Educational Partnerships involving UW-Madison

A Cautionary Tale

SCLAE-NSF Comprehensive MSP
Terry Millar, PI and Project Director
Professor of Mathematics UW-Madison
University of Nebraska
Presentation

October 22, 2011
By the old system the learner was presented with a rule, which told him how to perform certain operations on figures, and when they were done he would have a proper result. But no reason was given for a single step . . .

And when [the learner] had gone through and obtained the result, he understood neither what it was nor the use of it.

Neither did he know that it was the proper result, but was obliged to rely wholly on the book, or more frequently the teacher.

As he began in the dark, so he continued; and the results of his calculation seemed to be obtained by some magical operation rather than by the inductions of reason.

Walter Colburn (paper presented at the Assistant Masters Society, 1830), p 233.
Relevant Pre-SCALE Activities at UW-Madison

**SCALE: System-wide Change for All Learners and Educators**

$35M$ MSP Comprehensive Partnership

**University science in K-12**

- **Fast Plants**
- **NSF Institute for Chemistry Education**
- **Bottle Biology**
- **NSF Materials Research, Science, Engineering Center**
- **NSF National Institute for Science Education**
- **NSF GK-12 K-Through-Infinity Partnership**
- **Interdisciplinary Partnerships**
- **Inter-organizational Design Team**

**Timeline:**
- 1987
- 1993
- 1999
- 2003
Example of KTI Math Team

The Quilting Unit was initially developed at the Education Development Center (EDC) through Technology Enhanced Learning of Geometry (TELG), directed by Dan Watt

Rich Lehrer was the Principal Investigator of TELG at the UW-Madison, he worked with Millar and James Hamblin, at the time a graduate student in mathematics at the UW, to develop and implement the Quilting Unit.

Matt Felton, then an undergraduate and now a professor at University of Arizona, carried the work forward into SCALE and advanced it considerably.
Approach

• The Quilting Unit was taught using the principals of Cognitively Guided Instruction (CGI)
• Students explored and discussed their ideas, with the teacher as ‘guide on the side’
• Developed units for 2nd, 4-5th and 12th grades
• Teacher Professional Development units
Core Square

• Students were introduced to the Core Square as the basic unit of quilting. Here are some examples of Core Squares:
**Multiplication Table**

All rotations are clockwise.
- **UD** = Up-Down flip
- **LR** = Left-Right flip
- **TL** = Top-Left Diagonal flip
- **TR** = Top-Right Diagonal flip

<table>
<thead>
<tr>
<th>First</th>
<th>90</th>
<th>180</th>
<th>270</th>
<th>360</th>
<th>UD</th>
<th>LR</th>
<th>TL</th>
<th>TR</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>180</td>
<td>270</td>
<td>360</td>
<td>90</td>
<td>TR</td>
<td>TL</td>
<td>UD</td>
<td>LR</td>
</tr>
<tr>
<td>180</td>
<td>270</td>
<td>360</td>
<td>90</td>
<td>180</td>
<td>LR</td>
<td>UD</td>
<td>TR</td>
<td>TL</td>
</tr>
<tr>
<td>270</td>
<td>360</td>
<td>90</td>
<td>180</td>
<td>270</td>
<td>TR</td>
<td>TL</td>
<td>LR</td>
<td>UD</td>
</tr>
<tr>
<td>360</td>
<td>90</td>
<td>180</td>
<td>270</td>
<td>360</td>
<td>UD</td>
<td>LR</td>
<td>TL</td>
<td>TR</td>
</tr>
<tr>
<td>UD</td>
<td>TL</td>
<td>LR</td>
<td>TR</td>
<td>UD</td>
<td>360</td>
<td>180</td>
<td>90</td>
<td>270</td>
</tr>
<tr>
<td>LR</td>
<td>TR</td>
<td>UD</td>
<td>TL</td>
<td>LR</td>
<td>180</td>
<td>360</td>
<td>270</td>
<td>90</td>
</tr>
<tr>
<td>TL</td>
<td>LR</td>
<td>TR</td>
<td>UD</td>
<td>TL</td>
<td>270</td>
<td>90</td>
<td>360</td>
<td>180</td>
</tr>
<tr>
<td>TR</td>
<td>UD</td>
<td>TL</td>
<td>LR</td>
<td>TR</td>
<td>90</td>
<td>270</td>
<td>180</td>
<td>360</td>
</tr>
</tbody>
</table>
Quilting, Symmetry and Algebra

A Guide for Teachers in the Classroom

Mathew Felton
Jennifer Yttri

Grades: Modules designed for: 2, 4/5, and HS
Skills and Concepts: Geometric Transformations
Transformational Symmetry
Mathematical and Geometric vocabulary
Spatial Reasoning
Equivalence
Algebraic reasoning
The NSF Gamble
The SCALE Challenge
What strategy did we employ?

