Paper Session 2

Tuesday, January 24, 2012
10:25 a.m. - Noon
Summaries on Pages 27-29, Abstracts on Flash Drives

Breakout Room 2: **Discussant: Elizabeth VanderPutten**

Defining the Aims of STEM Education in an Era of Hyperpluralism

F. Joseph Merlino Strand: 1
MSPGP

Inequality for All: Identifying and Addressing Curricular Policies Supporting Systemic Inequality in Mathematics

Bill Schmidt Strand: 1
PROM/SE

Breakout Room 3: **Discussant: Pamela Brown**

Defining Effective STEM Teaching Within a Middle-School/Post-Secondary Collaboration Through a Cycle of Logic Model Development

Robert Curtis Strand: 1
SF Bay Integrated Middle School Science Project

Using Energy as a Cross-Cutting Concept to Teach More Effectively

Robert Chen Strand: 1
Boston Energy in Science Teaching (BEST)

Breakout Room 4: **Discussant: Maura Borrego**

Understanding Barriers to Change and Innovation in STEM Teaching and Learning: Silos and District-wide Teacher Learning Networks

Fouad Abd-El-Kalick Strand: 2
EnLiST

Exploring the Effectiveness and Utilization of Teacher Leader Support and Resources Through Social Network Analysis

Gale Mentzer Strand: 2
LEADERS: Leadership for Educators: Academy for Driving Economic Revitalization in Science

Breakout Room 5: **Discussant: Kyrsis Rodriguez**

A "Test-of-Concept" Study of a Learning Theory-based Model of Professional Development

Eric Banilower Strand: 2
AIM: K-8 Science

Noyce Master Teacher Developed K-5 Science Curriculum and Professional Development

George Nelson Strand: 2
NCOSP

Breakout Room 6: **Discussant: Joan T. Prival**

Localizing Teacher Leadership Expertise in Appalachia

Kimberly Zeidler-Watters Strand: 2
Appalachian MSP

Evolution of a Professional Development Program to Promote Effective Teaching

Michelle Borrero Strand: 2
Puerto Rico MSP

Paper Session 2

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Breakout Room 7: **Discussant: Kwang Suk Yoon**

Professional Learning Communities: A Vehicle for Preparing, Supporting and Sustaining Effective STEM Teaching
Blake Decker Strand: 2
College Ready

Mathematics Studio - a Greenhouse for Growing Mathematics Leadership
Thomas Dick Strand: 2
Oregon Mathematics Leadership Institute Partnership

Breakout Room 8: **Discussant: Wendy Smith**

Use of Multiple Strategies and Processes to Prepare Teachers and Faculty to Teach Effectively
Dianne DeMille Strand: 2
TASEL-M Phase 2

Building a Mathematics Coalition
Davida Fischman Strand: 2
Mathematical ACES

Breakout Room 9: **Discussant: Lee L. Zia**

The Poincaré Institute: Supporting Effective Teaching and Learning
Montserrat Teixidor-i-Bigas Strand: 2
Poincaré Institute: A Partnership for Mathematics Education

Using Teacher Liaisons to Support and Promote Effective Algebra Teaching
Michelle Homp Strand: 2
NebraskaMATH

Breakout Room 10: **Discussant: Richard W. Peterson**

Creating Coherence: Working with University Faculty and School Administrators to Support Effective High School Science Teaching
Kristin Bass Strand: 2
Project MAST

Supporting Freshman Physics Teachers
Deborah Hanuscin Strand: 2
A TIME for Physics First in Missouri

Breakout Room 11: **Discussant: Ruth Heaton**

Common Core Mathematical Practices Are Good Instructional Practices
Amy Cohen Strand: 2
NJ Partnership for Excellence in Middle School Mathematics

Mathematical Knowledge for Teaching as a Critical Element of Preservice Teacher Preparation
DeAnn Huinker Strand: 2
Milwaukee MSP

Paper Session 2

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Breakout Room 12: **Discussant: Kathleen B. Bergin**

Reconceiving "Misconceptions" in Teacher Professional Development

Ayush Gupta Strand: 2
Minority Student Pipeline MSP

The RITE Way to STEM Assessment

Dan Murray Strand: 3
RITES

Breakout Room 13: **Discussant: Donald Wink**

Attention to Teaching for Science Education Fellows

Pamela Pelletier Strand: 2
Boston Science Partnership

Effective STEM Professional Learning Communities - Learning from the Field

Joan Pasley Strand: 2
Knowledge Management and Dissemination

Breakout Room 14: **Discussant: James E. Hamos**

Affecting and Documenting Shifts in Secondary Precalculus Teachers' Instructional Effectiveness and Students' Learning
Marilyn Carlson Strand: 3
Project Pathways: A Math and Science Partnership Program for Arizona Targeted Project TrackEducation

