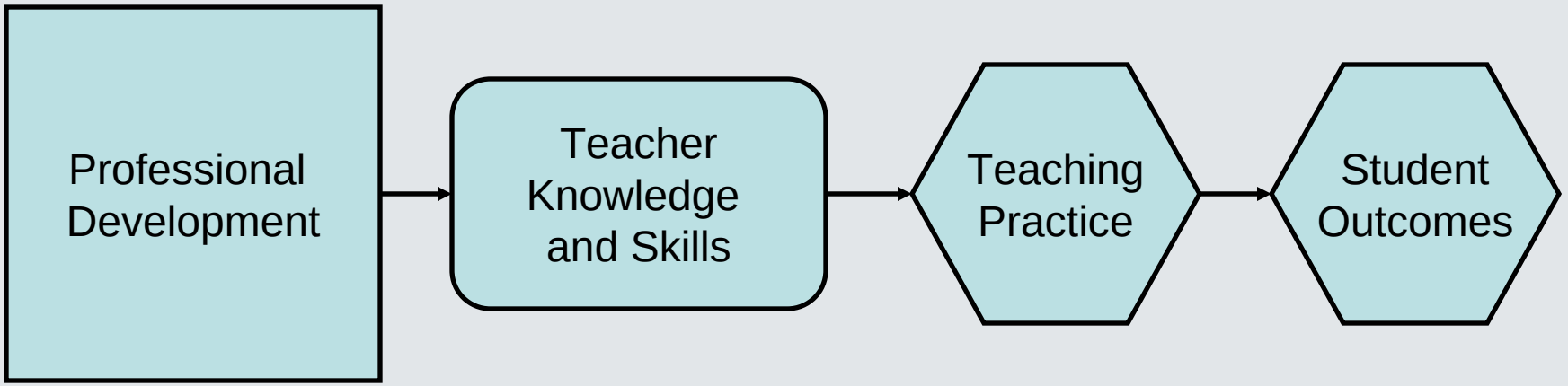
Simplified Logic Model for Professional Development



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PD is provided in a variety of “formats”

- Summer workshops
- Academic-year sessions

- University-based
- District-based
- School-based

- In person
- Via distance learning

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Using a variety of strategies

- Engage teachers in content-focused investigations;
- Have teachers consider content provided via lectures, readings, demonstrations;
- Have teachers analyze student instructional materials, or “cases” of instruction, or samples of student work.

What Is Effective PD?

Several reviews of studies have identified lists of common elements of PD programs that have some evidence of effectiveness

- These lists of characteristics tend to be consistent, suggesting an “emerging consensus”

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What Is Effective PD?

- Focuses on a purpose anchored in student learning of specific content in a specific setting
- Focuses on curriculum and pedagogy
- Connects instruction and learning
- Embodies a theory of adult learning
- Develops/sustains group work
- Involves active participation of school leaders and staff
- Sustains focus over time
- Models effective practice
- Uses assessment and evaluation

Elmore, R. F. (2002). *Bridging the gap between standards and achievement: The imperative for professional development in education.* Washington, DC: Albert Shanker Institute.

What Is Effective PD?

Empirical studies have found positive relationships between some characteristics of PD and impacts…

- Longer duration/more contact hours
- Opportunity to engage in mathematical analysis, reasoning, and communication

… are positively related to teacher learning of mathematics content knowledge for teaching.

Hill, H. C. & Ball, D. L. (2004). Learning mathematics for teaching: Results from California's mathematics professional development Institutes. Journal for Research in Mathematics Education, 35(5), 330–351.

What Is Effective PD?

- Focus on a specific practice/set of practices
- Coherence with other PD
- Active learning opportunities
- Collective participation of teachers
- "Reform types" of PD focused on higher order instructional/assessment practices

…are positively related to changes in teachers' instruction, assessment, and/or technology practices.

Desimone, L. M., Porter, A. C., Garet, M. S., Yoon, K. S., & Birman, B. F. (2002). Effects of professional development on teachers' instruction: Results from a three-year longitudinal study. *Educational Evaluation and Policy Analysis, 24*(2), 81–112.

MSP KMD review of research on PD to deepen TCK

- Identified more than 2000 “studies” on PD to deepen teacher mathematics/science content-related knowledge
- Applied standards of evidence to about 150 studies, those that were not simply advocacy pieces *and* actually measured TCK

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Why don’t we know more from the empirical research?

- We often found vague or incomplete documentation of programs or interventions.
- Consequently, we know something worked, but we don’t know a lot about what “it” was.

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Why don’t we know more?

