when playing the believing game, brainstorm methods to play the believing game, and discuss potential benefits of playing the believing game, both for themselves and for their students.</p>	

Time: 9:45–10:30 am	Location: Anderson Conference Room
Session #207: Exploring Professional Identity of Preservice Elementary Teachers	
Jennifer Cribbs	Oklahoma State University
John Weaver	Oklahoma State University
Adrienne Redmond Sanogo	Oklahoma State University
Latoya Johnson	Oklahoma State University
<p>This study explores changes in elementary preservice teachers' (EPT) beliefs related to mathematics over the course of a semester in an intermediate mathematics methods course. A quasi experimental design was implemented in the Fall of 2017 to examine differences between two methods of implementation for reflecting on classroom practice. This intervention involved EPTs in their final semester before student teaching as they participated in various field experiences (in schools, campus-based tutoring). Data were collected through pre- and post- surveys, self assessments, video reflections, and written reflections. Surveys administered to EPTs asked about their current beliefs related to mathematics including mathematics identity, teacher professional identity, and mindset. The self-assessment asked about teachers beliefs about teaching and learning mathematics. Various types of reflections were collected based on whether the group of EPTs was in the control or treatment group; however, all the reflections focused on examining classroom practice (other teachers or their own) to allow for changes in levels of noticing to be assessed. Preliminary results will be discussed in the presentation.</p>	

Time: 10:30–11:15 am*	Location: Anderson Conference Room
Session #208: Preservice Teachers' Reflections and Transformation of Beliefs	
Roland Pourdavood	Cleveland State University
<p>Many elementary pre-service teachers (PSTs) have negative experiences regarding learning mathematics. They express their lack of confidence for teaching mathematics. They carry their prior negative experiences with them as they take their mathematics methods courses for teaching young children. This qualitative and descriptive study describes 23 elementary PSTs stated experiences, expectations, beliefs, and attitudes toward mathematics during their K-12 schools and after when they took their college mathematics courses. The study examines how a semester-long methods course in mathematics provides these PSTs an opportunity to re-evaluate their prior assumptions about what mathematics is and the role of teachers and learners in mathematics classroom Data was collected throughout participants' enrollment in a semester-long course entitled, Mathematics Instruction in Preschool and the Primary Grades, which was taken in conjunction with their practicum. Data sources included university classroom observations, pre-service teachers' verbal and written responses to class discussions, reading assignments, course activities, presentations, and a final reflective paper. PSTs' responses were categorized and common themes were derived from the triangulation of data to include prospective teachers' critical reflections on teaching and learning, transformation of their stated beliefs and attitudes toward mathematics, and their concerns and struggles.</p>	
Session #209: Pre-Service Teachers' Perception of Their Mathematics Learning Experience	
Roland Pourdavood	Cleveland State University
<p>The aim of this study is to examine what mathematics classroom learning experiences pre-service teachers have had from elementary school to college, and whether such experiences can explain some of their attitudes and beliefs about mathematics teaching. Data were collected from students taking a mathematics methods course at a mid-western university via paper and pencil questionnaire. Most participants were in early childhood education and were participating in practicum at the time of the study. The results indicated that pre-service teachers reported a variety of mathematics learning experience, and specific longitudinal trends were noted regarding what mathematics learning strategies were emphasized at each grade level. While there was some growth in the frequency of strategies used to facilitate meaningful learning, memorization continued to be a widely reported strategy used at all grade levels. On the other hand, the preservice teachers' own mathematics learning experience did not seem to predict their current mathematics teaching attitudes well. Findings will be discussed and educational implications provided.</p> <p>* sessions are shared during this time slot</p>	

Time: 9:45–10:30 am	Location: Shelton 1
Session #210: Decimals and Fractions: Pre-Service Teachers' Conceptions of Their Density	
Michael Muzheve	Texas A&M University - Kingsville
<p>This presentation reports the findings of a qualitative study undertaken to investigate pre-service elementary school teachers' conceptions about the density of the set of decimals and the set of fractions. Specifically, the study investigated the ability of the thirty-six (36) participants to find a decimal or fraction between two given decimals or fractions and the reasoning(s) provided while answering the four purposefully chosen questions. On average each question was answered correctly by sixty-seven percent of the participants. The data suggests that the ability or ease with which participants were able to identify a decimal or fraction between two given decimals or fractions depends on the nature of the numbers in the question. Implications for teaching and assessments are discussed.</p>	

Time: 10:30–11:15 am	Location: Shelton 1
Session #211: PSTs' Self-authored Story Problems for Fraction Number Sentences	
Nesrin Sahin	University of Central Arkansas
James Fetterly	University of Central Arkansas
Sirin Budak	University of Wisconsin – Stevens Point
<p>This mixed methods study examined the changes in prospective teachers' understandings of writing story problems for specified fraction number sentences. The participants were prospective teachers who are enrolled in two sections of a mathematics content course for teachers. One section (treatment A) received direct instruction about writing word problems whereas the other section (treatment B) did an error analysis where they evaluated student work samples related to writing story problems for fraction number sentences. Students were given a pre-and post-test, and 16 student interviews were conducted after the post-test. We will discuss the differences in students' understanding of writing story problems between the two treatment groups, and we will discuss the misconceptions that prospective teachers maintain after receiving one of the treatments.</p>	

Time: 9:45–10:30 am	Location: Shelton 2
Session #212: The Development of the Concept of Rates of Change and its Impact on Students' Understanding of Functions	
Pragati Bannerjee	Texas A&M University-Corpus Christi
Faye Bruun	Texas A&M Corpus Christi
James Dogbey	Texas A&M University – Corpus Christi
<p>Powerful mathematical knowledge results from reasoning with mathematical principles coherent in specialized secondary school mathematics courses, and with the progression of learning as students build this knowledge over grade levels. This study explored the nature of 187 Grades 7-12 students' understanding and difficulties as they reason, represent, and make connections between various representations of rates of change in physical and functional situations involving two co-varying quantities. Among others, the findings from the study pointed to students' difficulty with estimating average rate of change from data tables, with matching given data tables to the correct function types, and with estimating average rate of change when presented with a graph of a non-linear function. Overall, the results of the study suggested that students' understandings did not appear to consistently build in a manner that could lead them to develop a solid mathematical structure of functions by the end of Pre-Calculus. The presentation will focus on unpacking emergent themes in students' strategies and difficulties, as well as discuss the implications of the findings for instructional practice and professional development for teachers who teach these concepts.</p>	

