

Research Review / Teacher Learning: What Matters?

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Research shows how schools can create more powerful professional development experiences.

To help young people learn the more complex and analytical skills they need for the 21st century, teachers must learn to teach in ways that develop higher-order thinking and performance. To develop the sophisticated teaching required for this mission, education systems must offer more effective professional learning than has traditionally been available. What does research say about the kind of professional learning opportunities that improve instruction and student achievement?

High-Quality Professional Development: A New Definition

In the last two decades, research has defined a new paradigm for professional development—one that rejects the ineffective "drive-by" workshop model of the past in favor of more powerful opportunities (Stein, Smith, & Silver, 1999). Research has begun to create a consensus about the content, context, and design of high-quality professional development (Hawley & Valli, 1999).

Content: Centered on Student Learning

The content of professional development can make the difference between enhancing teachers' competence and simply providing a forum for teachers to talk. The most useful professional development emphasizes active teaching, assessment, observation, and reflection rather than abstract discussions (Darling-Hammond & McLaughlin, 1995). Professional development that focuses on student learning and helps teachers develop the pedagogical skills to teach specific kinds of content has strong positive effects on practice (Blank, de las Alas, & Smith, 2007; Wenglinzky, 2000).

In a recent national survey (Garet, Porter, Desimone, Birman, & Yoon, 2001), teachers reported that their knowledge and skills grew and their practice changed when they received professional development that was coherent, focused on content knowledge, and involved active learning. Hands-on work that enhanced teachers' knowledge of the content and how to teach it produced a sense of efficacy—especially when that content was aligned with local curriculum and policies.

Saxe, Gearheart, and Nasir (2001) compared three types of support for teacher learning: (1) traditional professional development workshops, (2) a professional community-based activity that offered support to teachers using new curriculum units, and (3) the Integrated Mathematics Assessment (IMA) approach, which directly engaged teachers in learning the mathematics in the new curriculum and developing pedagogical content knowledge necessary to teach the curriculum. Students whose teachers had participated in the IMA program showed the greatest gains in conceptual understanding. These teachers attended

a five-day summer institute and then met once every two weeks throughout the year to discuss their practice and to problem solve. They looked at samples of student work or videotapes of students involved in problem solving, learned to assess student motivation, and developed specific pedagogies that included how to lead whole-class discussions, assess student work with rubrics, and create assessment tools of their own, which they shared with one another.

Context: Integrated with School Improvement

Professional development is more effective when schools approach it not in isolation (as in the traditional one-shot workshop) but rather as a coherent part of a school reform effort. To avoid disparities between what teachers learn in professional development work and what they can actually implement in their classrooms, schools should seamlessly link curriculum, assessment, standards, and professional learning opportunities.

This kind of linkage happened in Ohio when the National Science Foundation's Project Discovery offered sustained professional development linked to systemwide changes in science standards and curriculum. Teachers attended intensive six-week summer institutes covering science or mathematics content and then participated in six seminars throughout the school year that focused on curriculum equity and authentic assessment. In addition, they received on-demand support and site visits from regional leaders and contact with peers through newsletters and annual conferences. These efforts led to a significant, long-term increase in teachers' use of inquiry-based instructional practices (Supovitz, Mayer, & Kahle, 2000).

Research on effective professional development also highlights the importance of collaborative and collegial learning environments that help develop communities of practice able to promote school change beyond individual classrooms (Darling-Hammond & McLaughlin, 1995; Hord, 1997; Knapp, 2003; Louis, Marks, & Kruse, 1996; Perez et al., 2007). When whole grade levels, schools, or departments are involved, they create a critical mass for changed instruction at the school level. Teachers serve as support groups for one another in improving practice. Collective work in trusting environments provides a basis for inquiry and reflection, allowing teachers to raise issues, take risks, and address dilemmas in their own practice (Ball & Cohen, 1999; Bryk, Camburn & Louis, 1999; Little, 1990).

Design: Active, Sustained Learning

The design of professional development experiences must also address how teachers learn. In particular, active learning opportunities allow teachers to transform their teaching and not simply layer new strategies on top of the old (Snow-Renner & Lauer, 2005). These opportunities often involve modeling the new strategies and constructing opportunities for teachers to practice and reflect on them (Garet et al., 2001; Saxe et al., 2001; Supovitz et al., 2000).