Colleges of math, science and engineering

School Districts

Colleges of education + social science

Populate the intersections with promising new practices using “cross-cultural” working teams
SCALE Research and Evaluation

Range of focus

- Partnership
- District/University
- Sub-district/College
- School/Dept
- Classroom/Institute
- Instructor
- Student

Research Methodology

- Quantitative
- Qualitative

Targeted studies

Case studies

Partnership studies

Indicators
Goal Perspective: Research and Evaluation (5)

Research & Eval Team (RET) leader

- Besterfield-Sacre $ UPitt
- Schunn $ UPitt
- Mehali $ UPitt
- Doppelt $
- Moin $
- Larpkia-taworn $ Nichols $
- Dillen-berg $
- Silk $
- Dorfield $
- Webb
- Harper $

Targeted Studies (Goals 2, 3, 4) (U Pitt)
- Pittsburgh Public Schools

Research & Evaluation Team
- Porter $ Vanderbilt Goal 5 Leader
- North $ UW
- Thorn $ Webb $
- S. Millar $ Clune $
- Yr 1 Think Tank Design

RET Technology Dev’t Group – SCALEnet, Website, Database (WCER)
- Berger Glover $
- Kane $
- Dillenberg $
- King $
- Clifford $

RET Targeted Studies Goals 1, 2 (WCER)
- LAUSD
  - Cantrell - Prog Eval
  - Ullah - Science
  - Vheru - Math
- MMSD
  - Wachtel - Science
  - Ramberg - Math
  - Keifer - Prog Eval
- DPS
  - Walters - Science
  - Koester - Math
  - Eckerling - Prog Eval

De facto Goal 5 Leadership Group
- Schunn $ UPitt
- Cantrell LAUSD

RET District Case Studies (WCER)
- De facto
- Goal 5
- Resource Production & Delivery

Targeted Studies (Goal 4) (U Pitt)
- Schunn $ UPitt
- Besterfield-Sacre $ UPitt
- Larpkia-taworn $ Nichols $
A Guide to Building Education Partnerships
Navigating Diverse Cultural Contexts to Turn Challenge into Promise
MATTHEW T. HORA AND SUSAN B. MILLAR
Foreword by JUDITH A. RAMALEY

“This book presents the key challenges in building successful partnerships, with practical examples that show how the real work is done. It is a must read for leaders interested in building the next generation of schools.” —RICHARD HALVERSON, Associate Professor, Department of Educational Leadership and Policy Analysis, University of Wisconsin-Madison

“The authors have produced a very pragmatic and practical book that should be valuable to those in K-12 and higher education considering entering into new partnerships for school improvement.” —ANDY PORTER, Dean, Graduate School of Education, and George and Diane Weiss Professor of Education, University of Pennsylvania

“Most importantly, this work recognizes that every partnership will be unique. Rather than a ‘how-to’ cookbook approach, they provide practitioners a sound set of principles to help design, implement, evaluate, and refine partnerships across fundamentally different organizational cultures. This book is an essential tool for creating successful partnerships across multiple educational organizations.” —ART RAINWATER, Clinical Professor, Educational Leadership and Policy Analysis, University of Wisconsin-Madison, Retired Superintendent, Madison Metropolitan School District
Research Questions

(1) What are the component parts of partnerships at different points in time?

(2) How do these factors interact to result in outcomes in particular contexts?
The Study

• **The UDEP Partnership**: Improving math and science instruction in large, urban K-12 districts
• **Design**: Embedded case study
• **Sample**: 50 faculty, teachers, administrators and program staff
• **Data collection**: Semi-structured interviews; meeting observations
• **Data analysis**: Structured approach to grounded theory; causal network analysis
Advice on forming a historic Partnership

“We must all hang together, or assuredly we shall all hang separately"

Benjamin Franklin
Cultural dynamics in education partnerships

Matthew Tadashi Hora
Wisconsin Center for Education Research
University of Wisconsin-Madison
Current Views of Education Partnership

The Black Box of Partnership Operations

INPUTS
Personnel, funding, goals

CULTURE
What precisely is it?
How is it measured?
How does it influence partnership outcomes?