Time: 10:30–11:15 am	Location: Shelton 2
Session #213: Developing a Strong Conception of Function	
Jayleen Wangle	State University of New York at Oneonta
<p>Research shows developing a sound conception of the key ideas in calculus requires the ability to conceive of a function as both a process and object as depicted by Dubinskys' (1991) Action Process Object Schema (APOS) Theory. This talk will consist of a review of the literature regarding student development of the concept of function from an APOS perspective, and the role covariational understanding may play in the development of a process view of function. I plan on ending the talk with a discussion of approaches of teaching function that will encourage students to develop a foundational understanding of the concept of function.</p>	

Time: 9:45–10:30 am	Location: Achord Library
Session #214: Context Matters: Supports and Barriers to Formative Assessment	
Carolyn Mitten	Moravian College
<p>Formative assessment provides powerful opportunities for teachers to uncover students' mathematical thinking and make critical instructional decisions to improve student learning, yet it continues to be under-utilized in many classrooms. This session will present the results of a multi-case study aimed at uncovering the supports and barriers novice elementary teachers encountered implementing formative assessment during mathematics instruction. Each participant previously engaged in a practice-based graduate course on formative assessment for math instruction and worked in diverse school settings. The design of the course was identified by all as a support to their formative assessment knowledge and practice, but the degree to which they appropriated that knowledge and practice differed across individual and school factors. Supports and constraints from this study will be presented in addition to implications for teachers, schools, and teacher educators wanting to support elementary math teachers in the effective use of formative assessment.</p>	

Time: 10:30–11:15 am	Location: Achord Library
Session #215: Preparing Pre-service Teacher to Provide Feedback in Mathematics	
Tony Thompson	East Carolina University
Kwaku Adu-Gyamfi	East Carolina University
<p>Feedback is an important component of effective instruction; however, many teachers struggle to provide meaningful feedback for their students. This session presents activities designed to improve mathematics pre-service teachers' abilities to provide feedback. Research indicated these activities resulted in significant improvement in feedback provided by pre-service teachers.</p>	

BREAKOUT SESSION #3

Time: 1:00–1:45 pm	Location: Noland/Laborde Hall
Session #301: Action Research in Undergraduate Teacher Education	
Daniel Brahier	Bowling Green State University
Jonathan Bostic	Bowling Green State University
Gabriel Matney	Bowling Green State University
<p>In this session, we will examine a unique mathematics teacher education program that includes a capstone project for undergraduates in which they conduct classroom action research. Presenters will describe specific projects in which students have engaged and how the research has influenced their mathematics classroom teaching practices.</p>	

Time: 1:45–2:30 pm	Location: Noland/Laborde Hall
Session #302: Efficacy of Learning Trajectory-Based Computer Games for Young Children	
Candace Joswick	University of Denver
<p>We conducted a teaching experiment (Steffe & Thompson, 2000) to evaluate the efficacy of learning trajectory-based computer games designed for young children in the areas of number (counting and subitizing) and shape (including composition of 2D shapes). Seven children, ages 3 and 4 years, were pre-assessed using items adapted from tools for early assessment of mathematics (REMA; Sarama, Clements, & Wolfe, 2010) to determine each child's initial learning trajectory levels (Clements & Sarama, 2009, 2014). Children then individually played 4 distinct games, facilitated by a teacher-researcher, for 8 instructional sessions, averaging 17 minutes each. Children advanced through successive levels of the games as their thinking advanced in the specific content. Additionally, each instructional session began and ended with informal "paper-and-pencil" activities like subitizing linear arrangements of dots on plates to assess transfer. Field notes and transcribed video of all sessions were analyzed to assess incremental growth; post-assessments were compared to pre-assessments to determine children's overall growth using the learning trajectory levels. Findings suggest that the specially designed computer-based games support children's learning as intended. Further, the games are engaging for young children, promote learning that is transferrable beyond the game environment, and, for some students, engender additional off-game mathematizing.</p>	

Time: 1:00–1:45 pm	Location: Abell Boardroom
Session #303: Impacts of Abroad & Exchange Experiences on Elementary Math Teachers' CRP	
Tyrette Carter	North Carolina A&T State University
Nakeshia Williams	North Carolina A&T State University
<p>This presentation will discuss study abroad service learning projects and other cultural exchange programs and how these programs support the teaching and learning of teacher education candidates. The focus of the presentation is to engage in discussion about how these experience support with differentiated instruction and increase equitable practices in the classroom, specifically, the mathematics classroom.</p>	

Time: 1:45–2:30 pm	Location: Abell Boardroom
Session #304: Developing Equitable Practices by Assessing Students' Understandings	
Kerri Richardson	University of North Carolina at Greensboro
Tyrette Carter	North Carolina A&T State University
Nakeshia Williams	North Carolina A&T State University
<p>Our research focuses on a growth model of how teachers progressed in their ability from novice to proficient levels when assessing student learning. As a result the teachers' abilities to assess and understand the data gathered, they increased their growth in creating equitable instruction for the students in in informal school settings within the context of algebraic reasoning. We describe data collected as part of a study focusing on the mathematical reasoning of students in grades, 3, 4, and 5. Our research context took place in six elementary schools located in both rural and urban settings. We describe how teachers began their instruction and over time, how they developed their assessment strategies to ensure that students obtained access to and support for algebraic reasoning, mathematical content, and discourse.</p>	

Time: 1:00–1:45 pm	Location: Cook Conference Room
Session #305: Mathematics Immersion: An investigation of problem solving perceptions	
Michael Warren	Baylor University
Melissa Eubank	Baylor University
Brandy Crowley	Baylor University
Katelyn Hamilton	Baylor University
Trena Wilkerson	Baylor University
<p>The Standards for Mathematical Practice (NGO Center and CCSSO, 2010) provide a framework for productive student behaviors during the process of learning mathematics. According to Principles to Actions (NCTM, 2014), teachers are expected to support students' productive struggle to facilitate problem solving and mathematics learning. This research investigates the mathematical practices of graduate students as they engaged in problem solving as both student and teacher. Evidence of student problem solving processes, metacognitive awareness and perceptions of teaching problem solving were analyzed. Results of this analysis will be shared.</p>	

