Professional Development To Support Instructional Improvement: Lessons from Research

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Education is a field of ongoing change, with innovations (e.g., technology) and new policies (e.g., Common Core State Standards or Next Generation Science Standards) requiring that teachers learn throughout their careers. Teacher professional development is one of the logical responses to this challenge and thus is one of the major expenditures in many districts and charter management organizations.

Yet a long line of research supports the conflicting conclusions that while teacher professional development *can* have positive impacts on teachers that improve student learning, teacher professional development *is often not effective* at improving instruction and student outcomes.

An obvious problem is that while substantial funds are expended on teacher professional development, they are not always used strategically. This has been documented in numerous studies (e.g., TNTP's *Mirage* Report in 2015). This article acknowledges the issue of nonstrategic use of professional development resources up front and then moves on to highlight what research tells us about how professional development could be better designed to achieve desired impacts on instruction and student learning.

Lessons from Three Large Studies of Professional Development

A landmark study of professional development in mathematics and science substantially shaped the consensus understanding of what makes professional development "effective" (Garet, Porter, Desimone, Birman, & Yoon, 2001). That study, which surveyed a nationally representative sample of teachers participating in Title II-funded professional development, found relationships between teachers' reports about the nature of their professional development experiences and their reports about changes in their instructional practices. The study identified five features believed to make professional development more likely to be effective: content focus, active learning for teachers, coherence with instructional context, sustained duration, and collective participation. One limit of this study is that the outcome measure was teachers' self-reports about changes in their practice, which may not accurately measure actual changes. Nonetheless, this study had a sweeping influence on perceptions of high-quality professional development.

Moving forward almost a decade, the U.S. Department of Education Institute of Education Sciences sponsored two large-scale professional development experiments, one on middle school mathematics and one on early reading, to examine the effects of professional development on student achievement. In both cases, the programs were carefully designed to include the features of "effective" professional development and were generally implemented as intended. In the study of middle school mathematics professional development, the researchers found no effects from a 2-year professional development program on teacher content knowledge or student achievement (Garet et al., 2008). The same team carried out the large-scale evaluation of two versions of an elementary reading professional development program; (one version focused only on building teacher content knowledge, the second provided the same content-focused workshops supplemented by in-school coaching). These programs were successful in improving teacher content knowledge but changed only one of the three instructional practices measured and did not demonstrate effects on student achievement (Garet et al., 2011).

These two studies, notable for being large-scale experiments, cast doubt on the efficacy of professional development. They also suggested that even if professional development increases teacher content knowledge, student achievement will not improve unless the professional development also leads to substantial changes in teacher practice. The remainder of this review addresses what we know about how professional development can shift instruction enough to positively impact student learning.

Promising Insights into Effective Professional Development

A key idea in understanding the link between professional development and changes in teacher knowledge, skills, and practice is that teachers (like all learners) are not the metaphorical empty vessel into which professional development pours new knowledge. Instead, teachers must construct their own interpretations of the new ideas presented in professional development (Spillane, Reimer, & Reiser, 2002). *This suggests that a fundamental step in supporting teachers to change their practice is getting them to understand a different vision for instructional practice and getting them to identify the differences between their current practice and the envisioned practice.*

Other insights into how professional development can improve student learning come from a body of research on California's attempt to reform mathematics teaching and learning in the 1980s. The major study (Cohen & Hill, 2000) found that the multiple components of the reform gave teachers a new vision of instruction (via a new framework