The Urban District Education Partnership (UDEP)

OUTCOMES
Student learning, new curricula
A view of cultural dynamics in organizations and partnerships

Affinity Group (e.g., Chemistry faculty)
Peering inside the black box of partnership

Science teachers from Mayfair Middle School

Chemistry and Biology faculty from Mayfair University

The 3rd Space of Partnerships
## Component Parts of a Partnership

<table>
<thead>
<tr>
<th>Antecedents</th>
<th>Process</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structural</strong></td>
<td><strong>Structure</strong></td>
<td><strong>Structure</strong></td>
</tr>
<tr>
<td>Policies</td>
<td>Communications systems</td>
<td>New policies</td>
</tr>
<tr>
<td>Org hierarchy</td>
<td>Resources</td>
<td>New artifacts (e.g., curricula)</td>
</tr>
<tr>
<td><strong>Relationships</strong></td>
<td><strong>Relationships</strong></td>
<td><strong>Relationships</strong></td>
</tr>
<tr>
<td>Personal relationships</td>
<td>Power dynamics</td>
<td>New relationships</td>
</tr>
<tr>
<td></td>
<td>Tone and respect</td>
<td>Estranged relationships</td>
</tr>
<tr>
<td><strong>Socio-cultural Factors</strong></td>
<td><strong>Socio-cultural Factors</strong></td>
<td><strong>Socio-cultural Factors</strong></td>
</tr>
<tr>
<td>Cultural models</td>
<td>Cultural models</td>
<td>Cultural models</td>
</tr>
<tr>
<td>Organizational norms</td>
<td>Organizational norms</td>
<td>Organizational norms</td>
</tr>
<tr>
<td>Teaching tasks</td>
<td>Leadership</td>
<td>Teaching tasks</td>
</tr>
<tr>
<td>Administration</td>
<td>Administration</td>
<td>Degree of collaboration</td>
</tr>
<tr>
<td><strong>Individual Experiences</strong></td>
<td><strong>Individual Experiences</strong></td>
<td><strong>Individual Experiences</strong></td>
</tr>
<tr>
<td>Beliefs and values</td>
<td>View of partnership work</td>
<td>Beliefs and values</td>
</tr>
<tr>
<td>Motivations</td>
<td>View of problem/tasks</td>
<td>Views of problem/tasks</td>
</tr>
</tbody>
</table>
Causal fragment: Larry’s account of Math PD Group

**Antecedent**
- Pre-Partnership
- **Relationship**
  Previous negative experience w/outside PD providers
- **Cultural Models**
  Theory of action in org is to avoid projectitis
- **Individual Experience**
  Ed reform requires teacher input

**Process**
- Years 1-2
- **Structure**
  Meetings are ineffective reporting sessions; too much email
- **Cultural Models**
  Each partner org has different ideas and messages
- **Routines/Practices**
  During planning phase no thorough discussion of ToA compatibility

**Outcome**
- Year 3
- **Relationships**
  Organizations are not working together to forge a common vision
- **Relationships**
  Groups cannot communicate effectively; eventually stop working together
Relevant Pre-QED SCALE Immersion History with LAUSD/CSUDH

- **SCALE Proposal**
- **2002**
- **First Immersion Meeting - Madison**
- **2003**
- **Early Immersion LAUSD PD**
- **2004**
- **Immersion/IFL Interface created**
- **QED Proposal**
- **QED Start**
- **2005**
- **Science Immersion Concept Paper**
- **Partial Immersion/DL Integration started**
- **Early Immersion/Instructional Guide co-construction**

Immersion Team LAUSD Science Leadership meetings
Phase 1 – Immersion unit design for Instructional Guides
Phase 2 – Immersion unit design for Instructional Guides + QED
   Phase 3 – Immersion unit Instructional Guides field-testing
Phase 4 – Immersion unit Instructional Guides rollout
## SCALE Immersion Unit Development Workflow Teams

