



eye on *research*

Teacher Learning and Professional Development: Mapping the Terrain

By Hilda Borko

National and international reform movements are setting ambitious goals, and changes in classroom practices to achieve these goals ultimately fall on teachers and cannot be accomplished without support and guidance.

Although federal No Child Left Behind legislation requires that states ensure the availability of high-quality professional development for all teachers, the law does not address what constitutes high-quality professional development, or how professional development should be made available to teachers. Further, despite recognition of its importance, the professional development currently available to teachers is woefully inadequate. I hope that the broader educational research community will take on the challenge of providing high-quality professional development for all teachers.

Progress in the field of research on teacher learning over the past 20 years suggests that the challenges can be met. We now have evidence that professional development can lead to improvements in instructional practices and student learning. We are only beginning to learn, however, about exactly what and how teachers learn from professional development, or about the impact of teacher change on student outcomes. To assist the research community in developing a professional development policy and research agenda, we need to answer two major questions:

1. What do we know about professional development and its impact on teacher learning?
2. What are important directions and strategies for extending our knowledge?

To frame the analysis, we can look at the following key elements in a professional development system:

- the professional development program
- the teachers who are the learners in the program
- the facilitator who guides teachers as they construct new knowledge and practices
- the environment in which the professional development occurs

Teacher education scholars study these elements and the relationships among them in various research projects. Selected projects are divided into three phases of design and research that contribute to the professional development knowledge base. Each phase builds on the previous one.

Phase 1 design and research activities focus on single professional development programs at single sites. These designs typically study two elements of the professional development system: the program and individual teachers as learners. Phase 2 research activities study programs with more than one facilitator at more than one site. They explore relationships among facilitators, programs, and teachers as learners. Phase 3 designs incorporate comparative studies of multiple professional development programs enacted at multiple sites. Researchers study relationships of all four elements of the professional development system: the program, the teachers, the facilitators, and the environment.

A “situative perspective” may be used to interpret the research on professional development. Here, “situative” refers to a set of theoretical perspectives and lines of research with roots in various disciplines including anthropology, sociology, and psychology. Situative theorists describe learning as a social process. For teachers, learning occurs in many different situations, including their classrooms, their school communities, and professional development courses or workshops. To understand teacher learning, we must study it within these multiple contexts. And we must consider both the individual teacher-learners and the social systems in which they participate.

Phase 1 Research

Most of the professional development community’s work to date has been in Phase 1, designing and studying individual programs. This work provides evidence that high-quality professional development programs can lead to important changes in teachers’ subject matter knowledge for teaching, understanding of student thinking, and instructional practices.

Several studies demonstrate that professional development programs focused explicitly on subject matter knowledge can help teachers improve their understanding of the subjects they teach. Experiences that engage teachers as learners in activities such as solving mathematical problems and conducting scientific experiments are particularly effective.

To guide students’ thinking, teachers must also understand how students’ ideas about a subject develop, and the connections between their ideas and important ideas in the discipline. Several programs demonstrate that professional development can help teachers construct these understandings, by providing opportunities for them to explore the strategies that children use to solve problems, and the kinds of problems that children find difficult.

In projects that studied teachers’ instructional practices, teachers incorporated ideas from the professional development workshops into their teaching. For example, teachers who participated in a mathematics professional development program taught problem solving more frequently, encouraged students to discuss problem-solving strategies, and listened to them talk about their thinking.

Research also indicates that meaningful learning is a slow and uncertain process for teachers, just as it is for students. Some teachers change more than others through participation in professional development programs. And some elements of teachers’ knowledge and practice are more easily changed than others.

A review of Phase 1 research includes the processes and activities of professional development communities, which are communities of teachers working together on common instructional interests. Several projects reveal that professional development communities play an important role in fostering teacher change and student learning. But professional community is not easily achieved. Research reveals that the development of teacher communities is difficult and time-con-

suming work. Norms that promote challenging yet supportive conversations about teaching are one of the most important features of successful learning communities. To foster such discussions, professional development leaders must help teachers to establish trust, and to maintain a balance between respecting individual community members and critically analyzing issues in their teaching.

