

# A Place-based District-Research Partnership to Promote Improvement at Scale in the Use of Classroom Assessment in Science

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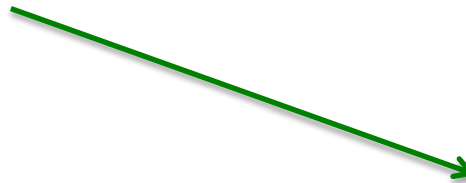
# District-Research Partnerships





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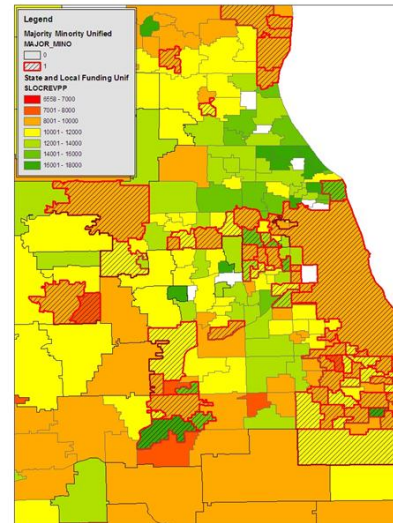
Focus on **designing and testing interventions** to improve teaching and learning district-wide



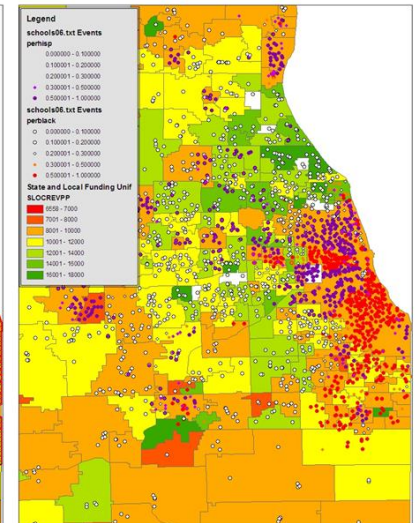
# Why Place?



Illinois State & Local Revenue & Majority Minority Districts



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# Why Place?

*Crafting coherence* is “a process of negotiation whereby school leaders and central office administrators continually craft the fit between external policy demands and schools’ own goals and strategies and use external demands strategically to inform and enable implementation of those goals and strategies.”

Honig, M. I., & Hatch, T. C. (2004). Crafting coherence: How schools strategically manage multiple, external demands. *Educational Researcher*, 33(8), 16-30.

# Design-based Implementation Research

- A focus on persistent problems of practice from multiple stakeholders' perspectives
- A commitment to iterative, collaborative design
- A concern with developing theory related to both classroom learning and implementation through systematic inquiry
- A concern with developing capacity for sustaining change in systems

# DBIR Workshop



# Example: Contingent Pedagogies

DBIR Element	Contingent Pedagogies Project
<b>A focus on persistent problems of practice from multiple stakeholders' perspectives</b>	Enactment of formative assessment to support learning from inquiry-based science curriculum
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# Why Formative Assessment?



# Why Formative Assessment?

- Research on formative assessment suggests we can expect *dramatic improvements* in student learning if:
  - Teachers pose questions that require deep thinking
  - Students have sufficient time to think and respond to teachers' questions and to pose their own questions
  - Students get feedback on how to improve
  - Students get to revise their own thinking through discussion with others
  - Teachers adjust instruction on the basis of what they learn about student thinking



# Challenges Are Everywhere

Requirement	Challenges
Posing questions that require deep thinking	Developing questions that ask students to “know that” and “know how” is easier than developing questions that ask students to “know why” and to “know when and where to apply knowledge”
Giving students time to think and pose questions	There are few built-in supports for wait-time; slowing down instruction can create opportunities for distraction
Providing students with feedback	In the middle of class, teachers can only give feedback to those students who respond orally to questions
Engaging students in discussing their ideas	The default pattern of communication – ask a question, get an answer, evaluate it – doesn’t encourage revision or debate
Adjusting instruction	There may be few other ways to teach the content, other than what the curriculum provides

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DBIR Element	Contingent Pedagogies Project
A focus on persistent problems of practice from multiple stakeholders' perspectives	Enactment of formative assessment to support learning from inquiry-based science curriculum
<b>A commitment to iterative, collaborative design</b>	Co-design with teachers in two distinct phases; Iteration informed by “soft” evidence of implementation
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# Changing Roles of Partners



Researchers and District Staff Refine Goals

Researchers learn about current practice and school contexts

**RAPID ETHNOGRAPHY**



Researchers, Curriculum Developers, Assessment Specialists, Teachers Design Activities

Teachers test; researchers study and iterate

**CODESIGN PHASE**



Codesign teacher takes on role of coach to support implementation among 13 teachers

Researchers conduct quasi-experimental study

**FIELD TEST**

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<b>A concern with developing theory related to both classroom learning and implementation through systematic inquiry</b>	What tools and practices support teachers in interpreting and making use of assessment data they collect? How can tools help teachers orchestrate students' engagement with and revision of their own and others' ideas?
A concern with developing capacity for sustaining change in systems	

