

Issues in Designing Randomized Field Trials of Teacher Professional Development

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Research Base on PD

- Kennedy (1998), in a review of impact studies in math and science, found support for certain types of PD (e.g., content-focused), but noted the limitations of the research base at that time.
- Yoon et al. (2007) recently conducted a synthesis of rigorous studies of PD, finding an overall positive impact (average $ES=0.54$), but studies were small-scale.
- Several large scale RFTs are currently underway to test specific models of PD, and this number is growing.

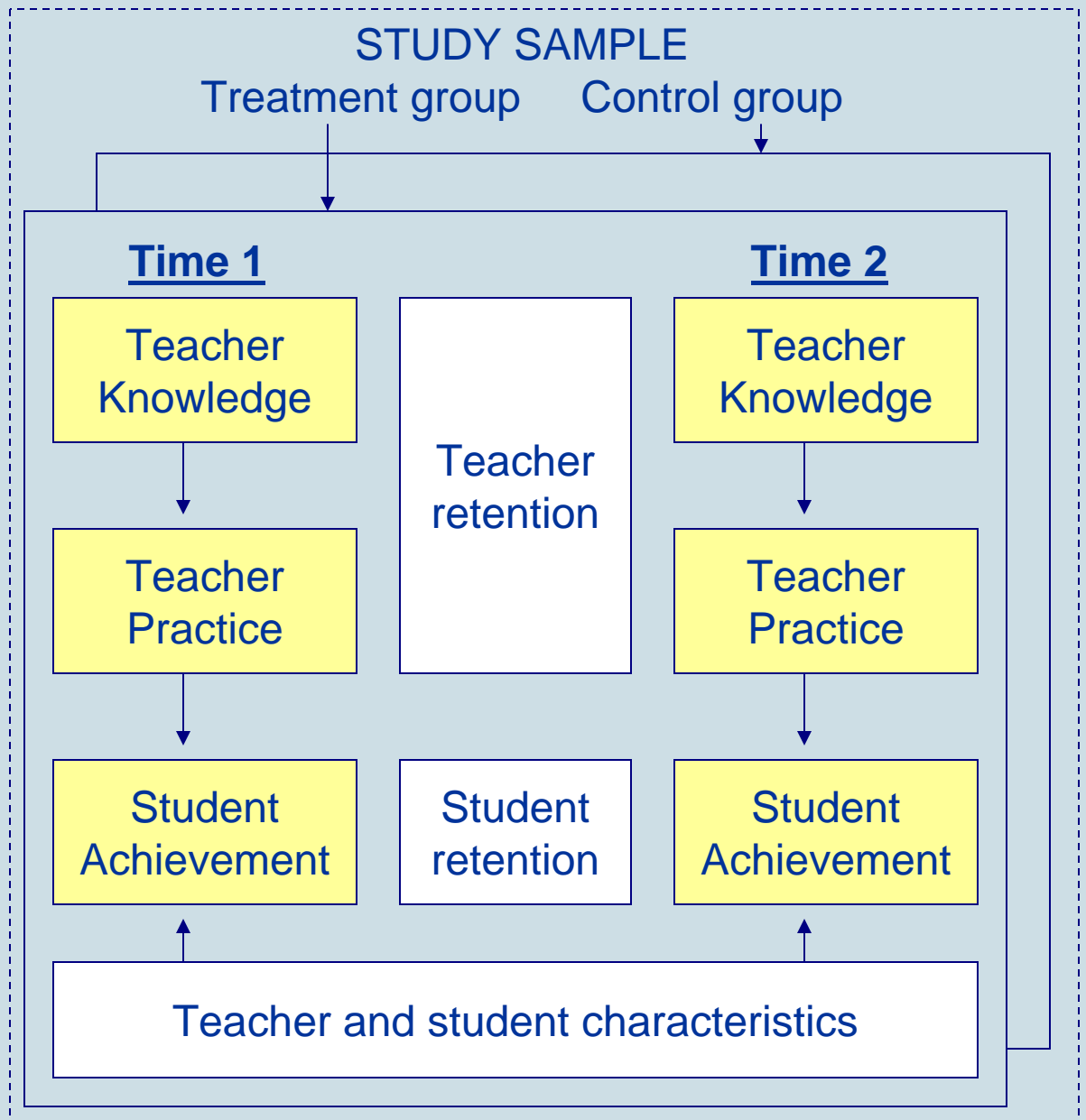
INTERVENTION

PD features

- Focus
- Structure
- Other

Other features

- Unit of intervention
- Non PD components



Four Issues

- **Treatment specification:** Which PD model(s) will be studied?
- **Context:** Where will the study be conducted?
- **Sample:** What sample will be needed?
- **Measurement:** What should be measured and when?

