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ABSTRACT

This report examines the nature and extent of professional development activities, assesses the current National Center for Education Statistics (NCES) collection of professional development data, and recommends ways to enhance that data collection. Section 1, "Overview and Background," introduces the subject. Section 2, "Linking Student Learning, Teaching Quality, and Professional Development," describes linkages between the three. Section 3, "Professional Development Indicators," outlines a taxonomy of professional development indicators of effectiveness in light of recent research and thinking. Section 4, "Measuring Professional Development Process and Outcomes," describes customary approaches to measuring professional development, focusing on teacher surveys, teacher interviews, observations of teaching practice, observations of professional development activity, and analysis of student achievement test results. Section 5, "Professional Development as Measured through Existing Surveys," analyzes the focus and usefulness of available survey items with respect to inclusion in NCES data collection activities. The survey items include professional development design, delivery, content, context, and outcomes. Section 6, "Recommendations for NCES Data Collection on Professional Development," recommends new items, instruments, and methods that will maintain important time series yet generate more comprehensive data sets for supporting characterizations of practice more responsive to present conceptions about educational outcomes. Section 7 offers conclusions. The four appendixes include referenced background materials and items from 22 surveys used by NCES and others to learn about professional development. Appendices contain, "The National

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Education Goals--Goal 4"; "U.S. Dept. of Education Professional Development Principles"; "American Federation of Teachers Professional Development Guidelines"; survey items and indicators. (Contains 52 references.) (SM)

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Student Learning, Teaching Quality, and Professional Development: Theoretical Linkages, Current Measurement, and Recommendations for Future Data Collection

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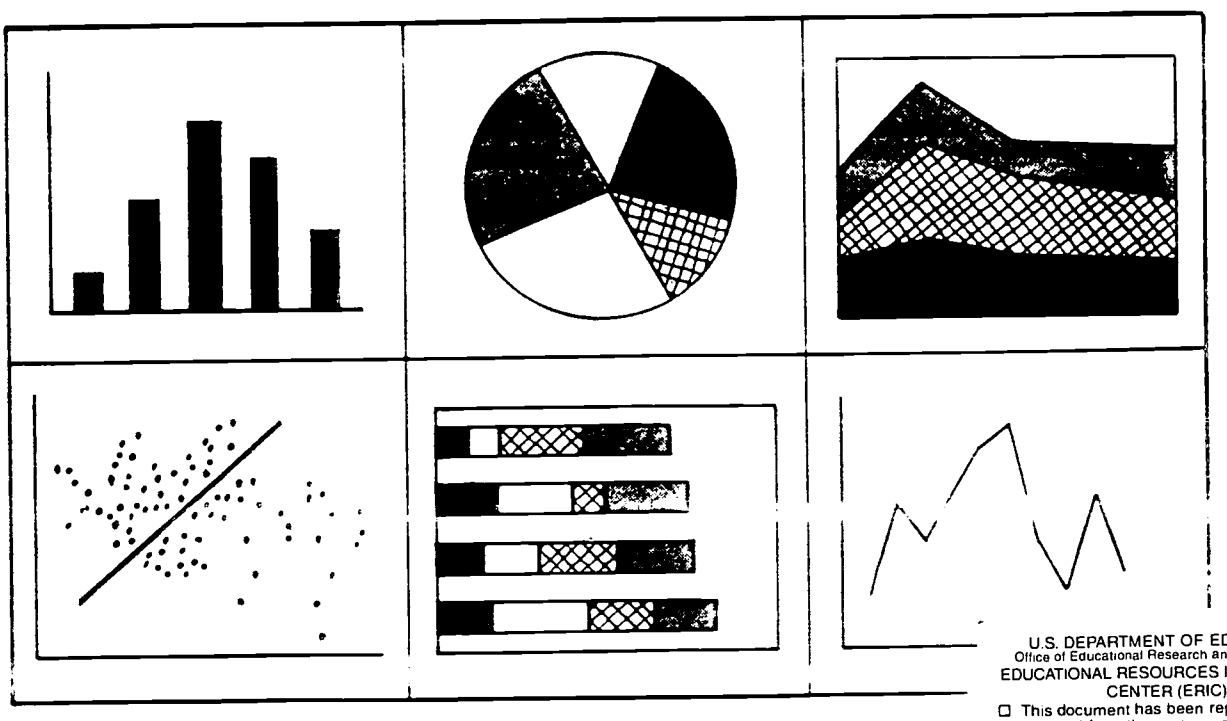