Cohen and Hill (2001) describe two approaches that proved successful in California's statewide reform, which introduced a new mathematics curriculum and assessments. Both

approaches gave teachers opportunities to actively learn about new mathematics content as well as to practice and share their new knowledge.

The first professional learning activity engaged teachers in learning the mathematics in the new curriculum units. Teachers then taught the units and returned to share their experiences with other teachers and to problem solve while preparing to teach subsequent units. In the second effective approach, teachers evaluated student work on assessments directly linked to the reform curriculum. The teachers were guided through conceptual roadblocks students faced on the assessments, and they learned how to anticipate and address these misunderstandings.

In addition, teaching practices and student learning are more likely to be transformed by professional development that is sustained, coherent, and intense (Cohen & Hill, 2001; Garet et al, 2001; Supovitz, Mayer, & Kahle, 2000; Weiss & Pasley, 2006). The traditional episodic, fragmented approach does not allow for rigorous, cumulative learning (Knapp, 2003).

Although time is not the only variable that matters, it is often a prerequisite for effective learning. Two separate evaluations found that teachers who had 80 or more hours of professional development in inquiry-based science during the previous year were significantly more likely to use this type of science instruction than teachers who had experienced fewer hours (Corcoran, McVay, & Riordan, 2003; Supovitz & Turner, 2000). Further, increased student achievement was associated with teachers' more intense participation in the professional development and students' greater exposure to the resulting reform-based instruction (Banilower, 2002).

In a review of nine studies, Yoon, Duncan, Lee, Scarloss, and Shapley (2007) found that sustained and intensive professional development was related to student achievement. The three studies of professional development lasting 14 or fewer hours showed no effects on student learning, whereas other studies of programs offering more than 14 hours of sustained teacher learning opportunities showed significant positive effects. The largest effects were found for programs offering between 30 and 100 hours spread out over 6–12 months.

Professional Learning Communities: The New Paradigm

Taken together, the research described here points to the effectiveness of sustained, job-embedded, collaborative teacher learning strategies. An approach that meets these criteria, and that has been increasingly featured in the literature, is the professional learning community. In this model, teachers work together and engage in continual dialogue to examine their practice and student performance and to develop and implement more effective instructional practices. In ongoing opportunities for collegial work, teachers learn about, try out, and reflect on new practices in their specific context, sharing their individual knowledge and expertise.

In the United States, efforts to develop professional learning communities bump up against individualistic norms and school structures that sharply limit time for

collaborative planning. Teachers and reformers do not always have images of how teachers can work and learn effectively together.

The productive teacher learning communities studied by Little (1990) engaged in what she came to call joint work—"thoughtful, explicit examination of practices and their consequences" (p. 520) that emerged from collaboration on concrete tasks such as curriculum development, problem solving around students and their learning, and peer observations. These communities created norms that valued mutual aid above privacy. They shared responsibility for instructional improvement and supported teachers' initiative and leadership with regard to professional practice. Because effective collaboration requires much more than simply bringing teachers together, we need to learn how schools can form and support teacher learning communities that engage in joint work.

Conditions That Support Joint Work

Louis, Marks, and Kruse (1996) examined the conditions necessary for such communities. In terms of structure, they found that smaller school size and common planning time were key. They also found that lower staffing complexity (more staff who were directly involved in teaching and learning) and the empowerment of teachers as decision makers were highly correlated with professional community. The human and social resources needed for professional community included supportive leadership, mutual respect steeped in strong professional knowledge, and a climate that invited risk taking and innovation.

These broad structures give some idea of the prerequisites for a professional learning community, but a finer lens is required to examine the types of interactions and processes that foster teacher learning in such a community. An understanding of the particular ways teachers talk and collaborate can provide insight into the role of professional learning communities in improving teacher practice.

Researchers who have studied the process of forming a community have found that it is often slow and fraught with conflicts, silences, and misunderstandings. Persistently working through and reflecting on these challenges creates avenues for community to emerge. Grossman, Wineburg, and Woolworth (2001) documented how social studies and English teachers in one urban high school slowly developed a professional learning community. Participants gradually began to accept shared responsibility for individual growth, formed a group identity and norms of interaction, and learned to use difference and conflict productively.

Like all professional development, a professional learning community's interactions should focus on improving instructional practice. To identify problems, group members must make their practice public to colleagues and take an inquiry stance. Change occurs as teachers learn to describe, discuss, and adjust their practices according to a collectively held standard of teaching quality (Little, 2003). The process of learning with colleagues in small, trusting, supportive groups makes the difference (Dunne, Nave, & Lewis, 2000).