Time: 1:45–2:30 pm	Location: Cook Conference Room
Session #306: Interactive Whiteboards in an Urban Mathematics Classroom	
Jamaal Young	University of North Texas
Marti Cason	University of North Texas
<p>The purpose of this study was to examine the effects of integrating Interactive Whiteboard (IWB) technology on middle school mathematics achievement in an urban school. Propensity score matching was used to create a comparable control group in order to isolate the effects of IWB technology on mathematics achievement. An initial experiential group (n = 716) of ethnically diverse urban students receiving IWB instruction was matched to a control population (n = 856) based on propensity scores generated from demographic and ability data. Student achievement data were analyzed with 2 x 4 ANOVA to assess treatment main effects and the effects of demographic variables such as gender, ethnicity, and ability. Ethnicity was a significant moderator of the effects. Specifically, a positive effect size was observed for White students, and the achievement gap was also reduced for Hispanic students. Implications for mathematics pedagogy with an IWB are provided based on these conclusions.</p>	

Time: 1:00–1:45 pm	Location: Anderson Conference Room
Session #307: Becoming Involved with Investigations in Mathematics Learning	
Drew Polly	University of North Carolina at Charlotte
<p>Participants will engage in discussions and dialogue about the RCML research journal. Information about opportunities to publish and review will be shared.</p>	

Time: 1:45–2:30 pm	Location: Anderson Conference Room
Session #308: A Case Study of Writing in the Secondary Math Classroom	
Melissa Gunter	University of Oklahoma
<p>This instrumental case study sought to discover how, when, and why secondary mathematics teachers are using writing in their classrooms to help students learn mathematics. Final results and implications for future research will be discussed.</p>	

Time: 1:00–1:45 pm	Location: Shelton 1
Session #309: The Influence of Combined Math/Science Methods courses on Math Educators	
Kim McComas	University of Arkansas
<p>This survey research examined math educators and math pre-service teachers in a combined math/science teacher preparation program to see how exposure to science education influenced their thinking for teaching mathematics. In this program, instead of a separate math methods course and a series of general education courses for all subject areas, the math and science majors take education courses together over the course of 2-4 years. These courses are typically taught with both a math and science educator contributing to the course, with experiences and model lessons revolving around math and science, often accentuating the connections between the two disciplines.</p> <p>Findings showed that participants believed their awareness and appreciation for the synergy between math and science had increased, as had their interest in looking for opportunities to integrate science concepts into math lessons to highlight the relevance and applicability of mathematics. Approximately 50% of the math educators indicated that they would still prefer to have one course dedicated solely to issues and methods of teaching mathematics.</p>	

Time: 1:45–2:30 pm*	Location: Shelton 1
Session #310: A Classroom Laboratory for Studying Curriculum, Teaching, and Learning	
Linda Venenciano	University of Hawai'i at Mānoa
Seanyelle Yagi	University of Hawai'i at Mānoa
<p>This session stimulates and disseminates research efforts designed to understand curriculum factors that affect children's mathematics learning. We will describe a graduate course we designed and taught concurrently with the curriculum research project, the Hawai'i Elementary Mathematics Laboratory (HEML). Seven and eight years old students were recruited to participate in a three-week summer school mathematics course, for 1.5 hours a day. The laboratory classroom served as a context for teachers to observe and study curriculum, lesson enactment, and students' experiences during the lessons. We will share our rationale for structuring course activities, evidence of course outcomes, and stimulate discussion on how this could serve as a model for teachers to study curriculum, instruction, and student learning in an authentic context.</p>	
Session #311: Investigating Place Value Concepts Within a Measurement Context	
Seanyelle Yagi	University of Hawai'i at Mānoa
Fay Zenigami	University of Hawai'i at Mānoa
<p>In the summer of 2017, sixteen students from an urban school district participated in the Hawai'i Elementary Mathematics Laboratory (HEML) curriculum research project. The purpose of the project was to develop and implement mathematics lessons with seven and eight years old children focused on place value concepts presented within different number systems developed through generalized quantitative contexts (using mass, area, length, and volume). While prior studies on the development of number skills have focused on students working solely in base ten and in using discrete models, quantitative experiences with continuous quantities serve as a natural starting point for mathematics learning because it mediates learning of concepts that are primary and basic in the structure of mathematics and students' ways making sense of the world (Venenciano & Dougherty, 2014). Students participated in a three-week summer course in which mathematics was taught by an experienced teacher-researcher for 1.5 hours each day. Lessons were designed, implemented, and retrospectively analyzed using design research methods (Gravemeijer, 1994) to develop the curriculum. The preliminary findings highlight the mathematics with which students engaged and informed further development of the curriculum. Insights into student thinking will also be shared.</p> <p>* sessions are shared during this time slot</p>	

Time: 1:00–1:45 pm	Location: Shelton 2
Session #312: Designing a Motivation Intervention in College Calculus	
Enes Akbuga	Texas State University
<p>Calculus students often ask, "Why are we learning this?" Students usually have difficulty seeing the value or the connections between course material and their lives (Wulf, 2007; Brophy, 1999). Hence, making math and science courses personally relevant and meaningful may engage students in the learning process (Hulleman & Harackiewicz, 2009). This study investigated motivational aspects such as expectations, utility values and interests in calculus courses. The study followed a quasi-experimental research design. The purpose of the study was to test the impact of an intervention, which is the implementation of the Science and Engineering Integrated Calculus Tasks (SEICT) in calculus courses, on student motivation.</p> <p>Participants of the study came from three introductory calculus courses that include 214 students at a Southwestern University in the United States in Fall 2017. Each of the three calculus courses were split into two lab sections by design, and those lab sections formed the treatment and comparison groups. The intervention was the implementation of the SEICT in treatment groups. The SEICT was developed by a team of professors from various departments within the same university. Data came solely from a survey, "Calculus Motivation Survey," which was adapted from Hulleman et al. (2010). The survey was implemented four times throughout the semester. Since this is an ongoing study, preliminary findings and analyses will be revealed.</p>	

Time: 1:45–2:30 pm	Location: Shelton 2
Session #313: Premonitions about Inquiry-Based Learning and Large Class Sizes	
Devon Gunter	University of Oklahoma
<p>This study consisted of a large-enrollment Calculus 2 class, of approximately 130-160 students, which was examined through multiple methods of data collection. This class was taught using Inquiry Based Learning (IBL), and integrals were the main focus of the course. Data from online surveys, qualitative interviews, and end-of-course evaluations suggest that there were significant affective gains; reasoning for why this class not only countered some situational premonitions regarding IBL in large class settings, but also created lasting impressions on some students.</p>	