<table>
<thead>
<tr>
<th>Immersion Unit</th>
<th>SCALE</th>
<th>LAUSD</th>
<th>UW-Madison</th>
<th>CSUDH/CSUN</th>
<th>IFL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grade 5</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Science</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weather</td>
<td>Jen Folsom-$</td>
<td>Henry Ortiz-$#</td>
<td>Steve Ackermann-$@</td>
<td></td>
<td>Bill Tarr-$@</td>
</tr>
<tr>
<td></td>
<td>Kevin Niemi-$</td>
<td></td>
<td></td>
<td>Margaret Mooney-$@</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hedi Baxter-$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dan Lauffer-$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grade 6</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Science</td>
<td>Ellen Friedman-$</td>
<td>Don Kawano-$#</td>
<td></td>
<td>John Keyantash-$*</td>
<td>Bill Tarr-$@</td>
</tr>
<tr>
<td></td>
<td>Hedi Baxter-$</td>
<td>Dan McDonnell-$#</td>
<td></td>
<td>Hedi Moscovici-$*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dan Lauffer-$</td>
<td>Dave Hicks-$#</td>
<td></td>
<td>Gerry Similia-$*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Gilberto Samuel-$#</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plate Tectonics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hedi Baxter-$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dan Lauffer-$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grade 7</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life Science</td>
<td>Dan Lauffer-$</td>
<td>Don Kawano-$#</td>
<td>Paul Williams-$@</td>
<td>Irene O.-$*</td>
<td>Bill Tarr-$@</td>
</tr>
<tr>
<td></td>
<td>Hedi Baxter-$</td>
<td>Dan McDonnell-$#</td>
<td>Jim Stewart-$@</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>MiRobin Webster-$</td>
<td>Robin Hall-$#</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eva Bear-$#</td>
<td></td>
<td>Univ. of Pittsburgh – Mike Ford-$@</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Review and Feedback</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kim Kelly-$#</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grade 8</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Science</td>
<td>Ellen Friedman-$</td>
<td>Don Kawano-$#</td>
<td>Jim Hill-$*</td>
<td></td>
<td>Bill Tarr-$@</td>
</tr>
<tr>
<td></td>
<td>Hedi Baxter-$</td>
<td>Dan McDonnell-$#</td>
<td></td>
<td>John Keyantash-$*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dan Lauffer-$</td>
<td>Tom Yee-$#</td>
<td></td>
<td>Hedi Moscovici-$*</td>
<td></td>
</tr>
<tr>
<td>Density and Buoyancy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## SCALE Immersion Unit Review and Feedback Teams

<table>
<thead>
<tr>
<th>Immersion Unit</th>
<th>SCALE</th>
<th>LAUSD</th>
<th>CSUDH/CSUN</th>
<th>IFL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grade 4</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life Science</td>
<td>Megan Chrysler-($)</td>
<td>Ann Carnes-($)</td>
<td></td>
<td>Bill Tarr-($)@</td>
</tr>
<tr>
<td>“Rot it Right”</td>
<td>Amy Becker-($)</td>
<td>Kim Kelly-($)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hedi Baxter-($)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dan Lauffer-($)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grade 5</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Science</td>
<td>Jen Folsom-($)</td>
<td></td>
<td></td>
<td>Bill Tarr-($)@</td>
</tr>
<tr>
<td>Weather</td>
<td>Kevin Niemi-($)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hedi Baxter-($)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dan Lauffer-($)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grade 6</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth Science</td>
<td>Ellen Friedman-($)*</td>
<td>Todd Ullah-($)#</td>
<td>John Keyantash-($)*</td>
<td>Bill Tarr-($)@</td>
</tr>
<tr>
<td>Plate Tectonics</td>
<td>Hedi Baxter-($)</td>
<td>Dan McDonnell-($)#</td>
<td>Hedi Moscovici-($)*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dan Lauffer-($)</td>
<td></td>
<td>Gerry Similia-($)*</td>
<td></td>
</tr>
<tr>
<td><strong>Grade 7</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life Science</td>
<td>Dan Lauffer-($)</td>
<td>Todd Ullah-($)#</td>
<td>Irene O.-($)*</td>
<td>Bill Tarr-($)@</td>
</tr>
<tr>
<td>Variation</td>
<td>Hedi Baxter-($)</td>
<td>Don Kawano-($)#</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dan McDonnell-($)#</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitoring and Feedback</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Steve Cantrell-($)#</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kim Kelly-($)#</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grade 8</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Science</td>
<td>Ellen Friedman-($)*</td>
<td>LAUSD</td>
<td>Jim Hill-($)*</td>
<td>Bill Tarr-($)@</td>
</tr>
<tr>
<td>Density and Buoyancy</td>
<td>Hedi Baxter-($)</td>
<td>Todd Ullah -($)#</td>
<td>John Keyantash-($)*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dan Lauffer-($)</td>
<td>Don Kawano-($)#</td>
<td>Hedi Moscovici-($)*</td>
<td></td>
</tr>
</tbody>
</table>
How partnership components lead to particular outcomes
The role of trust in group operations