- Studies tended to be more like program evaluations rather than research on particular strategies.
- Consequently, we know the overall experience worked, but we don’t know how much particular interventions contributed to the gains.

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Why don’t we know more?

- We often found serious limitations with study research designs, including:
  - Selection bias in samples and contexts
  - Lack of comparison groups or criteria
  - Idiosyncratic instrumentation, without evidence of validity/reliability/credibility

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What Is Effective PD?

A randomized controlled trial is currently being conducted to test characteristics of PD, including…

- Substantial number of contact hours over a full-year duration, including workshops and in-school coaching
- Focus on developing teachers' content knowledge, knowledge of student thinking, and lesson planning
- Collective participation of teachers in a school

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What Is Effective PD?

After one year, the study found impact on …

- Teachers' use of instructional practices to elicit student thinking

But no impact on …

- Teacher content knowledge,
- Teachers' use of representations in instruction,
- teachers' focus on mathematics reasoning in instruction,
- student achievement.

Garet, M. S., Wayne, A. J., Stancavage, F., Taylor, J., Walters, K., Song, M., Brown, S., Hurlburt, S., Zhu, P., Sepanik, S., Doolittle, F., & Warner, E. (2010). Middle school mathematics professional development impact study: Findings after the first year of implementation (NCEE 2010-4009). Alexandria, VA: U.S. Department of Education.

What Is Effective PD?

It may be that:

- The instruments for measuring impacts are not sensitive to outcomes that are occurring
- More time is needed for impacts to occur
- Our understanding of PD effectiveness is underspecified
  - Other characteristics of the PD also matter
  - Unidentified elements of the context of the PD matter

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What Is Effective PD?

- Or it may be that the “consensus” characteristics of PD don’t make the difference people believe they make.
- The jury is still out.

What is a PD designer to do?

- Elmore (2002) noted that the insights of experienced practitioners can serve as "sensible propositions" to guide PD as researchers work to develop a more rigorous empirical research base to support these insights

Practice-based Insights

Practice-based insights are of a much smaller grain size, and provide considerably more guidance to the field, but without the support that systematic study would provide.

Collecting practice-based Insights

- Interviews with Principal Investigators of the designated NSF-supported MSP projects
- Review of MSP project documentation
- Analysis of MSPNet dialogue

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Collecting practice-based insights

- Online panel discussion to collect insights and evidence from a set of individuals with have extensive and varied experience in professional development design and implementation.

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Characteristics of On-line Practitioner Panels

- Expertise of panelists
- Anonymity among panelists
- Iterative rounds of data collection, with interim analysis to inform the next round
- Focus and structure to queries, including requests for rationales/evidence
- Test for agreement and disagreement

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Practice-based insights

- Insights and examples collected in this process are included in a series of “knowledge reviews” posted on the MSP KMD website.

- Much of what is being shared at this conference is drawn from these insights and examples.

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In designing learning experiences for teachers

- Consider the potential strengths of each in relation to a particular purpose or set of purposes, and how you can design the PD to take advantage of those strengths.

- Consider the potential weaknesses of each, and how you can design to minimize the risks.

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Challenging Problems to Deepen Teacher Content Knowledge

- Work on challenging problems provides an opportunity for deepening teacher content knowledge.
- It is helpful to pose problems that have a low threshold, but a high ceiling.
- And the more challenging the problems, the more support you need to provide so teachers will hang in there.

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- And even when the problems are not intended for classroom use, teachers will likely want to see the connections between what they are learning and how the topic appears in the grade-level content.

- And unless cautioned otherwise, teachers may use the problems they work on in PD in their classrooms, even if they are not developmentally appropriate.

- Engaging teachers with challenging problems provides an opportunity to enhance teacher understanding of what it means “to do” science or mathematics.

- But it requires going beyond modeling to an explicit focus on disciplinary habits of mind.

Using student instructional materials in PD

- Why might you have teachers engage with investigations from the student instructional materials?
- Reflect as individuals, then share at your table.

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Possible purposes

- Deepen teacher content knowledge
- Help teachers understand how to use the student instructional materials

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Learner hat and teacher hat

- Experienced program leaders suggest having teachers do the investigations as learners first, and then consider the implications for teaching.

Focusing on the content story line

- As part of the “teacher hat,” teachers can be asked to analyze the mathematics/science ideas in student instructional materials to see how they are developed over time can be very helpful.
- But you need to keep student learning goals in the forefront, countering the tendency to focus on logistics and classroom management.

A few words about teachers designing lessons

- There is this romantic notion that teachers should design/adapt lessons in order to meet the needs of their particular students.