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Student Learning, Teaching Quality, and Professional Development: Theoretical Linkages, Current Measurement, and Recommendations for Future Data Collection

Working Paper No. 96-28 November 1996

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November 1996

Foreword

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I. Overview and Background

Critics of public education are divided on many issues, but agree on one: too few children leave school with the knowledge and skills that their credentials were intended to certify. As a result of widespread dissatisfaction with this outcome, thoughtful research and documentation of successful practice have fostered many promising reform movements. New theories of instruction growing out of new understandings of child development, learning and teaching styles, and organizational structures have spawned classrooms, schools, and districts that are heavily involved in change and experimentation. Many such movements are small, sometimes involving only a handful of teachers or a school or two; others are large and growing. Despite differences in size or intensity, most transformation efforts depend on improvements in teaching quality, typically brought about by program-related professional education, as one engine driving school and classroom change. Other resources may be brought to bear; curriculum, facilities and equipment, organizational arrangements, and family and community engagement all have roles to play. Increasingly, however, professional development leading to improvement in teaching quality is a key component of reform.

As the twentieth century comes to a close, schools face both a need to change and opportunities to succeed. Many who are deeply concerned about public education believe that professional development for teachers, effectively conceived and delivered and aligned with other dimensions of the education enterprise, can be a primary support for such reforms. In 1994, this conviction led to the addition of professional development to the list of National Goals:

> By the year 2000, the Nation's teaching force will have access to programs for the continued improvement of their professional skills and the opportunity to acquire the knowledge and skills needed to instruct and prepare all American students for the next century.

The objectives for this National Goal address the need to engage states, school districts, and community partners collaboratively in recruiting, preparing, and maintaining a highly qualified education workforce equipped to enable diverse student populations to achieve challenging academic goals. (See Appendix A.) Ten indicators were recommended for inclusion in the 1995 National Education Goals Panel Report (National Education Goals Panel, 1995).

Clearly, one direct way to enhance teacher quality is by revamping teachers' preservice experiences, but even if that process were ideal, it would be insufficient. New teachers constitute a small segment of the nation's education team. In the last three years, only one teacher in ten currently in the workforce had received intense pedagogical instruction such as that now offered in

preservice teacher education programs (NCES, 1995). Instead, the majority of classroom teachers are far and getting farther from such training: teachers are older and more experienced than they were 30 years ago. In 1966, the median age of all public school teachers was 36, and their median experience was eight years; in 1991, the median age of teachers was 42 and the median experience was 15 years (NCES, 1995, Table 68, p. 79). That aging trend is continuing. In 1993-94, 65 percent of public school teachers had ten or more years of experience, and 30 percent had 20 or more years (NCES, 1995). While experience is a definite asset in professional practice, it may also signal less recent exposure to extended professional education and less familiarity with new approaches. The 30 percent who are 20-year teaching veterans, for example, may have received their last intensive professional education in the 1960s, when much less was known about teaching and learning. Spurred by the need for a maturing workforce to keep current with the expanding professional knowledge base, emboldened by a commitment to help every child achieve high standards, and guided by new conceptions of how reforms occur, school communities are increasing attention to professional development as a central component of reform.

Like other aspects of schooling, professional development itself has changed as the result of an improvement in our understanding of and reliance on new models of teaching and learning. Until recently, professional development often consisted of single events designed to transmit new knowledge or well-defined skills, such as those needed to interpret test scores or complete a specific type of lesson plan. Although these efforts might have been related to some larger plan, they were not necessarily linked to the participants' goals for improving teaching and learning in any systematic way. Implementation was thus often flawed or limited, and desired effects were hard to document. New approaches provide a wide range of opportunities for teachers and others to explore rigorous and relevant ideas about child development, learning, and teaching based on current research and proven practices. Teachers' competence may be enhanced by creating and evaluating curriculum, designing assessments, participating in decision-making, joining networks of colleagues with similar subject matter or pedagogical interests, or any of a myriad of practice-related activities, in addition to traditional workshops and courses.

In 1995, the U.S. Department of Education (ED) created the Professional Development Team to assist policymakers and practitioners in making maximum use of the best ideas about professional development as the cornerstones of their reform efforts. According to this team, the mission of professional development is to "prepare and support educators to help all students achieve to high standards of learning and development" (ED, 1996). Its principles assert that effective professional development:

- Focuses on teachers as central to student learning

- Reflects best available research and practice
- Promotes continuous inquiry and improvement
- Is best evaluated ultimately by its impact on teacher effectiveness and student learning
- Is planned collaboratively

The team's full statement of mission and principles is included in Appendix B.