Time: 1:00–1:45 pm	Location: Achord Library
Session #314: Examining Longitudinal Outcomes of Blended Professional Learning	
Georgia Cobbs Jennifer Luebeck	University of Montana Montana State University
<p>School districts across the country have adopted and continue to implement Common Core Standards for Mathematics (CCSSM), but "implementing CCSSM does not change one significant reality: improvements in student learning can come only from a strategy focused on improving instruction" (Larson, 2010). We report results from an innovative blended professional learning program focused on preparing teachers to transform their teaching in accordance with adoption of the CCSSM. A qualitative research study examined whether the program succeeded, two to three years later, in its efforts not only to improve teachers' knowledge of mathematics content and standards, but also to nurture lasting implementation of that acquired knowledge. Site visits to seven of the project's 15 partner districts resulted in 25 teacher and 13 administrator interviews and 25 classroom observations. Findings from this research chronicle positive outcomes and reveal obstacles and affordances to implementation. This work informs research on how professional learning influences teachers and students and can serve as an impetus for other professional developers to incorporate aspects of our blended professional learning model to enhance and extend outreach efforts.</p>	

Time: 1:45–2:30 pm	Location: Achord Library
Session #315: Programmatic Effects on High Stakes Measures in Secondary Math Preparation	
Jeremy Zelkowski	The University of Alabama
Jim Gleason	The University of Alabama
<p>Given the small populations of secondary mathematics education students at most institutions nationally, it is imperative that our community understand programmatic effects on the measures that hold most programs accountable (e.g. Praxis II, edTPA, NCTM SPA). The population from this study focused on the University of Alabama's Secondary Mathematics Teacher preparation program that has made many transformations since 2010. During this session we will present preliminary findings on accountable measures based on program design, key assessments, and teacher candidate performances in the classroom using the validated Mathematics Classroom Observation Protocol for Practices. While our results are preliminary given the most recent implementation of the edTPA, the initial findings support many of the recommendations of the CBMS MET2, the NCTM SPA standards, and moving towards a two-year cohorted model to develop a community of learners. We intend to engage those who attend the session to think more deeply about the analyses we intend to do with additional cohort data and that of which will advanced our community's ability to improve programmatic effects on teacher knowledge. Moreover, we will look for institutions who may wish to do comparative analyses to leverage their respective institutions for transforming preparation programs based on strong empirical evidence.</p>	

BREAKOUT SESSION #4

Time: 2:45–3:30 pm	Location: Noland/Laborde Hall
Session #401: Investigating Middle Grades Teachers' Curricular Reasoning	
Travis Olson	University of Nevada, Las Vegas
<p>Through examining teachers' curricular reasoning, our study attempts to shine light on ways in which teachers' knowledge, goals, orientations, and perspectives on mathematical content in curriculum affect mathematics learning. Initial work of a research study will be shared, and feedback on our analysis will be solicited from participants.</p>	

Time: 3:30–4:15 pm	Location: Noland/Laborde Hall
Session #402: Out-Of-School Time and Black Student Achievement in Mathematics	
Jamaal Young	University of North Texas
<p>The purpose of this study was to assess the ability of out-of-school time (OST) science, technology, engineering, and mathematics (STEM) activities to differentially influence mathematics achievement in Black students. A sample of students (N = 3,763) was drawn from the HSL09/12 for this study. After propensity score matching, a univariate analysis of variance (ANOVA) analysis was conducted. Participation in OST activities had a statistically significant main effect on the mathematics achievement of Black students ($d = .18$). This is important because the effect size data suggested that Black students who participated in STEM-focused OST activities in mathematics scored, on average, higher than approximately 60% of Black students who did not participate in these activities. Implications are provided for parents and teachers.</p>	

Time: 2:45–3:30 pm	Location: Abell Boardroom
Session #403: "AWFUL" & "Fun": Teachers' Mixed Perceptions of Content-Focused PD	
Christopher Parrish	University of South Alabama
Jacob Dasinger	University of South Alabama
<p>A clear connection exists between the need for content-focused professional development and student learning; to teach conceptually, teachers must have a deep understanding of the content and how students learn that content. Even so, teachers with the greatest need for improvement in mathematics content knowledge are the least likely to take sustained, content-focused professional development. This study uses the data from a two-week summer professional development to examine how middle school mathematics teachers who did and did not choose to participate in year-long content-focused professional development: (a) perceived the importance of the training, and (b) the factors they considered when deciding to attend or not attend the training. We hypothesize the study will find that most middle school teachers believe engaging in challenging mathematics is important and necessary professional development. In contrast, we hypothesize a few middle school teachers will find the same professional development opportunities unproductive and not useful. We further expect a relationship to exist between a teacher's content knowledge and perceptions of the importance of content-focused professional development. These expected findings would suggest that teacher educators and administrators should be proactive in addressing teachers' perceptions and barriers that may hinder attendance in content-focused professional development.</p>	

Time: 3:30–4:15 pm	Location: Abell Boardroom
Session #404: Design of Professional Development to Support Primary Grades' Teachers of a Formative Assessment Tool	
Drew Polly Christie Martin	University of North Carolina at Charlotte University of South Carolina
<p>This session shares the design and outcomes of a three-year professional development project focused on primary grades teachers' use of an internet-based formative assessment tool on number sense. The presentation will feature a description of the impact of the project on student learning outcomes, teacher-participants' reactions to the professional development, and teacher-participant data on instructional practices.</p>	

Time: 2:45–3:30 pm	Location: Cook Conference Room
Session #405: An Inquiry Approach to Teaching and Learning Mathematics	
Shelia McGee Ingram Tommy Smith	Birmingham-Southern College University of Alabama at Birmingham
<p>Despite the significant amount of research on inquiry-based teaching and learning strategies (e.g., problem-based, project-based learning), there is only a scarce amount of research on them in secondary education. The purpose of this study was to examine the perceptions of secondary school mathematics teachers on their facilitator training, classroom experiences, roles, skills, and implementation challenges. Survey data were collected. The findings revealed that a strong majority of participants indicated that their training was effective at helping them understand the philosophy of the teaching and learning approach, and the training provided them with sufficient insight into how to manage the small group learning process.</p>	

Time: 3:30–4:15 pm	Location: Cook Conference Room
Session #406: Justification in Elementary Students' Mathematical Argumentative Writing	
Karl Kosko	Kent State University
<p>Research in the realm of argumentation, justification, and proof is becoming more prevalent. With this prevalence comes calls for more specificity in how these constructs are described and defined. The present study reports on efforts to examine the role of justification in elementary children's mathematical argumentative writing. Findings indicate that children convey justifications either tacitly or explicitly. Tacit justifications allow for the potential inference of a rationale behind a child's description, but fail to properly organize a child's description to fully support a mathematical claim. However, explicit justifications are more likely to occur when a child has fully synthesized the warrants in their descriptive argument to support a mathematical claim. Additional findings revealed that within the continuum of tacit to explicit justifications were a subset of students' tacit justifications that used examples. The observed classification schemes provide clear distinctions that may be of particular use to mathematics educators investigating and working with elementary students in justification, argumentation, and proof.</p>	

