

Improving Teacher Professional Development

(a.k.a. Tough Love for State
Policymakers)

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The Setting

- 99% of teachers attend professional development in a given year
 - Mandated by your state’s re-licensure requirements, and by most districts
- Requirements = we know what works, right?
 - # Math PD studies meeting “rigorous” standard in past two decades:
 - 8
 - Science PD studies meeting such standards:
 - 7

The Problem

- An inefficient system
 - Most professional development locally provided
 - No rigorous evaluation
 - Teachers, schools, districts cannot say “what works” to improve instruction and student achievement
 - Quality tremendously variable
- Skewed incentive structure
 - While math/science master’s related to student achievement
 - General master’s degree has NO relationship to student achievement
 - Yet districts reward master’s degrees with an 11% pay bump (Goldhaber & Brewer, 1999)
 - Most professional development undertaken to fulfill requirements
 - Meanwhile, more substantial and focused learning opportunities ignored



Solving the problem

- Public administration approaches:
 - More bureaucracy (e.g., licensing for PD, centralization)
 - Change teacher incentive structure (e.g., toward better forms of PD)
- Increase professional control
 - Similar to medicine
- “Market” approaches
 - “Voting with feet”
 - Provide better information to consumers
- But where do we get the information?



New Tools

- Studies involving student achievement as outcome notoriously difficult
- Need for new tools to capture teacher knowledge and skills proximate to student outcomes
- Use these new tools to identify effective vs. ineffective professional development

Example: Learning Mathematics for Teaching Instruments

- Math tests for teachers in specific content domains
- Can be used as pre/post test evaluating PD
- But not typical mathematics tests
 - Composed of items meant to represent problems that occur in teaching

Knowing Multiplication

Multiply:

$$\begin{array}{r} 35 \\ \times 25 \\ \hline \end{array}$$

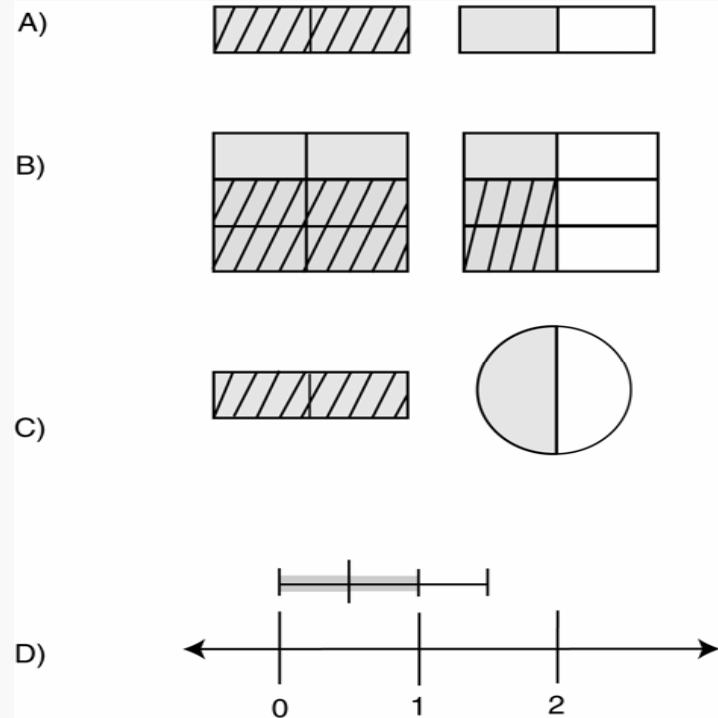
Knowing multiplication for teaching

Which of these students is using a method that could be used to multiply any two whole number

Student A	Student B	Student C
$\begin{array}{r} 35 \\ \times 25 \\ \hline 125 \\ +75 \\ \hline 875 \end{array}$	$\begin{array}{r} 35 \\ \times 25 \\ \hline 175 \\ +700 \\ \hline 875 \end{array}$	$\begin{array}{r} 35 \\ \times 25 \\ \hline 25 \\ 150 \\ 100 \\ +600 \\ \hline 875 \end{array}$

Representing operations

Which model cannot be used to show that $1\frac{1}{2} \times \frac{2}{3} = 1$?



Measures Uses

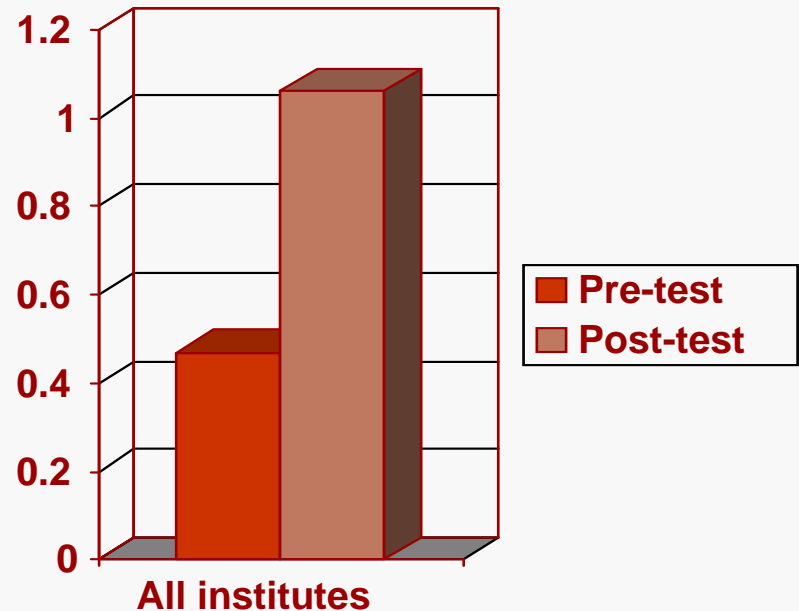
- Pre/post evaluations of:
 - Teacher professional development
 - Pre-service teacher education
 - Principal coursework
 - State officials?
- Research
 - NCLB's middle school teacher quality effort
 - Links to student achievement
 - Links to quality of classroom instruction
 - Validation efforts

