Session Title:
Coordinating Research & Practice: New Models for Engaging Teachers with the Research-Base Related to STEM Practices

MSP Project Names:
A Research + Practice Collaboratory
Math ACES

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Collaborative Session

Strand 3

Summary:
How can engagement with research support classroom adoption of Common Core Math and Next Generation Science Standards? In this session we review three professional development approaches to engaging teachers with research related to *STEM Practices,* as espoused by the new standards. We highlight models that support classroom mathematics, classroom science, and informal science engineering instruction; stressing in particular how the plans and processes for engaging educators with research morphed over time, as questions, experiences and knowledge from practice encountered concepts and findings from research. This session will engage participants in dialogue about the reflexive relationship between research and practice in STEM educational improvement efforts, specifically focused on "the practice turn" that is being suggested for implementation of the new standards.

Section 1: Questions framing the session:
STEM Practices
Relationship of research and practice
Teacher/Educator professional development

Section 2: Conceptual framework:
The R+P Collaboratory adopts a sociocultural framework in its work to develop new models of the relationship of research and practice. The Collaboratory works with a design-based implementation research (DBIR) approach organized around the following four principles: (1) focusing on persistent problems of practice that integrate multiple stakeholder perspectives; (2) conducting collaborative, iterative design-based activities; (3) designing for disciplined adaptation and testing of findings—in instructional tools and

practices—that can both support practice and build theory; and (4) building capacity for sustaining change.

ACES engages in developing and integrating practical and scholarly knowledge through a network of Communities of Practice (CoP) involving teachers, teacher leaders, district personnel, mathematicians, and mathematics educators. These CoPs implement research-based theories of action, modify them in response to needs of classroom practice, and conduct classroom-based research at a variety of levels. *ACES* research is conducted within the context of the Common Core State Standards for Mathematical Practice and aims to develop a deep understanding of the practices as well as an understanding of effective ways to integrate these practices into all aspects of education: classroom practice, teacher collaboration, and professional development.

Both projects seek to build knowledge and theory that is grounded in practice and therefore promotes and sustains change in practice.

Section 3: Explanatory framework:
This session will share efforts to engage educators with findings from research. We will describe how efforts to engage educators with researchers and research findings began, partially stalled in response to local needs and constraints on the ground, and morphed over time into productive engagements and mutually-beneficial partnerships. The purpose of the session is to raise the question of how the relationship between researchers and practitioners can be strengthened, and to invite participating MSP projects identify their own local and current barriers to creating a strong and productive coordination of research findings with classroom practices in their specific improvement efforts.

Section 4: Discussion:
We lack implementation research on improvement efforts that productively bridge the historic gulf between educational practice and research. Supporting consideration of the questions, methods, and contexts for the processes of both educational research and practice can help to build more viable approaches to the design, conduct, and implementation of research into educational practices, and contribute to expanded STEM learning opportunities for children.

Section 5: How will you structure this session? What is your plan for participant interaction?
We will frame the discussion by introducing the cultural engagement model from translational research in the health sciences. This 5-minute overview will highlight the potential benefits to the PK-12 STEM field for exploring new models of the relationship of research and practice. To illustrate the model more concretely, we will share three different approaches to the integration of research into professional development for educators. Each of these models will be presented in 10 minutes. We will have 10 minutes for whole group clarification questions. In the remaining 45 minutes of the 90 minute session we will ask participants to work at their tables to identify: (1) the key findings from research that address the core issues their MSPs are addressing especially as they relate to STEM practices, (2) the key obstacles or possibilities in practice that

correspond to the adaptation of research findings about STEM practices into classroom practice, and (3) the key questions in practice that relate to barriers, constraints or opportunities. We will reserve 10 minutes for a discussion of key issues (not details) that came up for people with respect for the need for new cultural models of the relationship of research and practice.