Structured dialogue as part of a group's inquiry cycle can provide the necessary opportunities for a continual focus on improving practice. Hollins, McIntyre, DeBose, Hollins, and Towner (2004) documented how elementary teachers collaboratively inquired about improving literacy development among their black students. In a five-step process, they identified a challenge, selected an approach, implemented and evaluated the approach, and then reflected on their experiences to guide future practice. In the course of two years, the teachers developed more positive views of their students' abilities, developed new instructional strategies, and watched their students improve.

A Variety of Community Structures

A number of different types of collaborative, job-embedded professional learning activities can improve teacher practice and student achievement.

Peer observations of practice. Teachers in professional communities often make regular visits to one another's classrooms and provide feedback and assistance (Hord, 1997). Critical friends groups trained to use protocols designed by the National Reform Faculty have successfully engaged in this type of professional learning (Dunne, Nave, & Lewis, 2000). Teachers can also videotape their teaching to make aspects of their practice open to peer review, to learn new practices and pedagogical strategies, and to analyze aspects of teaching practice that may be difficult to capture otherwise (Sherin, 2004). Research has found that this kind of work can change teachers' practices, knowledge, and effectiveness (Lustick & Sykes, 2006; Sato, Wei, & Darling-Hammond, 2008).

Analysis of student work and student data. The activities of productive professional learning communities often center on student work and data. Analyzing student work together gives teachers opportunities to develop a common understanding of what good work is, what common misconceptions students have, and what instructional strategies are working. The power of focusing on data and dialogue in professional learning is evident in the success of elementary schools that consistently produce higher-than-expected student achievement (Strahan, 2003).

Study groups. When professional communities study practice and research together, they can make meaning of new strategies and concepts and can support one another in implementing new ideas. Phillips (2003) describes a community that transformed its practice by reading and discussing education research. Teachers used what they learned in their study groups to improve their assessment practices, raise expectations for traditionally underperforming groups, and create relevant and engaging curriculum.

New Possibilities for Teacher Learning

Professional learning communities can change practice and transform student learning—when they have in place the processes and structures that make true joint work possible and desirable.

Current research suggests that providing intensive, content-rich, and collegial learning opportunities for teachers can improve both teaching and student learning. When schools support teachers with well-designed and rich professional development, those teachers

are able to create the same types of rigorous and engaging opportunities for students—a foundation for student success in school and beyond.

Research Supports Professional Development That

- * Deepens teachers' knowledge of content and how to teach it to students.
- * Helps teachers understand how students learn specific content.
- * Provides opportunities for active, hands-on learning.
- * Enables teachers to acquire new knowledge, apply it to practice, and reflect on the results with colleagues.
- * Is part of a school reform effort that links curriculum, assessment, and standards to professional learning.
- * Is collaborative and collegial.
- * Is intensive and sustained over time.

Research Does Not Support Professional Development That

- * Relies on the one-shot workshop model.
- * Focuses only on training teachers in new techniques and behaviors.
- * Is not related to teachers' specific contexts and curriculums.
- * Is episodic and fragmented.
- * Expects teachers to make changes in isolation and without support.
- * Does not provide sustained teacher learning opportunities over multiple days and weeks.

The Old Paradigm

Like many schools in its large urban district, Kennedy High School was facing low levels of achievement in 9th grade algebra. To address the problem, the principal dedicated two of the five professional development days that year to improving algebra instruction. She brought in experts to help her math department learn teaching strategies that would help improve algebra scores.

At the beginning of the year, the 16 math teachers were eager to spend concentrated time on improving math instruction. On the first professional development day, the consultant introduced an exciting new research-based program. Teachers spent four hours listening to and watching the consultant demonstrate how using manipulatives and projects could engage students. They watched videos in which teachers praised the program and students were visibly involved in learning math. The school invested heavily in new materials to support the program.

At the end of the two-day workshop, teachers were asked how they would incorporate the new strategies into their classrooms. Many said they would try the strategies the next week. Several teachers left feeling they wanted to learn more and that their students would enjoy working with the program's hands-on materials. But they also left with questions and doubts: How will this new approach help us align our curriculum with the

state standards? This program looks great, but how will my students handle it? How will I change what I've been doing to incorporate this new approach?

