Assessing the Long-Term Impact of Professional Development on Classroom Practices of High School Math Teachers

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Outline

- Introduction
- Program Description
- Data Collection
- Results
- Discussion
- Questions & Answers
What's New at RUSMP?

RUSMP's Richard Parr Presents Research Findings at Psychology of Mathematics Education Conference

Richard Parr recently shared RUSMP research findings at the 2013 Psychology of Mathematics Education held in Chicago November 14-17.

more...
Introduction

Teachers the key to student success

Effective instruction critical for promoting students’ conceptual understanding

Standards-based teaching distributed inequitably across school contexts

- Teachers in low-socioeconomic-status and high-minority schools more often relying on rote instructional methods
Key Features of High-Quality PD

- Content and pedagogical content focus
- Active learning experience
- Connections to teacher work
- Program duration
What is missing?

- Limited research on the sustainability of the effects of PD
- Most studies based on teachers’ self-reported data
- Limited focus on changes in various aspects of mathematics instruction
Project

Funded by the NSF MSP program-Grant no: 0412072

Partnership between Rice University and two urban school districts that mainly serve low-income students or students of color

Designed to provide PD, support, and leadership experiences for high school teachers

79 teachers in 3 cohorts
Project Goals

Deepening subject-matter knowledge specific for teaching

Improving teachers’ understanding how students learn and difficulties associated with mastery

Improving teachers’ understanding of equity and how to address better in their teaching.
**Program Details**

**Summer institutes**
- 4-week long for two consecutive summers
- Mathematics focus: algebra and geometry during the 1st summer & combinatorics and statistics during the 2nd summer

**Academic year activities**
- Monthly meetings
- Individualized support through site visits and electronic communication
Participants

49 high-school mathematics teachers from Cohorts I & II

All teachers certified

36 held master’s degrees

Years of experience ranged from 1 to 49 years (mean = 14.1; median = 12)
Classroom Observation Instrument

Developed by the research team of RUSMP

Designed to capture various aspects of and factors related to instruction

Composed of 20 dichotomous items as well as 25 items on a 6-point frequency

Items capturing teacher behaviors as well as student behaviors on a 6-point Likert scale

Items capturing the materials used, the content focus, and the classroom culture dichotomous.
External evaluators conducted classroom observations beginning in fall 2005 after Cohort I completed the 1st summer program.

Classroom observations continued through spring 2010.

Two separate factor analyses for the items on binary and Likert scales.
Students used a variety of means to represent concepts (e.g., models, drawings, graphs, manipulatives).
Data Analysis

Level 3: Cohorts

Level 2: Teachers
- # of graduate-credit hours
- Content knowledge

Level 1: Time
- Time in the program
- Years of teaching experience
Results

![Graph showing standardized predicted changes over time for different categories: Student Interactions, Mathematical Discourse, Instructional Clarity.](image)
Results Cont.

![Graph showing standardized predicted changes over time for different categories.](image)

- **Mathematical Habit of Mind**
- **Hands-on Materials**
- **Hands-on Materials**
Results Cont.

- Credit
  - Mathematical Discourse
  - Student Interactions
  - Instructional Clarity
  - Mathematical Habit of Mind
  - Hands-on Materials

- Experience
Discussion

Limitations

- Convenient sample
- Local instruments
- Measurement error
- Number of observations

Mathematical Discourse
Mathematical Habit of Mind
Instructional Clarity
Student Interactions
Hands-on Materials

Introduction  Program Description  Data Collection  Results  Discussion  Q & A
Certain instructional practices apt to change whereas others not.

Teachers continue to grow with appropriate support.

Lack of incorporation of concrete materials into instruction.
Thanks!