1. Treatment Specification

- PD rests on two theories: a **theory of teacher change** and a **theory of instruction**
- One key distinction is focus on **teacher knowledge** vs focus on **specific practices**
- PD is a package, and it is difficult to tease out effects of individual components
 - ◆ One option is a multi-arm study, with each arm focusing on a different mediator

2. Study Context

- **Fit** between local curriculum and the PD
- **Support** for the PD in the local policy environment
- **Ambient PD**
 - ◆ Ambient PD represents the counterfactual
 - ◆ Ambient PD may compete with treatment PD; teachers have limited time

3. Study Sample

- **Unit of random assignment:** School or teacher
 - ◆ Role of teacher mobility
- **Precision** of impact estimators:
 - ◆ Relative precision for teacher and student outcome estimates
 - ◆ Absence of good data on teacher-level parameters (ie, variance components for teacher knowledge or teacher instructional practice)
- Establishing expected **effect size**

4. Measurement

- Measuring key **mediators** in addition to achievement
 - ◆ Teacher knowledge and instructional practices
- Appropriate **alignment** of measures to PD
 - ◆ Tension between “over” and “under” alignment
- Optimal **timing** of outcome measurement
 - ◆ Potential relationship between intensity and specificity of PD and time period of impact

Example:

Professional Development Impact Study

PD Impact Study

- The 5-year study is supported by the Institute of Education Sciences (IES).
- We are in the middle of the 5th year.
- We are in the process of completing the first report.

Principal Staff

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Partner Organizations

American Institutes for Research (AIR)

www.air.org

MDRC

www.mdrc.org

REDA International, Inc.

www.redainternational.com

Sopris West

www.sopriswest.com

CORE

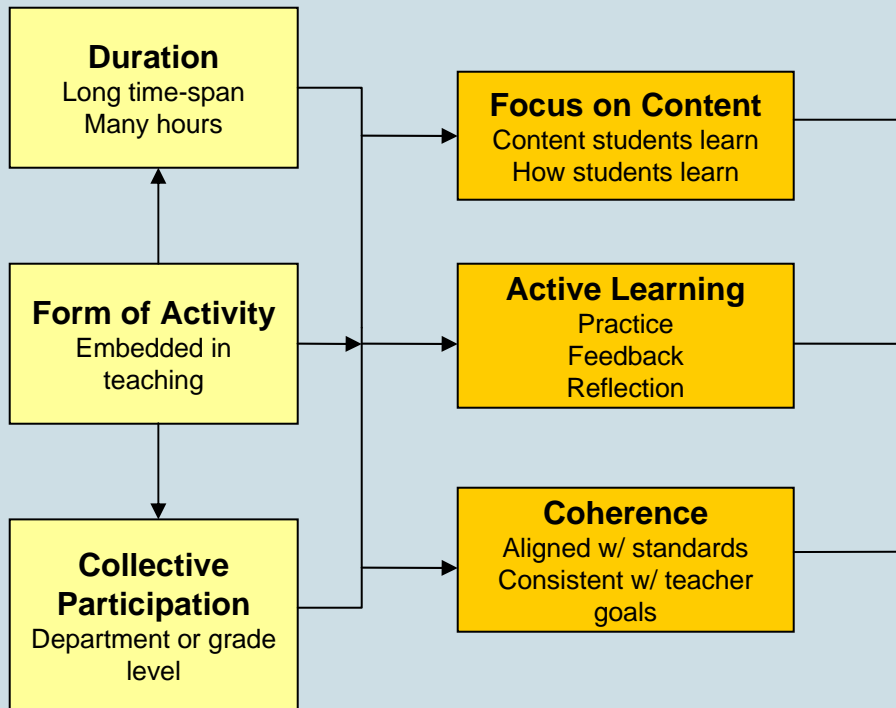
www.corelearn.com

1. Treatment Specification

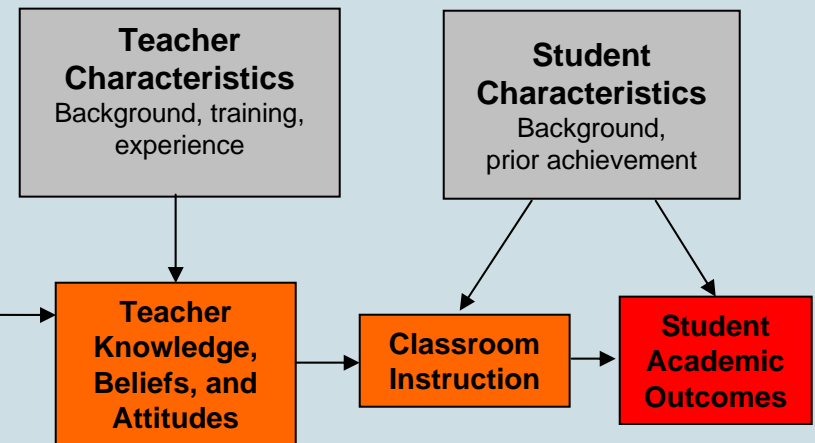
- **Theory of teacher change:** The study is informed by an emerging conceptual model (small “t” theory) of features of PD that we hypothesize may support teachers in improving their knowledge, instruction, and student achievement (Garet et al, 2002).
- **Theory of instruction:** The PD emphasized explicit instruction in the five components of reading instruction, as summarized in the work of the National Reading Panel (2000).