Time: 2:45–3:30 pm	Location: Anderson Conference Room
Session #407: Models of Influence on Mathematics Instructional Coaches	
Sue Brown	University of Houston-Clear Lake
Sandra Browning	University of Houston Clear Lake
<p>In this study, we examined coaching experiences as reported by the instructional coaches and the participating teachers from three high school sites. The district's school board initiated a pilot program for instructional coaching by approving mathematics coaches for three of its five high schools to begin working with teachers. The instructional coaches were hired to support teachers in the mathematics departments of the three high schools. They each attended Jim Knight's training on instructional coaching (Knight, 2009). The job responsibilities of the coaches included teaching one class as well as coaching duties: assisting teams in planning, leading teams in data analysis, modeling lessons, conducting observations, and providing feedback. We sampled five teachers from each algebra team at the three sites for a total of 15 teachers. Data were collected from focus groups and interviews at the beginning and end of the study to inform the research question: "What factors contribute to the differences in the implementation of mathematics instructional coaching at each site?" This presentation will answer the research question.</p>	

Time: 3:30–4:15 pm	Location: Anderson Conference Room
Session #408: Algebra I Teachers' Beliefs and Knowledge of Algebra for Teaching	
Travis Mukina	Chaminade University of Honolulu
Juliana Utley	Oklahoma State University
<p>Research indicates that teachers' mathematical beliefs and mathematical knowledge for teaching impacts practices in the classroom. Additionally, researchers have identified that Algebra I is a gatekeeper to higher-level mathematics. With the prevailing shortage of teachers to place in the classroom, schools are forced to employ teachers who have gained their certification through a multitude of pathways for teachers to enter the classroom, especially in the area of mathematics. With these increased number of certification pathways in some states, it is important to explore Algebra I teachers' beliefs and knowledge of algebra for teaching. In this presentation, we will share the characteristics of the Algebra I teachers in Oklahoma and any significant differences in their beliefs and knowledge of algebra for teaching based on certification pathways.</p>	

Time: 2:45–3:30 pm	Location: Shelton 1
Session #409: Proportional Reasoning: Student Thinking and Implications for Teaching	
Suzanne Riehl	University of Northern Iowa
Olof Steinhorsdottir	University of Northern Iowa
<p>The numbers in proportional reasoning tasks influence student thinking. We share a practical classification system and briefly describe our research and findings. To translate this research into practice, we will identify key aspects of the mathematics of a proportion and discuss how student work reveals their understandings and misconceptions. We aim to enable teachers to combine this knowledge so that they can assess their students' current understanding and create tasks that advance their students' thinking.</p> <p>To develop robust proportional reasoning, students need many, varied experiences. Our data suggests a hierarchy of problem difficulty and our classification system enables teachers to create tasks of varying difficulty. Additionally, by the judicious choice of the number structure of a problem, teachers can elicit different solution strategies and help students make mathematical connections.</p>	

Time: 3:30–4:15 pm	Location: Shelton 1
Session #410: Investigating Prospective Teachers' Development of Numerical Reasoning	
Nesrin Sahin	University of Central Arkansas
Sinan Kanbir	University of Wisconsin – Stevens Point
<p>This mixed methods study examined the extent to which prospective service elementary teachers (PSTs) learned to notice, to state, and to apply the distributive property and the commutative and associative properties of addition/multiplication for real numbers. Part of the study will be concerned with the extent to which the participating PSTs' developing knowledge and understanding of the associative and distributive properties of real numbers helped them not only to formalize the concept of a variable but also to develop a better understanding of what is traditionally regarded as elementary algebra. The participants were 102 PSTs from two universities. The treatment group received a series of workshops focused on the development of algebraic reasoning. Pre- and post-tests were administered to the participants, and a total of 16 students were interviewed at the pre- and post-teaching stages.</p>	

Time: 2:45–3:30 pm	Location: Shelton 2
Session #411: Inverse Teaching: Miscommunication in a Collectivist Culture	
Summer Bateiha	Virginia Commonwealth University in Qatar
<p>This study explored what three instructors at an American university in Qatar discovered about the similarities and differences between teaching mathematics at an American university in Qatar versus American universities in the USA. The study spans three years of mathematics courses taught. In these courses, the language of study was English, and the curriculum used was American. However, speaking the English language and working with an American curriculum did not result in communication with the students that was familiar to the instructors, from their experiences in the USA. Findings of this research yielded significant information about the impact of culture on effective communication between instructors and students. These findings could be particularly useful to university instructors who teach students who come from collectivist cultures.</p>	

Time: 3:30–4:15 pm	Location: Shelton 2
Session #412: Introducing STEM in the Elementary Classroom with Three Act Tasks	
Cynthia Orona	University of Arkansas
<p>This study required pre-service teachers to create three act tasks and implement them in their internship classrooms as a means of introducing students to Science, Technology, Engineering, and Mathematics (STEM) using a problem-based mathematics approach. In prior sections of this course, students struggled with finding ways to truly engage their students and achieve the results they wanted when students had no prior experience with STEM. This study was an extension of prior work with this particular course and preparing pre-service teachers to incorporate STEM in their future classrooms that included the recommendation of utilizing three act tasks as a means of introducing problem-based mathematics to students in a meaningful way. The recommendation was initially introduced in the undergraduate mathematics course and further developed in a graduate problem-based mathematics course where the pre-service teachers were required to create their own three act tasks, making them applicable to their classrooms. The pre-service teachers reflected on creation and implementation of the tasks, as well as on the assignment as a whole and provided recommendations.</p>	

Time: 2:45–3:30 pm	Location: Achord Library
Session #413: Building Fluency in a Mathematics for Elementary Teachers Course Sequence	
Rachel Bachman	Weber State University
C. David Walters	Weber State University
<p>Learn ways elementary preservice teachers are being challenged to gain mathematical fluency throughout their mathematics content and methods coursework. This presentation will highlight strategies being used in these classes to help students build fluency with whole number operations; fraction, decimal, and percentage comparisons and operations; and estimation. These strategies focus on building multiple choices to arrive at an unknown answer by working from what students do know and understand. Evidence of student growth with mathematical fluency will be presented from multiple semesters and instructors involved in the initiative. Suggestions for future research of this program are welcomed.</p>	