<table>
<thead>
<tr>
<th>Causal Network Theme</th>
<th>Antecedent</th>
<th>Process</th>
<th>Process</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mark: Ed faculty</strong></td>
<td>Relationship History of HE/K12 mistrust</td>
<td>Practices Tasks were meaningful and productive</td>
<td>Relationship Collaborative production led to trust</td>
<td>Structural Group produced high-quality Science PD</td>
</tr>
<tr>
<td><strong>Janice: K12 teacher</strong></td>
<td>Relationship Did not know anyone in the working group</td>
<td>Structure Leaders created safe atmosphere for K12/disagreement</td>
<td>Relationship High trust developed over time; new team continued</td>
<td></td>
</tr>
<tr>
<td><strong>Fred: Geology faculty</strong></td>
<td>Practices Knew nothing about K12 classrooms or teachers</td>
<td>Practices Leaders built a common language and framework for all participants</td>
<td>Relationship People were able to disagree b/c of trust</td>
<td>Structural Group produced good PD that reflected HE/K12 expertise</td>
</tr>
</tbody>
</table>
A flexible diagnostic approach to designing and managing education partnerships

Part I: Getting ready for partnership
1. Convening a pre-partnership planning group
2. Sizing up organizational attributes
3. Identifying cultural dynamics
4. Crossing organizational and cultural boundaries

Part II: Designing Partnership
5. Types of organizational structures
6. Administration and leadership
7. Developing effective communications and interactions

Part III: Implementing Partnership
8. Designing the work
9. Developing and managing working groups
10. The key role of trust and managing conflict

Forming ➔ Storming ➔ Norming & Performing ➔ Adjourning

Repeat when new groups formed, conflicts and disruptions are encountered, etc.

Bruce Tuckman
Identifying specific mechanisms of partnership operations provides a diagnostic framework for practitioners.

Component parts of a partnership interact in a complex and often unpredictable fashion.

Cultural dynamics are at the heart of collaborative work.

Pre-partnership planning and careful design of organizational and administrative processes are key.

“Building Education Partnerships”
http://www.stylus.com
Quote from Deborah Ball

“How well teachers know mathematics is central to their capacity to use instructional materials wisely, to assess students progress, and to make sound judgments about presentation, emphasis, and sequencing.”

TOTAL FOR ALL Dane County Partner Districts (in 2008) Middle School Teacher Credentials

208 Regular Ed Teachers Teach Math  17 (8%) Secondary Math Certified

154 Special Ed. and ESL Teachers Support Students in Math 0 (0%) Secondary Math Certified
Solution?
Collaborative Teacher PD Workshops

• Year 1: 20 hours Content
  – 2 Monday Nights (3 hours)
  – 2 Saturdays (7 hours)

• Year 1: 20 hours Pedagogy
  – Completed through SCALEnet

• Year 2-3: 40 hours Content/Pedagogy
  – 3 Monday Nights (3 hours)
  – 3 Saturdays (7 hours)
  – 10 hours On-Line Interaction
Workshop Topics

• Based on NCTM Standards
  – Algebraic Reasoning
  – Geometry
  – Measurement
  – Statistics and Probability

• Year 2 Additions
  – Algebraic Reasoning II
  – Proportional Reasoning
Workshop “Team-Teaching”

• Delivery
• In-class coaching
• Feedback from participants
What is the relationship between PD instructor knowledge, PD instruction, and teacher explanation structures for teaching mathematics?

How does teacher participation in the PD affect classroom instruction?

Math Masters

QED
Madison Metropolitan School District Mathematics Task Force Report:

Review of Mathematics Curriculum and Related Issues

Task Force Chairs

Jim Lewis – University of Nebraska Lincoln

Merle Price – U.C.L.A.

Submitted to the Madison Metropolitan School District Board of Education
June 2008
Task Force Recommendations (Abbreviated)

Establish the goal of moving to the full use of mathematics specialists in grades 5 through 8.

Focus hiring of grade 6-8 math teachers on candidates who are mathematics specialists.

Make a much larger commitment to mathematics professional development.

Extend the partnership with the University of Wisconsin and other colleges/universities... to provide coherent programs that lead to mathematics specialist certification programs consistent with recommendations in the first two recommendations.

Advocate to Department of Public Instruction for new middle school-level mathematics certification requirements consistent with the first two recommendations.
Quote from Deborah Ball

“How well teachers know mathematics is central to their capacity to use instructional materials wisely, to assess students progress, and to make sound judgments about presentation, emphasis, and sequencing.”