Assessing Mathematical Habits of Mind for Teaching
Sarah Sword Strand: 3
Focus on Mathematics, Phase II: Learning Cultures for High Student Achievement

Breakout Room 15: **Discussant: Ron Buckmire**

How Do You Know if Your Project Is Resulting in Effective STEM Teaching?
Karin Wiburg Strand: 3
Mathematically Connected Communities - Leadership Institute for Teachers

Developing Effective Math Teaching: Assessing Content Knowledge, Pedagogical Knowledge, and Student Success
Roger Peach Strand: 3
Math Teacher Transformation Institute

Paper Session 2 – Summaries

Breakout Room 2:

Defining the Aims of STEM Education in an Era of Hyperpluralism

F. Joseph Merlino, MSPGP, Strand: 1

SUMMARY: The factor most responsible for the elusiveness in defining effective STEM teaching is the fundamental problem in reaching clarity and consensus as to what should be the aim of STEM education. We live in an era of "hyperpluralism" where a vast number and variety of contending groups and individuals involved in K-20 education, and the larger public and policy world, each stake their claim, or harbor their private definition, as revealed by their actual practice, as to the purpose of STEM education. Based on our nine years of operating a targeted MSP, we share the first results of a research supplement to provide a historical-based taxonomy of different aims as a way to negotiate consensus about the meaning of effective STEM teaching.

Inequality for All: Identifying and Addressing Curricular Policies Supporting Systemic Inequality in Mathematics

Bill Schmidt, PROM/SE, Strand: 1

SUMMARY: The "effective teaching" concept informing the Promoting Rigorous Outcomes in Mathematics and Science Education (PROM/SE) MSP focused on what is taught together with a commitment to provide all students with a challenging and rigorous curriculum. Professional development helped teachers understand linkages between topics taught in their classrooms as well as linkages to those taught earlier and in subsequent years. The point has been to bring coherence to the curriculum both from a disciplinary viewpoint as well as from the experience of students as they move through all the grades of schooling. After more than five years of effort, PROM/SE has found some evidence that this approach has benefited students.

Breakout Room 3:

Defining Effective STEM Teaching Within a Middle-School/Post-Secondary Collaboration Through a Cycle of Logic Model Development

Robert Curtis, SF Bay Integrated Middle School Science Project, Strand: 1

SUMMARY: This proposal focuses on the first year of implementation of an NSF MSP grant. The process of developing and using logic models helped our project define effective STEM teaching and learning, and refine and evaluate project goals, outcomes and activities. These goals, outcomes and activities have continued to evolve and be clarified over the first year of the project using a logic-modeling process involving key partners, project staff, researchers and our evaluator. The logic model process helps us to reveal and negotiate core assumptions; align project components; network across groups; share learnings about effective STEM teaching; increase coherence across all partners and build capacities of all partners for inquiry-based teaching and learning.

Using Energy as a Cross-Cutting Concept to Teach More Effectively

Robert Chen, Boston Energy in Science Teaching (BEST), Strand: 1

SUMMARY: The Boston Energy in Science Teaching (BEST) project defines effective teaching as facilitating opportunities for learners to explore concepts and connections across science disciplines. Our project's strategy is to use the cross-cutting concept of energy to facilitate these opportunities for teachers by adapting our phase I professional development (PD) strategies to be cross-disciplinary instead of disciplinary specific. We believe that using concept-based PD will lead to more effective and efficient instruction compared to discipline-based PD. To test this we will be comparing data of grade 3-8 teachers who participated in our discipline-based PD through the BSP, teachers who participated in both, and teachers who have only participated in BEST.

Paper Session 2 – Summaries

Breakout Room 4:

Understanding Barriers to Change and Innovation in STEM Teaching and Learning: Silos and District-wide Teacher Learning Networks

Fouad Abd-El-Kalick, EnLiST, Strand: 2

SUMMARY: Effective precollege STEM teaching provides students with meaningfully integrated horizontal (within-grade level) and vertical (across-grade levels) innovative experiences across scientific disciplines. This approach requires a holistic transformation of STEM learning across the curriculum and school experiences. This study adopted a social network perspective on learning to understand how innovation is 'taken up' by teachers across school buildings or districts, and characterized the nature of extant science teacher learning networks within a whole school district. Results show that science teachers' learning networks were mostly siloed within buildings with hardly any cross-grade, cross-level, and cross-building relations. Additionally, teacher networks related to science teaching and learning were less elaborate when compared to other networks, such as those related to learning about classroom management.