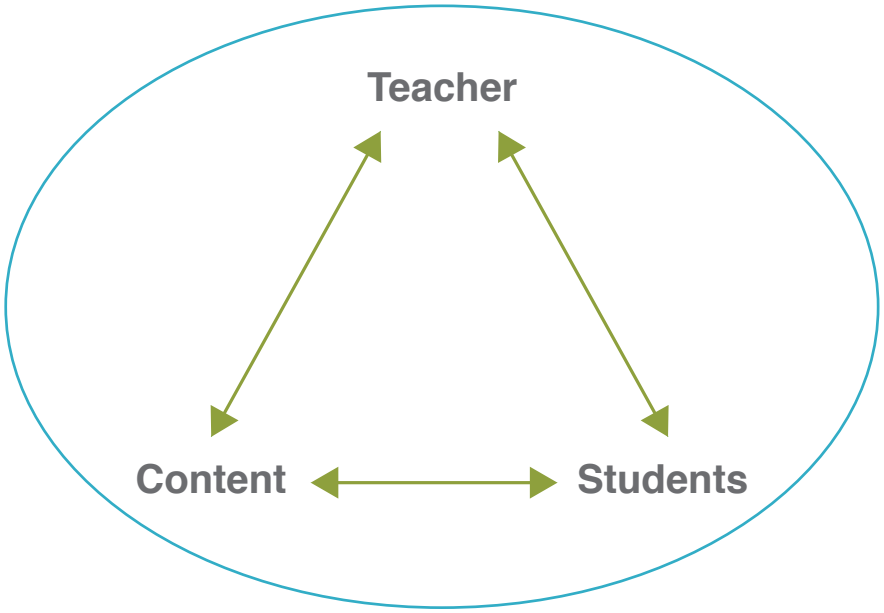
that set higher expectations for student learning), an understanding of their students' skills relative to those in the new framework (via new reform-oriented assessments), new knowledge and skills (via professional development), and new instructional materials (replacement units to support teachers in changing their instruction). The impacts on teachers and instruction in turn improved student mathematics achievement.

From this and other studies they were conducting, the broader research team represented teaching in a way that suggests mechanisms for improving instruction. They described teaching as the work of drawing on professional knowledge and skills to create productive interactions between and among students, the teacher, and content (using both outside instructional materials and representations used and created by teachers) (Figure 1) (Cohen, Raudenbush, & Ball, 2003).

This line of research suggests that to improve student learning, program developers and policy makers can leverage instructional materials and/or teachers' knowledge and skills.

Since the 1980s, many individual studies have tested specific interventions. In the remainder of the review, I use some of these other studies to potentially counter, corroborate, or extend these two insights. This synthesis includes only studies of professional development of moderate to long duration, because research consistently shows that while one-shot professional development may transmit distinct knowledge (e.g., information about a new policy), such events are insufficient for supporting substantial instructional change.

Figure 1. Teaching as productive interactions



Source: Adapted from Cohen, Raudenbush & Ball, (2003).

Randomized Controlled Trials of Professional Development Programs

What research tells us about how to help teachers envision new instructional practices in their classrooms. Multiple approaches to professional development can provide teachers a way to envision new instructional practices. Among the most common are having the teachers experience new practices in the role of a student (e.g., role-playing new practices), providing coaching, or using videos of instruction in professional development.

The research suggests that none of these approaches inherently "works" but that all can be effective under some circumstances. What appears to matter is the focus of professional development (e.g., if the content and skills address instructional improvements linked to student learning) and how the professional development helps teachers attend to key aspects of the new instructional practice (August et al., 2014; Blazar & Kraft, 2015; Borko, Koellner, Jacobs, & Seago, 2011; Matsumara, Garnier, & Spybrook, 2012; Penuel, Gallagher, & Moorthy; 2011; Santagata, Kersting, Givvin, & Stigler, 2011). Further, a vision of a new type of instruction appears typically to be insufficient for changing most teachers' instruction in a relatively short time frame; accomplishing change requires additional supports for implementing new ideas in the classroom. Such supports in professional development may include discussion, feedback, and/or facilitated planning to help teachers transfer new ideas into their practice; aligned instructional materials can also be used to support transfer of new ideas into practice.