When the math teachers came together for a second meeting in the spring with the consultant, teachers confessed that they had made little progress with the new approaches. Teachers said they did not really understand how to teach with the materials. Some had tried, with limited success; others simply couldn't find time in the curriculum, given the pressure to cover all the standards. The teachers were frustrated about spending time on "yet another new flavor of the month" for math when they could be figuring out ways to prepare students for the exam later that month. They spent the next few weeks focusing on test prep, drilling students on sample test items and formats. At the end of the year, no gains had been made in student achievement and the principal was stumped as to how to improve math instruction and student learning in her school.

The New Paradigm

In just three years, Pine Hills Elementary School went from having two-thirds of its primarily low-income students reading below grade level to having two-thirds reading at or above grade level. The principal and teachers attribute this transformation to the redesign of professional learning opportunities at the school.

Pine Hills teachers were given the opportunity to create their own professional development plan on the basis of goals they selected for their students. They decided to focus on literacy and sent a cadre of teachers to a three-week summer literacy institute sponsored by a local university. The institute helped them learn to integrate reading and writing instruction with strategic assessments and teaching of essential skills to students as needed.

The six teachers who attended the institute worked with two district-funded instructional coaches to design professional development for the rest of the staff. The coaches, who were selected by the teachers, had substantial, deep knowledge of the institute's language arts strategies and the strong body of research on which they were based. These coaches, in collaboration with the six newly trained teachers, introduced curriculum and teaching strategies and data-analysis techniques during professional development meetings held monthly throughout the year.

The two coaches served as experts in the building and were available any time to model a lesson, observe and provide feedback, or organize a study group. They also organized peer observations so that teachers could observe reading lessons in one another's classrooms and debrief together, sometimes serving as substitutes to allow these observations to happen.

Instead of using the five district-allocated professional development days for daylong sessions, the principal redesigned the school schedule to enable teachers to spend an hour together each week while students were at music or art, in the library, or receiving tutoring. During this time, grade-level teams collaborated to improve reading instruction,

sometimes on their own and sometimes with the help of the instructional coaches or outside consultants. Individual teachers brought problems from their classrooms to the group and the team engaged in inquiry cycles to devise solutions.

Teachers worked within the framework of the state standards and were supported by both district and school leadership. The school adopted the new strategies after teachers had tried the new approaches with their peers and discussed problems they may have had teaching them. By learning to pose problems and research effective approaches, teachers improved reading instruction and student learning in their school.

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This review indicates that, while the study Figure 1 (Borg 1997) summarises the answers of teacher cognition has established itself on the research to these questions. It indicates that teachers agenda in the field of language teaching and provided have cognitions about all aspects of their work, valuable insight into the mental lives of language teachers, and lists recurrent labels used to describe the a clear sense of unity is lacking in the work and there are various psychological constructs which I collectively several major issues in language teaching. which have yet refer to here as teacher cognition.Â a Graduate Diploma in Education at learning and the roles of teachers an Australian university Brumfit et al. Teacher educators' professional learning: A literature review. Teaching and Teacher Education. June 2018. Teaching and Teacher Education 75. DOI: 10.1016/j.tate.2018.06.003. Authors: Cui Ping.Â Results show that research on teacher educators'. professional learning appears to be a growing ĩ- eld of interest but fragmented in focus. Our review in- dicates: (a) there is no clear knowledge base essential for teacher educators' work, (b) teacher educators. undertake different activities from which to learn, and (c) they generally experience the need to learn to. do their work as teacher educators. Our study may contribute to understanding and supporting teacher. Teacher Learning: What Matters? February 2009. Educational leadership: journal of the Department of Supervision and Curriculum Development, N.E.A 66(5):46-53.Â There is also research to suggest that a teacher's improved skill in handling of active learning will help them to better provide feedback to students, review student work, and lead classroom discussions (Van den Bergh et al., 2014). The Impact of Elementary Mathematics Coaches on Elementary Teachers' Attitudes Towards Teaching Mathematics. First, teachers need to understand subject matter deeply and flexibly so that they can help students create useful cognitive maps, relate ideas to one another, and address misconceptions. Teachers need to see how ideas connect across fields and to everyday life. (Shulman, 1987.)Â Beginning teachers get a more coherent learning experience when they teach and learn in teams with these veteran faculty and with one another.Â Similarly, at Fairdale High School in Louisville, Kentucky, teachers' research coupled with shared decision making produced major changes. As part of a self-study, ten teachers followed ten children through a school day. When it was over, teachers said things like, "It was boring," or, "You know, this isn't a very humane place to be."