- The (admittedly scant) research evidence available suggests that teacher adaptation of even poorly-designed lessons makes them worse.

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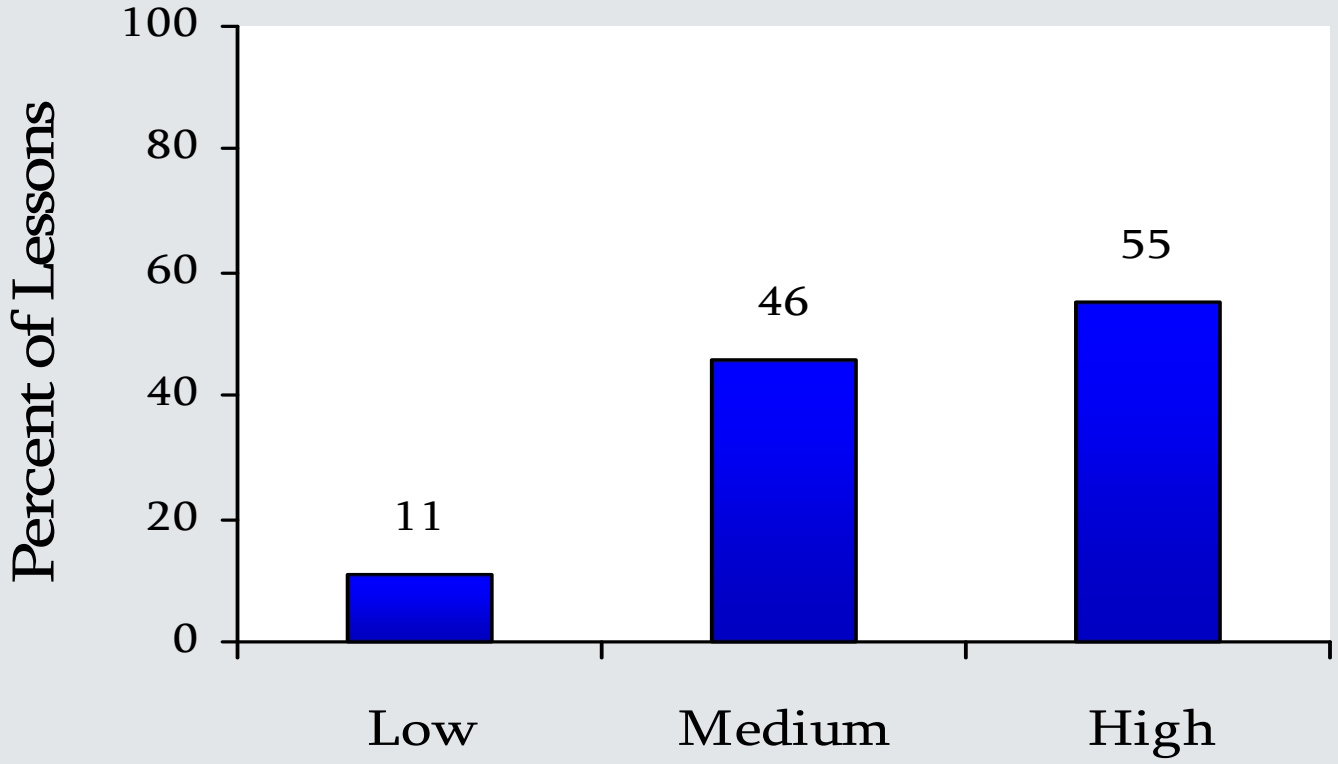
Impact on Classroom Practices

Highly-Rated Lessons, by Adherence to LSC-Designated Materials



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- Few teachers have the depth of content expertise and understanding of research on student learning to design effective lessons.
- If you take this on as part of PD, be sure to provide extensive support throughout the process, and to review/edit the resulting lessons carefully.
- **

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Frame for PD planning

- Why that content?
- Are you focusing on DCK, PCK or both?
- How does ways of knowing fit in?
- Where are the teachers starting in their understanding of the focus content?
- How will you engage teachers with the focus content?
- How will you address teachers' varied needs?

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Concurrent Breakout Sessions Descriptions in Tab 3 (blue)

Consortium for Achievement in Mathematics and Science	Harrison
El Paso Math and Science Partnership	Jackson
Math in the Middle and Nebraska Math	Madison
Milwaukee Mathematics Partnership	Monroe
North Cascades and Olympic Science Partnership	Van Buren
NSF Institute: Preparing Virginia's Mathematics Specialists	Wilson

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- **Lunch is in Lincoln Hall**
- **Breakouts start at 1:20 pm**
- **www.mspkmd.net**

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