What research tells us about how instructional materials can support changes in instruction. Instructional materials appear insufficient in isolation to support major changes in instructional practices (Schneider, Krajcik, & Blumenfeld, 2005), though they may improve student achievement by improving the alignment between the content students are taught and standards (or assessments). However, the review of studies of professional development that have found positive impacts on student learning yielded a striking pattern. Most programs that achieved positive impacts on student learning, especially large-scale randomized controlled trials that tested professional development delivered by someone other than the professional development provider, included aligned instructional materials along with professional development (August et al., 2014; Finkelstein, Hanson, Huang, Hirschman, & Huang , 2011; Gallagher, Woodworth, & Arshan, 2016; Kim et al., 2011; Meyers et al., 2016; Penuel et al., 2011; Perry & Lewis, 2011; Taylor, Roth, Wilson, Stuhlsatz, & Tipton, 2016). This may be because instructional materials can both help teachers envision a different type of instruction and scaffold their attempts at offering it to their students.

Of these, the study by Taylor et al. is particularly noteworthy because of the comparison group. The comparison group received the same amount of professional development as the treatment group, but it was focused solely on content knowledge (which research has shown is key for high-quality instruction). On the other hand, the treatment group's professional development included content knowledge, pedagogical approaches, aligned curricular materials, and supports for teachers to design their own curricular materials. Thus, the positive impact on student learning represents the relatively greater effectiveness of addressing multiple facets of teacher knowledge and skill in order to change instructional practice rather than relying on changes in teacher content knowledge alone.

What about the "student" part of the instructional triangle? None of the studies of professional development I reviewed tested an approach to professional development that focused solely on examining student learning as a vehicle for driving instructional change. However, formative assessment is generally considered to be an important component of effective instructional practice (Black & Wiliam, 1998). An example below highlights how formative assessment can support uptake of ideas in professional development as well as better instruction.

A Hybrid Approach: Professional Development, Supporting Materials, and Formative Assessment

This review has discussed how a vision of new instruction, aligned instructional materials, formative assessment tools and, in passing, stronger content knowledge can support changes in instruction. Evidence suggests, however, that a hybrid approach is likely to be the most productive if the goal is to support most teachers in making substantial instructional improvements in a relatively short time. One such an approach comes from the National Writing Project, which created the College-Ready Writers Program (CRWP) to help secondary teachers teach argument writing more effectively. The CRWP program offered professional development on argument writing, which worked to deepen teachers' content knowledge while supporting their use of CRWP instructional materials and a formative assessment tool. A randomized controlled trial in 44 rural districts across 10 states found positive impacts on student writing and teacher instruction (Gallagher et al., 2016).

Multiple approaches were used in the professional development (typically modeling and coaching) to provide teachers a vision of new instruction. The instructional materials were a cornerstone of the program because they worked to improve instruction in three ways:

1. They helped provide teachers with the different vision of instruction.
2. They changed the content focus of the instruction students received.
3. They enabled teachers to deliver instruction using new approaches while they were building their own understanding of those approaches.

In this way, materials themselves can be "educative" for teachers and students alike.[1] The formative assessment tool supported the implementation of new practices by pointing teachers to key skills their students needed to learn, providing teachers with feedback on and evidence of student success with new approaches (which in turn increased teachers' buy-in to the program) and data to facilitate high-quality instructional planning (Gallagher et al., 2016). This particular mix of approaches might not be best for all purposes, but it does illustrate the idea that various approaches to supporting teacher learning and instructional change can be combined strategically to achieve program goals.

Conclusion

Overall, the review suggests that no particular approach to professional development is a silver bullet. Instead, those designing or selecting professional development need to both help teachers envision what it would look like to teach differently and provide them with supports to help teachers bring those practices into the classroom. Professional development that offers new knowledge and skills combined with program materials that help teachers transfer new ideas into their instruction can be a potent combination for instructional improvement.

1 Note that the idea of "educative" curriculum runs directly counter to highly scripted "teacherproof" curricula. Educative curricula seek to build teachers' deep understanding of content and new approaches, sometimes with the explicit goal of supporting them in adapting existing materials or developing their own aligned materials once they become effective in new instructional practices. For a discussion of how educative curricular materials can support teacher learning see, for example, Schneider and Krajcik (2002).

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Acknowledgements: *SRI Education wishes to thank the CHARLES AND LYNN SCHUSTERMAN FAMILY FOUNDATION for their support of this paper.*

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