Pre/post Evaluation: Tracking Teacher Growth

- Items piloted in California's Mathematics Professional Development Institutes (MPDI)
 - Instructors: Mathematicians and mathematics educators
 - 40-120 hours of professional development
 - Focus is squarely on mathematics content
 - Summer 2001
 - Pre/post assessment format (parallel forms)

MPDI Teacher Growth

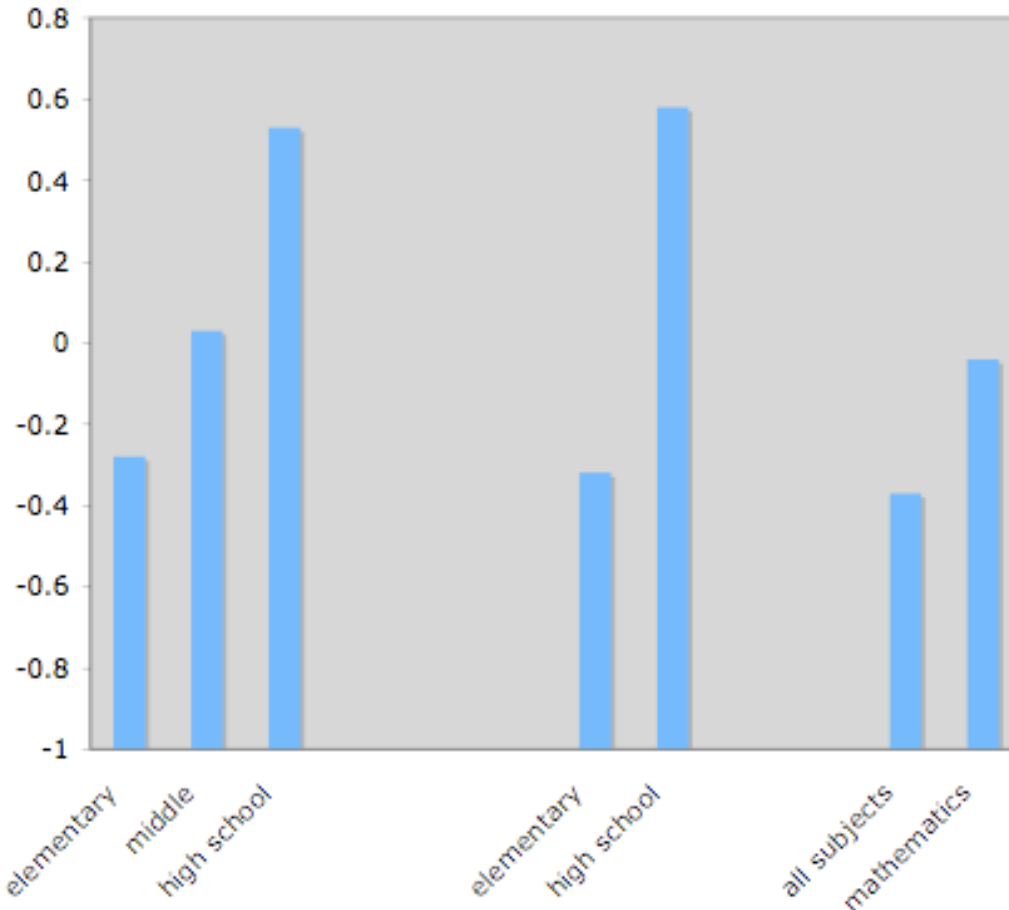
- Teachers gained roughly $\frac{1}{2}$ standard deviation
- Translates to 2-3 item increase on assessment
- Considered substantial gain



MPDI Evaluation: Findings

- Significant variation in performance on our measure by institute
- Length of institute predicts teacher gains
 - 120-hour institutes most effective, on average
 - But some 40-hour institutes very effective
- Focus on mathematical analysis, proof, and communication leads to higher gains

Research: NCLB Middle School



Credential type

Previous experience

Credential subject



Research: Equity

Are teachers of low-socioeconomic status students...

- Less prepared?
 - Less experienced
($r = -0.09$)
 - Less likely to have a math credential
($r = -0.11$)
 - More likely to be elementary teachers
($r = 0.07$)
- Less knowledgeable?
 - Math assessment score and SES:
 $r = -0.19$

Policy question: Does this help explain the achievement gap?

Conclusion

- Efforts to revise system must be *statewide*
- Must build capacity in state to perform proper research/evaluation
- Make use of new tools for evaluating efficacy of professional development
- Make use of new tools to answer pressing policy questions