Exploring the Effectiveness and Utilization of Teacher Leader Support and Resources Through Social Network Analysis

Gale Mentzer, LEADERS: Leadership for Educators: Academy for Driving Economic Revitalization in Science, Strand: 2

SUMMARY: Student engagement is the hallmark of effective STEM teaching. It is student-centered and includes iterative cycles of authentic scientific investigation centered on real-world issues through collaboration between students, teachers, and members of the community in a collaboration of inquiry. As such, teachers must be aware of and take advantage of the wealth of community resources that can translate relevant issues facing students to the classroom. Social network analysis (SNA) can compare teacher leader interactions with the partnership's support to determine strengths and weaknesses. Our findings revealed that support use was linked to school district dynamics, teacher preferences, and teacher awareness of supports. Results allowed the partnership to improve support offerings thereby improving STEM teaching. This presentation includes SNA graphs and interpretations.

Breakout Room 5:

A "Test-of-Concept" Study of a Learning Theory-based Model of Professional Development

Eric Banilower, AIM: K-8 Science, Strand: 2

SUMMARY: Assessing the Impact of the MSPs: K-8 Science (AIM) is working with MSPs to study the impact of different professional development strategies on teacher content knowledge and student learning. As part of this broader study, AIM is conducting a "test-of-concept" study for a learning theory-based model of professional development. We hypothesize that professional development consistent with this model will increase teacher understanding of the targeted content and provide teachers with the tools and support needed to teach science effectively (in a manner aligned with the vision of science instruction described in the framework for the Next Generation Science Standards). This session will share initial findings of the impact of this model on teacher knowledge, classroom practices, and student learning.

Noyce Master Teacher Developed K-5 Science Curriculum and Professional Development

George Nelson, NCOSP, Strand: 2

SUMMARY: Six elementary and two middle school teachers were supported by the North Cascades and Olympic Science Partnership and their school district to research and assemble a coherent K-5 science curriculum. They are also supported to design and deliver professional development and instructional support for all of their peers in the district's 14 elementary schools to promote effective science teaching as the new curriculum is implemented. As a result, in the first year the percent of fifth and second grade classrooms where science is consistently being taught increased from 18% to 68% and the school district has committed to continued funding for curriculum implementation and professional development. The support materials developed by the group are now available and being accessed and used by other districts including NCOSP partner districts, and the Noyce Master Teachers are providing advice and training to schools outside of their district.

Paper Session 2 – Summaries

Breakout Room 6:

Localizing Teacher Leadership Expertise in Appalachia

Kimberly Zeidler-Watters, Appalachian MSP, Strand: 2

SUMMARY: The Appalachian Mathematics and Science Partnership received NSF supplemental funding for the AMSP Master Teacher Project. Eighteen experienced grade 6-12 mathematics and science teachers received a three-year program of mentored professional development and support designed to develop Master Teachers in mathematics and science who demonstrate effective teaching in their own classrooms and serve as leaders in the rural Appalachian region. Findings to-date indicate: most participants have shifted their thinking about instruction, moving from a focus on teaching to a focus on learning; they still vary in their conception of teacher leadership and their views of themselves as leaders; and the teachers have developed a strong professional network, valuing and using each other as sources of information, ideas, and support.

Evolution of a Professional Development Program to Promote Effective Teaching

Michelle Borrero, Puerto Rico MSP**,** Strand: 2

SUMMARY: The Puerto Rico Math and Science Partnership defines effective teaching in STEM as the practice that generates learning with understanding. We prepare and support teachers to teach effectively through our Authentic Professional Development Program (APDP) which integrates the best teaching practices with math and science content, while performing continuous assessment to promote reflection and metacognition. Our current emphasis is on empowering teachers to train their peers and support them as leaders in their schools. Our APDP includes collaborative evaluation as a strategy that enables teachers to design, implement and evaluate APDP activities for their peers. Our preliminary results suggest that teachers are improving in content knowledge and practices; thus becoming more effective in their roles in their classroom and schools.