Time: 3:30–4:15 pm	Location: Achord Library
Session #414: Meaning-Making with Curriculum Materials: A Case Study of One School	
Kate Raymond	University of Oklahoma
<p>Extensive online resources have fundamentally changed the ways in which teachers interact with curriculum materials. The majority of teachers now select at least some of their curriculum materials themselves; half of teachers in STEM content area routinely search for curriculum materials online. Before this technology, the quality of curriculum resources teachers encountered was controlled by publishing companies and district supervisors; the availability of internet-based teacher resources eliminates these control factors and fundamentally changes the ways teachers interact with curriculum materials. Rather than using a single source of curriculum, teachers evaluate a variety of materials that may be written with different values, purposes, and audiences in mind. How do teachers contend with creating a coherent curriculum from these disparate curriculum materials? How can policymakers, administrators, curriculum designers, and teacher educators support teachers' meaning-making from disparate sources of curriculum?</p> <p>This session will share findings of a case study which followed five educators as they made meaning from a variety of curriculum materials for an Algebra 2. Findings suggest that teachers approach meaning-making as a recursive process which is informed not only by curriculum materials and teachers, but by experiences with students and local contexts as well. Participants will be engaged in creatively think about how to facilitate teachers' meaning-making.</p>	

BREAKOUT SESSION #5

Time: 8:00–8:45 am	Location: Noland/Laborde Hall
Session #501: An Investigation of Pre-service Teachers' Problem Solving Skills	
Kathy Horak Smith	Tarleton State University
Eileen Faulkenberry	Tarleton State University
Michael Warren	Baylor University
<p>According to <i>Principles and Standards for School Mathematics</i> (NCTM, 2001) problem solving should be an integral part of all mathematics learning. Problem solving allows for students to enter through various pathways and the use of various tools (NCTM, 2014). This research investigates how pre-service teachers perceive themselves as problem solvers and how they approach solving routine and non-routine problems. Students were given the Metacognitive Awareness Inventory (MAI) during their first mathematics education course to measure their perceptions of their own problem solving ability. They were also asked to solve various problems during the semester and their strategies were recorded. Results from both the survey and their strategies will be shared.</p>	

Time: 8:45–9:30 am	Location: Noland/Laborde Hall
Session #502: Lesson Studies on Model Eliciting Activities	
Rachel Wiemken	Bowling Green State University
Gabriel Matney	Bowling Green State University
<p>The study presented will examine the impact of a lesson that used a Model Eliciting Activity (MEA) in mathematics classrooms. We will briefly explain what MEA tasks are and share the MEA involved in the research. The study explored different types of models students created while engaging in the MEA. Next, we examined what mathematical content students engaged in, how students used their mathematical knowledge to form a new model, and how the lesson allowed the teacher to have a vision of students' comprehension and use of mathematics. Recommendations will be made for the use of the MEA. We will encourage discussion among participants about the role and place for MEA's in K-20 mathematics instruction.</p>	

Time: 8:00–8:45 am	Location: Abell Boardroom
Session #503: Varied Field Experiences for Preservice Teachers Teaching in a Math Academy	
Sandi Cooper	Baylor University
Trena Wilkerson	Baylor University
Keith Kerschen	Baylor University
Ryann Shelton	Baylor University
Brandy Crowley	Baylor University
<p>In an effort to learn more about the impact of a varied field experience on preservice teachers, the researchers explored the experiences of seven preservice teachers who participated in teaching experiences during a summer academy. This summer academy offered to Pre-Kindergarten and Kindergarten students was designed to engage early learners in a focused learning experience to nurture the development of early number concepts. The findings from this study seem to suggest that a varied, additional field experience in elementary mathematics teaching can help preservice teachers increase their confidence with teaching mathematics and implementing important differentiation strategies and using manipulatives.</p>	

Time: 8:45–9:30 am	Location: Abell Boardroom
Session #504: Changes in Preservice Elementary Teachers' Problem Solving Ability	
James Telese Jair Aguilar	University of Texas, Rio Grande Valley East Carolina University
<p>This session presents findings from 60 preservice teachers' changes in their ability to problem solve. Mathematics teacher candidates were administered nonroutine problem solving tasks in relation to the content being address during the course of two semesters. The tasks were scored using a rubric designed to rate Procedural Fluency, Conceptual Understanding, and Problem Solving/Strategic Competency. Patterns in how math teacher candidates approached and solved problems will be presented, along with determining the relationship between their ratings and self-efficacy for mathematics teaching and outcome expectations.</p>	

Time: 8:00–8:45 am	Location: Cook Conference Room
Session #505: Fraction Learning with iPads in Middle School	
Tarah Donoghue Darlinda Cassel Lydia Buntin	University of Central Oklahoma University of Central Oklahoma University of Central Oklahoma
<p>The conclusion of a 2+ year study investigating the effectiveness of iPad technology in middle school classrooms. Specifically, the research seeks to uncover if the use of iPads and fraction-based apps deepen (or weaken) student understanding of fraction concepts. As educators, reinforcing conceptual understanding is our main concern, and this study reviews the effectiveness of this technology in middle school classrooms. Fraction concept understanding is foundational for development of algebra concept understanding as students progress through mathematics courses.</p>	

Time: 8:45–9:30 am	Location: Cook Conference Room
Session #506: Math Teachers' Technology Integration Practices: The SAMR Model	
Kwaku Adu Gyamfi Tony Thompson	East Carolina University East Carolina University
<p>Technology integration has been an issue and a focus for math teachers in today's classrooms. According to the National Council of Teachers of Mathematics (NCTM, 2000), there is a growing need for mathematics teachers to utilize technology effectively in their instruction. To meet this need, different technology tools have rapidly been introduced in today's mathematics classroom. This study explores the perceptions and practices of in-service teachers as they integrate these technology tools to impact the learning of their students. The SAMR framework served as a lens for investigating teachers' technology integration practices in this study. Preliminary results and implications for future research will be discussed.</p>	

Time: 8:00–8:45 am	Location: Anderson Conference Room
Session #507: Elementary Teachers' Content Knowledge: Impact of two MSP Projects	
Gregory Chamblee Georgia Cobbs	Georgia Southern University University of Montana
<p>This session will describe how two United States Department of Education Mathematics and Science Projects impacted practicing elementary mathematics teachers' content knowledge. Data findings from pre- and post-tests of content along with delivery model design and implementation successes and pitfalls will be discussed. Participant comments about each project will be discussed. Implications for in-service and pre-service content and pedagogy courses and delivery models will be noted. Attendees will be asked to discuss how their professional development activities and courses are related to these findings and recommendations.</p>	