Conceptual Model

Key Features of Effective Professional Development



Teacher and Student Outcomes



Core Elements

- The theory suggests that 6 features of PD are important.
- It is not possible to vary all 6 features in one study.
- We tested two versions of the PD.
 - ◆ PD treatment A: *Institutes and seminars* that incorporate 5 of the 6 features -- all except PD embedded in teaching
 - ◆ PD treatment B: *Institutes and seminars plus coaching*, an embedded component

PD Treatment A

3 institute days (summer 2005) and 5 follow-up seminar days (2005-06 school year)

- Based on *Language Essentials for Teachers of Reading and Spelling* (LETRS), by Louisa Moats
- Drawing on a detailed syllabus, with consistent materials and activities across sites
- Delivered by 4 experienced LETRS facilitators
- Supported by project staff to ensure high teacher attendance

PD Treatment B

Participation in institutes and seminars (treatment A), plus half-time reading coach in each school

- Based on *Consortium on Reading Excellence* (CORE) coach training model
- 20 coaches in total, working across 30 schools
- All received week-long training, coaching manual, and continuing support to ensure fidelity

Control Condition (Group C)

The control condition (Group C) is “Business as usual” – that is, the PD each district currently provides

- The control condition is *not* the absence of PD.
- The control condition varies to some extent across districts (and in fact across teachers).

Research Questions

- What is the impact of institutes and seminars on teacher knowledge, classroom instruction, and student achievement? (compare Group A to Group C)
- What is the added value of coaching in improving teacher knowledge, classroom instruction, and student achievement? (compare Group B to Group A)
- What is the impact of the combination of institutes, and seminars and coaching? (compare Group B to Group C)

Research Questions (cont'd)

- Does the impact of the PD differ for teachers with lower or higher knowledge as measured at baseline?
- Do teacher knowledge and classroom instruction mediate the impact of professional development on student achievement?

2. Context

- The study is being conducted in 6 districts, each using either *Open Court* or *Houghton Mifflin's Nation's Choice or Legacy of Literacy*
- We focused on high-poverty schools (> 50% of students eligible for free lunch)
- We excluded districts with substantial coaching programs, and we excluded schools participating in Reading First.

3. Sample

- Our theory predicts that the effects of professional development will be maximized when teachers participate with their grade-level peers.
- Thus, we view the treatment as a **school-level**, not a **teacher-level**, intervention.
- We randomly assigned schools to treatment conditions separately within each of the 6 participating districts

Sample (cont'd)

- At each school, participants include:
 - ◆ All 2nd grade teachers (not volunteers)
 - ◆ School reading specialist who works with 2nd grade
 - ◆ Special education teacher who works with 2nd grade
 - ◆ Principal

Required Sample Size

- We designed the study to be able to detect an effect on teacher knowledge and instruction of 0.4 SD, and an impact on achievement of 0.2 SD.
- Over second grade, students typically gain about one SD. An impact on achievement of 0.2 SD is roughly one-fifth of the typical annual gain.
- To achieve this objective, a sample of 90 schools is required, 30 per treatment condition

Participating Districts

District	N of Group A schools	N of Group B schools	N of Group C schools
A	6	6	6
B	5	5	5
C	2	2	2
D	8	8	8
E	2	2	2
F	7	7	7
Total	30	30	30

4. Measurement

- We gathered data on three main types of variables:
 - ◆ Fidelity of implementation of the intervention and the dosage received
 - ◆ Mediating variables
 - ◆ Outcomes




Implementation Fidelity and Dosage

- Observations of all institutes and seminars
- Sign-in sheets to monitor teacher attendance at institutes and seminars
- Logs of coaching activities completed daily
- Teacher surveys collecting data on all PD in which both **intervention and control teachers** participated

Timing of Impacts

- The PD is delivered over a one-year period (summer of 2005 and 2005-06 school year)
- We are interested in:
 - ◆ The *immediate impact* during the year of implementation of the PD
 - ◆ The *sustained impact* in the year following the implementation of the PD
- The school (not the student or teacher) is the primary focus of longitudinal analysis

Mediators and Outcomes

- Reading content and practices survey (measure of teacher knowledge)
 - ◆ 3 time points (1 pre and 2 post) 
- Classroom observations of teacher practices during reading instruction
 - ◆ 3 time points (all post) 
- Student achievement for consecutive cohorts of 2nd graders
 - ◆ 4 time points (2 pre and 2 post) 

Timing of Data Collection

2005

2006

2007

Spr

Sum

Fall

Wtr

Spr

Sum

Fall

Wtr

Spr

Institute, Seminars, and Coaching



Stay Tuned for the Report!

- It should appear by the end of 2008.

What Studies Are Most Likely to Improve our Understanding of PD?

■ Mike's suggestions:

- ◆ Increase the precision of the underlying theory of instruction and the specificity and intensity of the intervention, improving the alignment of measures and increasing the chance of getting large effect on proximal mediators
- ◆ Conduct the study in contexts in which the curricular fit and support for the PD are high, reducing mixed messages
- ◆ Consider the effect size for teacher knowledge or practice needed to obtain the desired impact on achievement
- ◆ Develop “packages” of related measures of teacher knowledge, instructional practice, and achievement