Breakout Room 7:

Professional Learning Communities: A Vehicle for Preparing, Supporting and Sustaining Effective STEM Teaching

Blake Decker, College Ready, Strand: 2

SUMMARY: This session describes the iterative process of implementing PLCs across the College Ready in Mathematics and Physics Partnership. PLC concepts and practices for effective implementation have been the unifying link across Partnership activities, building to the launch of PLCs during the 2011-2012 academic year. Initial findings have revealed the need for a precise definition of and expectations for PLCs in the MSP; that a knowing-doing gap exists in educational leadership; and that training for PLC facilitation is lacking. These findings have resulted in numerous changes in how the Partnership has systematized activities to support PLC implementation in partner schools. This session will include further explication of specific challenges and in-progress solutions relating to the implementation of PLCs in College Ready.

Mathematics Studio - a Greenhouse for Growing Mathematics Leadership

Thomas Dick, Oregon Mathematics Leadership Institute Partnership, Strand: 2

SUMMARY: The Mathematics Studio Classroom is a scalable and sustainable model that can transform the professional learning culture in a school. A cohort of teachers, coaches, and administrators meets to learn and rehearse "mathematically productive teaching routines" - practices that are designed to: align directly with how students learn mathematics, recur regularly in the everyday work of teaching mathematics, typically involve one or more challenging aspects of mathematics teaching, and enable mathematical access and challenge for all students. Studio work includes planning for implementation of a lesson, a "live" rehearsal of one or more of these routines, observations of the enacted plan, gathering of student data, and analysis of data as evidence about the impact of instructional decisions and lesson design.

Paper Session 2 – Summaries

Breakout Room 8:

Use of Multiple Strategies and Processes to Prepare Teachers and Faculty to Teach Effectively

Dianne DeMille, TASEL-M Phase 2, Strand: 2

SUMMARY: "Effective teaching in STEM" relies on the support of "learning" for each student by motivating and engaging them in mathematics. In order to address these varying aspects, Teachers Assisting Students to Excel in Learning Mathematics: Phase II (TASEL-M2) approach content delivery; best practices and assessment; a structure for lesson design; and strategies that support student struggles in learning mathematics. A cohesive plan that brings all teachers and faculty members together within a school or district with a common cohesive approach will increase mathematics knowledge for each student to learn at their highest potential. In addition, through the years, this process will support students in the school and district.

Building a Mathematics Coalition

Davida Fischman, Mathematical ACES, Strand: 2

SUMMARY: ACES has constructed and continues to deepen and broaden a coalition of partners who support one another in enhancing mathematics learning in grades 4-8, with the ultimate goal of having students succeed in algebra, and be well-prepared for advanced mathematics classes. The partners include teacher-teams, district administrators, county specialists, education faculty, natural science faculty, and the project evaluator. We will discuss how ACES is creating true and long-lasting partnerships which involve mutual trust and respect, and how these are influencing professional development, lesson study teams, and mathematics instruction. District and University personnel identify strengths of highly effective teachers, and ways to enhance pre and inservice teacher education. The web of collaborative relationships strengthens P-18 articulation and instruction at all levels.

Breakout Room 9:

The Poincaré Institute: Supporting Effective Teaching and Learning

Montserrat Teixidor-i-Bigas, Poincaré Institute: A Partnership for Mathematics Education, Strand: 2

SUMMARY: The Poincaré Institute provides three online courses for inservice teachers. The courses – designed and taught by mathematicians, physicists, and education researchers – focus on the real line and Cartesian plane, algebra and functions, their representation and applications. This presentation will focus on the content and structure of the lessons, on how the courses have evolved taking into account teachers' suggestions and performance, on how we evaluate the impact of the project on teacher development and student learning, and on preliminary data we have collected and analyzed so far.

Using Teacher Liaisons to Support and Promote Effective Algebra Teaching

Michelle Homp, NebraskaMATH, Strand: 2

SUMMARY: NebraskaMATH is a 5-year Targeted Math Science Partnership Project, whose goal is to improve achievement in mathematics for all students and to narrow achievement gaps of at-risk populations. Nebraska Algebra is the component of NebraskaMATH which targets Algebra 1 teachers, in order to support these teachers in becoming more effective Algebra 1 teachers. Participants take three graduate courses focused on increasing their knowledge of algebra, adolescents/motivation, and pedagogy; we believe these areas are crucial to helping teachers teach algebra more effectively. During the academic year, participants are provided with teacher liaisons, to help support them in improving their algebra instruction, and thus increase student achievement in algebra.