Time: 8:45–9:30 am	Location: Anderson Conference Room
Session #508: Impacting Anxiety in Mathematics with Creative and Alternative Approaches	
James Fetterly	University of Central Arkansas
<p>Children and adults have anxiety when it comes to mathematics in almost any environment. The work of many investigators has documented the pervasive existence of math anxiety. In this quantitative study, mathematical anxiety was examined along with the notion of mathematical creativity. A counterbalanced design was employed, randomizing the participants into two groups and giving a pre- and post-test to determine if significant differences exist in the participants who are exposed to creative and alternative approaches, that is, problem posing, divergent thought and invented strategies. These exposures were punctuated, intentional experiences with mathematical creativity. The differences in mathematical anxiety and creativity were also gauged using repeated measures during the study. Furthermore, anxiety was correlated with mathematical creativity by employing pre- and post-test measures. The findings of this study suggest that mathematical creativity can be fostered and sustained under certain conditions. Also, the results indicated that mathematical anxiety is significantly impacted by intentional experiences with creative and alternative approaches to mathematics: alternative algorithms, divergent thought, invented strategies and problem posing.</p>	

Time: 8:00–8:45 am	Location: Shelton 1
Session #509: Mathematics Teacher Efficacy and Mathematics Anxiety in Preservice Teachers	
Gina Gresham	University of Central Florida
<p>This study investigated the relationship between mathematics teacher efficacy and mathematics anxiety among preservice teachers. Data collection involved findings from the Mathematics Teaching Efficacy Beliefs Instruments (MTEBI), Mathematics Anxiety Rating Scale (MARS), and interviews. Findings revealed a significant, negative relationship between mathematics teacher efficacy and mathematics anxiety. Preservice teacher interviews revealed that efficaciousness towards mathematics teaching practices is associated with mathematics anxiety and is the basis for their mathematics teaching efficacy beliefs. Preservice teachers with the lowest degree of mathematics anxiety had the highest levels of mathematics teacher efficacy.</p>	

Time: 8:45–9:30 am	Location: Shelton 1
Session #510: Accessibility Experiences in Online College Mathematics Courses	
Michaela Stone	Louisiana State University
<p>As economic pressures and technological advances fuel a shift towards online instruction and assessment in college mathematics, universities rely on the accessibility claims of content providers to ensure equitable mathematics learning experiences for all of their students. This ongoing research seeks to address discrepancies between the accessibility claims of providers of online mathematics courseware and the experiences of college mathematics students who are blind or visually impaired (SBVI). By sharing the accessibility concerns of SBVI who are enrolled in or have completed online college mathematics courses, we are able to bring to light factors that affect mathematics learning at the undergraduate level. Addressing the issues experienced by these students is essential in closing the gap between content providers' claims of accessibility and the practical experiences of SBVI attempting to engage fully with online mathematics courses.</p>	

Time: 8:00–8:45 am	Location: Shelton 2
Session #511: Impact of Mathematics Progressions on In-Service Teacher Content Knowledge	
Alice Steimle	University of Mississippi
Julie James	Center for Mathematics and Science Education, University of Mississippi
<p>How does a two-week content-focused summer institute impact teachers' content knowledge? Are there certain professional development models or focal areas that would make gains in content knowledge more significantly than others? In this presentation, we share the changes of mathematics teachers' content knowledge after participating in a two-week summer institute focused on the progression of mathematics learning across the elementary and middle grades. Initial findings indicated that a focus on the progression of learning may have a greater impact on teacher content development than a grade-level or domain-specific focus.</p>	

Time: 8:45–9:30 am	Location: Shelton 2
Session #512: Failure to Launch: Teacher Perceptions of State Standards in Mathematics	
Kate Raymond Stacy Reeder	University of Oklahoma University of Oklahoma
<p>Oklahoma is one of three states that rejected Common Core Standards after initial adoption. This uncertainty in vision for Oklahoma schools left teachers without direction for mathematics teaching and learning. Self-developed standards were approved by the state legislature in early 2016 and implemented in the 2016-2017 school year. The process by which the mathematics standards in Oklahoma were implemented was investigated in a two-phase mixed-method study consisting of a survey sent to all Oklahoma teachers and interviews of a purposeful sample of respondents. We asked what strategies and supports help facilitate the implementation of the Oklahoma Academic Standards in Mathematics, how confident are teachers in their ability to implement new standards, and what factors most influence teachers' feelings of efficacy with the standards. Results indicate that teachers who had professional development experiences focused on the new state standards had significantly higher self-perceptions of efficacy. These teachers also reported greater changes in their practice than did those who had no professional development. Yet few Oklahoma teachers had any professional development on the new standards. This study calls into question the feasibility of reform through changes in standards and guidelines, and highlights the need for clear vision and goal from policy makers as well as support in the form of professional development when changes in standards or guidelines are made.</p>	

Time: 8:00–8:45 am	Location: Achord Library
Session #513: Scaffolding Struggle for Mathematics Learning	
Thomas Ricks	Louisiana State University
<p>This presentation explores the delicate tension between teacher scaffolding and student struggle during mathematics instruction, illustrated with examples from international mathematics classrooms. Although maintaining students' cognitive struggle is a major recommended educational goal for inquiry-based mathematics instruction, too much struggle can lead to frustration, limit the growth of productive dispositions, and inhibit conceptual learning. How do teachers balance the competing goals of challenging their students with appropriate mathematical tasks, while simultaneously scaffolding their conceptual development? I develop theory that argues American mathematics education often under- and/or over-scaffolds mathematics instruction to the detriment of pupil learning, and I conclude with implications for broader teacher professional development reform.</p>	

Time: 8:45–9:30 am	Location: Achord Library
Session #514: Characterizing Prospective Mathematics Teachers' Productive Struggle	
Kanita DuCloux Hope Marchionda	Western Kentucky University Western Kentucky University
<p>The field of mathematics education has highlighted the role of productive struggle in students learning mathematics for understanding (NCTM, 2014a; Warshauer, 2015). Students struggling to learn mathematics is often viewed as problematic but research suggests that this struggle can be a productive and necessary component of learning mathematics (Hiebert & Grouws, 2007). To better understand the process of productive struggle and how best to engage prospective mathematics teachers in productive struggle, a small qualitative study was conducted in three mathematics content courses to examine (1) how prospective elementary, middle, and secondary teachers engaged in productive struggle as they completed non-routine mathematical tasks and (2) how prospective teachers perceived and characterized their struggle during non-routine mathematical tasks. After the participants engaged in a non-routine mathematical task, they were asked to reflect on their struggle with the task. The researchers observed the mathematics lessons, creating field notes of the task experience and then used qualitative methods (Creswell, 2013), beginning with open coding and then theme creation, to analyze the field notes, student reflections, and student work. Preliminary analysis revealed that group dynamics influenced the struggle. That is, many participants indicated that the dynamic of working in a group had the potential to either sustain or hinder productive struggle.</p>	

2017 RCML Board Meeting Minutes: *March 3, 2017*

President Juliana Utley called the general business meeting to order at 12:30 pm.