# Suite of Tools Approach

Requirement	Contingent Pedagogies Tools
Posing questions that require deep thinking	<i>Elicitation and Reflect and Revise</i> questions for each investigation
Giving students time to think	<i>Clicker Technology</i> : require time for response <i>Spark Discussion Questions</i> : Students to prepare an explanation for their answer
Providing students with feedback	<i>Clicker Technology</i> : Anonymous display for all to see
Engaging students in discussing their ideas	<i>Classroom Norms</i> to encourage students to contribute, listen, and revise ideas <i>Discussion Moves</i> to elicit questions, probe thinking, and encourage students to take responsibility for learning
Adjusting instruction	<i>Decision Rules</i> to guide adjustments <i>Contingent Activities</i> when many students still hold problematic ideas

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<b>A concern with developing capacity for sustaining change in systems</b>	Ongoing joint grant development: Expansion of Curriculum Customization Service



# Contributions to Theory



## Fostering Teachers' Use of Talk Moves to Promote Productive Participation in Scientific Practices

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**Abstract:** This paper explores variation in how teachers use a set of *talk moves* intended to help students engage productively in science discourse. Participants in the study were 20 middle school Earth science teachers from a large, diverse urban school district and their students. Thirteen of the teachers implemented tools intended to help students orient to other students' contributions in class, particularly their reasoning about weathering and erosion and about plate tectonics. In this analysis of videotaped lessons from teachers, we present examples of tool use that are generative of student talk, particularly scientific explanation, as well as examples of less generative uses of the tools. We analyze how each type of use fit within a larger trajectory of discussion, in order to inform refinements to the design of the talk moves as tools and to the design of professional development.

### Introduction

Strengthening students' competency with scientific practices related to specific science content is a key goal of the framework for the next generation of science standards in the United States (National Research Council, 2011). A key premise of the framework is that by engaging in the practices of science and engineering, students can gain a direct experience of how science knowledge develops. Further, by engaging in practices to develop understanding of the big ideas of science, students can gain an appreciation of the diversity of social practices

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- Infrastructures for collaboration (Work to build a DBIR network)
- Studying DBIR process

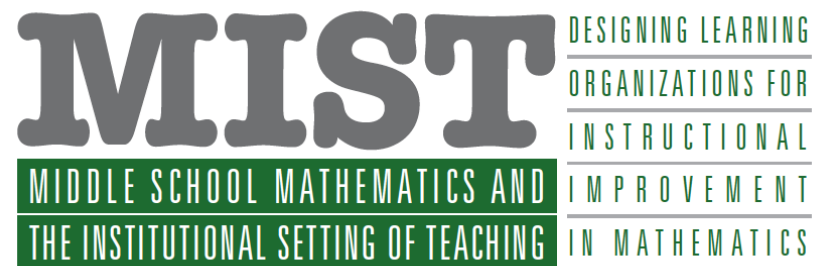
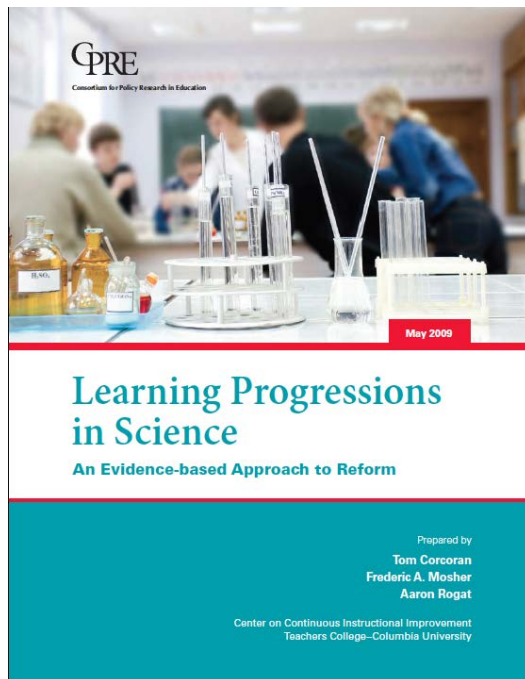


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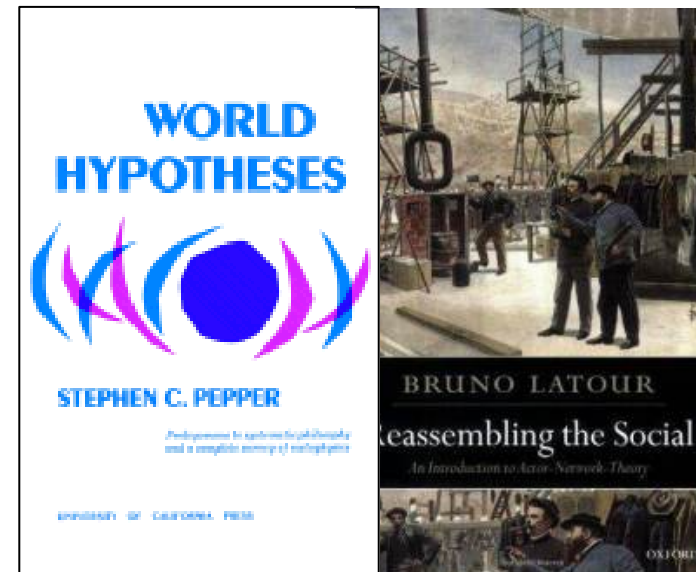
# One More Challenge

- Developing an actionable theory of change
  - Need for more linkages among learning sciences and policy research



# One More Challenge

- Developing an actionable theory of change
  - Root metaphors (Pepper, 1942) matter in developing theory
  - Both the container and network metaphors can do some work for us



# *NSSE* Volume: Hubs of Expertise

- Cross-setting interventions
- Theory and methods of participatory design
- Evidence standards for DBIR
- Infrastructure