Paper Session 2 – Summaries

Breakout Room 10:

Creating Coherence: Working with University Faculty and School Administrators to Support Effective High School Science Teaching

Kristin Bass, Project MAST, Strand: 2

SUMMARY: Effective post-secondary STEM teaching relates the material being taught with teachers' prior knowledge and experiences, and helps them apply what they're learning to their classroom context. The Mississippi Academy for Science Teaching's (Project MAST) staff and external evaluators closely monitor the alignment of university professional development with K-12 policies and practices through observations, instructor interviews, teacher surveys and school site visits. This session describes Project MAST's efforts to support STEM instruction by improving the teaching done by STEM faculty, adjusting the content of the professional development, and educating school administrators about the ways in which they can best support their teachers. This session shares our evidence-based reflective process and the lessons learned along the way.

Supporting Freshman Physics Teachers

Deborah Hanuscin, A TIME for Physics First in Missouri, Strand: 2

SUMMARY: Our project, currently in its third year, seeks to increase both the teaching effectiveness and leadership capacity of ninth grade physics teachers. Our professional development program, which consists of three summers of content-rich academies (10 weeks) and three academic years of online leadership courses, provides opportunities for teachers to strengthen their content knowledge, develop their use of modeling pedagogy, and expand their knowledge and skills for serving as leaders and catalysts for changes within their schools and districts. Through implementation of two different models, one that utilizes coaching (face to face classroom support) and one that utilizes mentoring (online support), we hope to understand how teachers can best be supported in enhancing their teaching effectiveness and impacting student learning.

Breakout Room 11:

Common Core Mathematical Practices Are Good Instructional Practices

Amy Cohen, NJ Partnership for Excellence in Middle School Mathematics, Strand: 2

SUMMARY: This presentation describes the structure of an MSP Institute for mid-career middle school math teachers intended to deepen their understanding of the mathematics of the middle grades and of some key aspects of mathematical pedagogy. The mathematical practices called for in CCSSM are implicit in our basic definition of effective teaching and learning. We make explicit reference to these "core practices" in this presentation.

Mathematical Knowledge for Teaching as a Critical Element of Preservice Teacher Preparation

DeAnn Huinker, Milwaukee MSP, Strand: 2

SUMMARY: An important element of preservice teacher preparation is developing a deep knowledge of mathematics content that is relevant to teaching. However, not all preservice teachers elect the same math coursework which leads to variations in content knowledge upon program completion. Our MSP developed four content courses for preservice elementary (Grades 1-8) teachers electing a mathematics minor. It stands to reason that these individuals would demonstrate stronger mathematics content knowledge at the conclusion of their preparation program. To answer this question, we compare the results of preservice teachers with mathematics minors to non-mathematics minors on measures of mathematical knowledge for teaching (MKT) completed at the beginning and end of their programs.

Paper Session 2 – Summaries

Breakout Room 12:

Reconceiving "Misconceptions" in Teacher Professional Development

Ayush Gupta, Minority Student Pipeline MSP, Strand: 2

SUMMARY: When science teachers engage in inquiry as part of professional development, facilitators often nudge them away from common misconceptions as quickly as possible, in order to help the teachers engage in more productive ways of thinking about the targeted concept. We argue that confronting certain misconceptions too soon can sometimes (often?) cut off productive lines of inquiry. To make this case, we present data from an inquiry workshop where a group of elementary school science teachers started from a common misconception, viewing forces as analogous to a substance carried by an object. Building on this metaphor, however, they construct a sophisticated Galilean explanation for why objects of different masses accelerate at the same rate due to gravity.

The RITE Way to STEM Assessment

Dan Murray, RITES, Strand: 3

SUMMARY: Effective STEM teaching is manifested in gains in content knowledge, increased use of technology, and a shift towards more discovery-based teaching. Assessment of progress towards these goals employs a variety of instruments that capture gains in content and shifts towards more discovery-based modes of teaching. This assessment of effective teaching begins in summer workshops, and continues with examination of teaching practices in the classroom throughout the following academic year. Beyond the workshops, we monitor the increased involvement of teachers in other STEM initiatives, changes in their attitudes towards science and inquiry-based methodologies, and measures of student success. Results from all of these measures of progress will be presented, along with a consideration of which instruments best predict effective teaching.