Because professional development activities grounded in teachers' own classroom practices are very powerful learning experiences, one of my research projects focuses on both the learning activities of the professional development community, and the knowledge and instructional practices of individual teachers. This program, Supporting the Transition from Arithmetic to Algebraic Reasoning (STAAR), is designed for middle-school mathematics teachers. One component of the program is a series of activities where teachers work together on a mathematical task and discuss how to use the task in their own classrooms. Each teacher then conducts a lesson using the task, and the lessons are videotaped by our research team. In subsequent professional development sessions, the teachers view and discuss segments of the videotapes, and they collectively examine samples of student work. Our initial analyses show connections between teachers' experiences in the professional development workshops and changes in their mathematics instruction.

Phase 2 Research

The central goal of Phase 2 research is a well-defined professional development program that can be enacted successfully in different settings and by different providers. Major design activities include articulating program goals and components, developing tasks and materials for teachers, specifying facilitators' roles, and developing training for facilitators. I did not find any programs that accomplished all components of this goal. A small number of projects provide high-quality professional development for large numbers of teachers, although they have not been studied systematically across multiple sites.

Two projects include sets of curricular materials designed to be used in professional development seminars for teachers. Their major goals are to help teachers deepen their understanding of mathematics content, students' mathematical thinking, and instructional strategies. Groups of teachers work together intensively, over a long period of time, immersed in both subject matter and teaching practices. Group facilitators receive substantial preparation and support for their roles. Participating teachers develop new norms of professional discourse and a stronger understanding of the mathematics content they study.

In contrast to Phase 1, Phase 2 projects investigate the role of the facilitator, noting that the facilitator is crucial to the success of the professional development program. Facilitators must know the program goals and materials used to achieve those goals. They must be able to establish a community of learners in which inquiry is valued, and they must structure the learning experiences for that community. To maintain integrity when "scaling up," curriculum-based professional development must effectively communicate the intended goals and uses of resources to prospective facilitators.

The National Writing Project, a well-known Phase 2 program, follows a teachers-teaching-teachers model and focuses on situating teachers' learning in their own writing and classroom practices. It now includes 175 writing project sites and over 12,000 active teacher leaders. In contrast to other Phase 2 projects, studies of the National Writing Project have relied primarily on surveys and interviews to gather self-report data from teachers. Teachers have reported that the writing project helped them to develop a valuable profes-

sional network, change their philosophies about teaching writing, and increase their use of exemplary teaching practices. Some analyses of student writing samples have also been conducted, with a majority of students' work showing improvements in organization, coherence, and use of writing conventions. Only limited information is available about the actual activities and processes in the institutes and workshops, or the instructional practices of participating teachers.

Phase 3 Research

The goals of this line of research are to provide information about the effects of multiple professional development programs on teacher learning as well as the resources needed for successful enactment. Since no current projects exist, I offer the following suggestions for a Phase 3 research agenda:

- investigate a set of well-specified professional development programs with a track record of success
- further refine these programs, developing a "final" version that is ready for widespread dissemination and use
- provide information about effects and resources
- design studies that address
 - how each intervention operates
 - program fidelity across sites
 - impact on teacher and student learning
 - resources required for enactment
 - policies that support enactment

Recommendations for All Phases of Research

Phase 1 work must address academic subjects and grade levels that have received little attention to date. For example, researchers should investigate whether professional development programs with demonstrated effectiveness for elementary mathematics teaching can be adapted to other subjects and grade levels. For the many high-quality, small-scale professional development projects in existence today, Phase 2 research should be conducted to determine whether the resources for teachers and facilitators are sufficiently well-specified to be used with fidelity by other providers and in other settings. Finally, to conduct Phase 3 research, the community needs new data collection and analysis tools. For example, we need instruments to measure change in teachers' subject matter knowledge and instructional practices. Some efforts to improve measurement of instruction are currently underway.

We have much work to do and many questions to answer in order to provide high-quality professional development to all teachers. I urge us to engage in all three phases of research, and to make thoughtful, informed decisions about the methods and tools most appropriate to the specific questions we are asking.

Hilda Borko is professor of education and chair of the educational psychology program area. Dr. Borko's research explores teacher cognition and the process of learning to teach, with an emphasis on changes in novice and experienced teachers' knowledge and beliefs about teaching, learning, and assessment as they participate in reform-based professional development programs. As president of the American Educational Research Association, Dr. Borko delivered the Presidential Address at the annual conference in April. This article is a summary of her address.