Recognition of first-time attendees
Recognition of conferences attended

President Overview – Juliana Utley: Juliana acknowledged the RCML Executive Committee Voting Members and Ex-Officio Member.

Approval of Minutes: Sarah Pratt provided the minutes from the RCML 2016 conference business meeting, which was also distributed in the 2017 conference program. Bob Drake moved to approve the minutes, seconded by Lynn Columba. No discussion. Motion carried.

Member Coordinator’s Report – Kerri Richardson: As of December 31, 2016, there were 140 members, down from 184 in 2015. As of today there are 217 members for 2017. That includes an international member, and there is an increase in the student membership.

Treasurer’s Report – Kerri Richardson: Kerri shared a beginning balance of \$49,203 for FY2016 and an ending balance of \$39,836 for FY2016, revealing a loss for the past year. This was due to the updated web site and the journal transition. Melfried Olson moved to accept the treasurer’s report, seconded by Pat Jordan. No discussion. Motion carried.

Election Results – Juliana Utley:

Conference Committee

- Melanie Fields (2017-2020)
- Luke Foster (2017-2020)

Publications Committee - Elected

- Kathy Horak Smith (2017-2020)
- Valerie Sharon (2017-2020)

Secretary: Travis Olson (2017-2019)

President Call for Nominations – Juliana Utley: Nominations are being sought for President Elect, VP Conferences, Treasurer, Conference Committee (2), and Publications Committee (2). Onsite nomination forms can be given to Juliana Utley; you may also email your nominations to juliana.utley@okstate.edu

VP of Conferences – Kansas Conrady: There was a first-year attendees breakfast at 7:00 am and there will be another one tomorrow morning. There were 165 registered, 76 presentations, and 23 posters. There were a total of 137 presenters. Kansas thanked the program chair, Melanie Fields, and program co-chair, Eileen Faulkenberry, and conference chair, Kathy Horak Smith. She also thanked the conference committee members, reviewers of the proposals, and conference moderators.

Next year, the 2018 Annual Conference will be held in Baton Rouge, LA, February 25-27, 2018 at the LSU Lod Cook Alumni Center. Proposals for 2019 and beyond are welcome.

There is a Facebook event – RCML 44th Annual Conference. Next year’s conference has been created – RCML 44th Annual Conference.

Conference Proceedings – Juliana Utley:

Juliana recognized Travis Olson, Proceedings Co-Editor, and Linda Venenciano, Co-Editor. She reported that there were 18 manuscripts accepted, with a 52.9% acceptance rate. She thanked all of the reviewers for volunteering and providing such thorough reviews. She also thanked, and Nicholas Kaleolani Wong, editorial assistant. She requested that any suggestions can be sent to Travis Olson or Linda Venenciano.

President Juliana Utley announced that Travis recommended Linda Venenciano to the Board to serve as 2018 Proceedings Editor. Linda has agreed to serve.

Juliana introduced Gabriel with his responsibilities and the new journal.

VP of Publications – Gabriel Matney:

The journal has been shipped, and some have been received already. He presented the new cover design and is being published by Taylor & Francis. He acknowledged Drew Polly as editor and recognized the impact on his leadership to decrease review periods. There is a new page length restriction to 25 pages with references. Also, the web site hosts the archives of all volumes of IML. He requested that members write the preferred address in the web site member profile. He invited members to serve as a reviewer for IML. He produced IML cards for members to disseminate at home institutions and other conferences to encourage colleagues to submit to IML.

Gabriel then acknowledged the Editorial Board and the Publications Committee.

Juliana Utley informed the membership that lawyers reviewed the contract with Taylor & Francis, and the contract keeps the rights of the journal with RCML. Also, she reiterated to pay dues by December to ensure the first issue of the next volume is mailed to you. She then encouraged membership to inform their library to gain access to the journal.

Gabriel called Jonathan Bostic and Bill McGalliard to report on the newsletter. Jonathan asked for members to submit to “Connection Points.” He also asked for names to them for Signal & Noise.

Memorial Scholarships –Juliana Utley:

Acknowledgement of the Memorial Scholarship Committee: Alan Zollman, Lynn Columba-Piervallo, and Travis Olson. The 2017 Awardees is as follows: in honor of James Heddens, is Rachel Bates, Redlands Community College. The 2018 Award will be in honor of Sheryl Maxwell. There will be a call for next year’s committee distributed to the membership soon.

Recognition of RCML Service – Juliana Utley:

Jonathan Bostic, Conference Committee

Sean Yee, Conference Committee

Linda Venenciano - Conference Proceedings Co-Editor, 2016 – 2017

Jonathan Bostic - Newsletter Editor, 2015-2017
Travis Olson - 2017 Proceedings Editor
Kathy Horak Smith – 2017 Conference Chair
Melanie Field – 2017 Program Chair
Eileen Faulkenberry – 2017 Co-Program Chair
Sarah Pratt – Secretary, 2015-2017

Old Business – Juliana Utley:

Constitution and By-Laws. She thanked Dan Brahier, Bill Speer, Fay Zenigami and Alan Zollman for their service. The edited version will be posted on the web site for 60 days for members to review and provide any feedback. She also updated on the RCML web site.

New Business – Juliana Utley:

There will be a new award given by RCML: Distinguished Service to RCML. Also, Dan Brahier will be forming an ad hoc committee to explore Electronic Communications for RCML.

2017-2018 Strategic Goals – Juliana Utley:

- Explore/Expand Electronic Communication Strategies
 - President appoints ad hoc Electronic Communications Committee
 - Create Twitter Feeds and Facebook Page
- Update Officer and Committee Member Handbooks
 - Review Roles, Responsibilities, and Timelines
 - Scan/Digitize all Handbooks for Electronic Access
- Define What We Do Better/Differently Than Other Organizations (and how to market accordingly)

Juliana passed the gavel on to Dan Brahier (Gabriel Matney served as his stand-in).

Gabriel Matney recognized Juliana Utley for her service as RCML President (2015-2017).

Meeting adjourned at 1:25 pm.

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