Breakout Room 13:

Attention to Teaching for Science Education Fellows

Pamela Pelletier, Boston Science Partnership, Strand: 2

SUMMARY: The Boston Public Schools' Science Department defines teacher leadership as leadership in schools, the district or beyond that stems from excellent and recognized classroom practice with children and work with peers. To increase the number of teacher leaders and deepen their leadership skills, the Boston Science Partnership has supported a year-long fellowship for K-12 teachers of any science subject. This session will share the program design and components of the fellowship, such as the use of video, collaborative lesson study and personal plans which form the basis of the year-long fellowship. These components have led teachers to elevate the quality of their own classroom practices. The district has benefited by being able to focus the attention of teachers – both Fellows and their colleagues – on the importance and excitement of classroom instruction. Lessons learned provide direction for future efforts that aim to improve classroom practice for the teaching of science.

Effective STEM Professional Learning Communities - Learning from the Field

Joan Pasley, Knowledge Management and Dissemination**,** Strand: 2

SUMMARY: The Math and Science Partnership Knowledge Management and Dissemination project (MSP KMD) is charged with situating what the MSPs are learning in the broader knowledge base. One area of inquiry we have pursued involves STEM professional learning communities, an approach for improving mathematics/science teaching and learning that is included in a number of MSP projects. The MSP KMD project has collected and synthesized recent MSP research as well as the insights of experienced practitioners utilizing STEM PLCs as a key mechanism for enhancing teaching and impacting student success in mathematics and science. This session will address what we know from research and engage participants with the key practice-based insights of MSP leaders and other experienced practitioners on designing STEM PLCs.

Paper Session 2 – Summaries

Breakout Room 14:

Affecting and Documenting Shifts in Secondary Precalculus Teachers' Instructional Effectiveness and Students' Learning

Marilyn Carlson, Project Pathways: A Math and Science Partnership Program for Arizona Targeted Project Track-Education, Strand: 3

SUMMARY: The Pathways Precalculus Professional Development Model (PPDM) that includes focused workshops for teachers, in-class activities with detailed teacher notes, online videos and dynamic applets will be shared. Its design was based on lessons learned from Phase I research activities and findings. The PPDM student assessment data from over 30 Pathways precalculus classes revealed large gains in student understandings and ability to use the central ideas of precalculus. Analysis of data also revealed that improvement in teachers' content knowledge alone did not result in gains in student learning. However, when teachers were provided a research designed, conceptually oriented curriculum, with focused workshops and instructional resources to support their implementation, large gains in student learning and teacher effectiveness were achieved.

Assessing Mathematical Habits of Mind for Teaching

Sarah Sword, Focus on Mathematics, Phase II: Learning Cultures for High Student Achievement, Strand: 3

SUMMARY: Focus on Mathematics is a targeted MSP funded by the National Science Foundation since 2003. As part of this work, we are developing a research program with the goal of understanding the connections between secondary teachers' mathematical habits of mind (MHoM) and students' mathematical understanding and achievement. We are developing tools to study the question: What are the MHoM that high school teachers use in their professional lives and how can we measure them? In this session, we will share our working definition of effective teaching and describe how that definition is shaping the development of an assessment to measure MHoM.

Breakout Room 15:

How Do You Know if Your Project Is Resulting in Effective STEM Teaching?

Karin Wiburg, Mathematically Connected Communities - Leadership Institute for Teachers, Strand: 3

SUMMARY: The MC2-LIFT project has a strong research component which provides frequent feedback to the staff and participants in relation to meeting its purpose of developing mathematics teacher leaders. Researchers have been able to measure progress towards our definition of effective STEM teaching. The research team is also able to share findings with our institute development team and school support team who can use the data in developing revised content and modifying school support. This presentation will share our research design, research questions, methodology and instrumentation as well as current findings. So far findings indicate that it is possible for teachers with significant support to make positive changes in as little as one year in the quality of their mathematics teaching.

Developing Effective Math Teaching: Assessing Content Knowledge, Pedagogical Knowledge, and Student Success

Roger Peach, Math Teacher Transformation Institute, Strand: 3

SUMMARY: The Mathematics Teacher Transformation Institutes (MTTI) program attempts to develop math teacher leaders in part by providing content, inquiry and leadership courses aimed at making them more effective teachers. We assessed progress by observing their teaching practices, and encouraging them to introduce or extend inquiry-based pedagogy in their classrooms. We found there was little relationship between our measures of math content knowledge and effective teaching. But teachers who employed student-centered, inquiry-based pedagogy tended to be more effective as math teachers, at least if effectiveness is assessed by the extent to which their students were engaged in the lesson. We also found that we needed to broaden our concept of student success from the time we submitted our proposal.