Similarly, the American Federation of Teachers (AFT) characterizes professional development as a "continuous process...[that] should empower individual educators and communities of educators to make complex decisions, identify and solve problems, and connect theory, practice, and student outcomes" (AFT, 1995). Its guidelines define sound professional development as that which:

- Ensures depth of content knowledge
- Provides a strong foundation in content pedagogy
- Provides more general knowledge about teaching and learning processes
- Takes a variety of forms

The complete AFT guidelines are included in Appendix C.

Although many view professional development as centrally important to school improvement, comprehensive assessment of such learning opportunities has yet to be undertaken. The National Center for Education Statistics (NCES), primarily through the Schools and Staffing Survey (SASS), collects some data, yet the National Education Goals Panel (NEGP) found little information on which to base its yearly evaluation of progress toward the new national goal. Indeed, examining the breadth and depth of information on professional development collected by a number of sources reveals overlaps and gaps. While much general information distinguishes among the professional development delivery types, little is collected on the objectives and design of those experiences or on other processes that stimulate teacher learning, such as action research or participating on a school improvement team. Items from SASS are the most extensive, while information from the National Assessment of Educational Progress (NAEP) and National Education Longitudinal Study of 1988 (NELS:88) focuses primarily on measuring contact hours by content area.

The purpose of this report is to lay the groundwork for building NCES capacity to assess the nature and extent of professional development activities as an increasingly vital element of the nation's

education systems. The report is organized into six sections and four appendices. Section II describes the linkages between student learning, teaching quality, and professional development, while Section III outlines a taxonomy of professional development indicators of effectiveness in light of recent research and thinking. Section IV describes customary approaches to measuring professional development, and Section V analyzes the focus and usefulness of available survey items with respect to inclusion in NCES data collection activities. In Section VI we recommend new items, instruments, and methods that will maintain important time series, yet generate more comprehensive data sets that will support characterizations of practice more responsive to present conceptions about educational outcomes. Section VII presents our conclusions. The appendices include referenced background materials and items from 22 surveys now used by NCES and others to learn about professional development.

In this report, we examine the nature and importance of professional development, assess the current NCES collection of important professional development data, and recommend ways to enhance that data collection. The culmination of the activities initiated with this paper will be development of further capacity to assess how the nation's school systems are creating opportunities for teachers to learn, what skills and knowledge they target for teacher learning, what purposes they aim to serve by this investment, and what effects they achieve. We expect that the information collected with this expanded capacity will add to the definition and usefulness of the professional development data already collected and analyzed by NCES and others.

II. Linking Student Learning, Teaching Quality, and Professional Development

This section explores the rationale for providing teachers with professional development that enhances student learning. First, we describe student learning in terms of the content and processes of instruction. Second, we explain how teaching quality shapes learning experiences for students. Then we explore several ways that teaching quality may be influenced by professional development and show how conceptions of learning opportunities for teachers have changed to reflect new understanding of the acquisition and use of professional expertise. Finally, drawing on a review of recent research on this subject, we propose a set of indicators of high quality in five dimensions of professional development: design, delivery, content, context, and outcomes.

Student Learning

The primary goal of education is student learning--the acquisition of knowledge, skills, and attitudes. Learning is the result of substantive student work directly related to lesson objectives, and it occurs when the complexity of instruction is well-matched to the student's level of competence, motivation, and task engagement at the time of the lesson. Increased student achievement is the ultimate evidence of school success. At the heart of all school activity is a single, pivotal point: productive student engagement in a purposeful, academic task. Other aspects of desired student growth--for instance, citizenship and responsibility--are usually taught in the context of academic work.

Assumptions about the process of learning shape assumptions about teaching effectiveness, and both sets of assumptions have recently evolved at a rapid pace. According to Resnick (1989), contemporary cognitive theory highlights three dimensions of learning that influence conceptions of teaching. First, learning involves interpreting information, not simply recording it. Second, new learning builds on prior learning; the previously unknown must find a niche among the known if it is to be acquired at all. Third, new learning is acquired in context; context provides clues about meaning that strengthen acquisition and ownership. Research on teaching that accommodates this notion of learning is far from complete; however, while future refinements of what it really means to know something may change the terms of discourse about student learning, it will not alter the need to keep the quantity and quality of student engagement as the focus of improvement efforts. New ideas about learning may suggest additional strategies that will eventually prove or disprove their

merit, but student engagement in work aimed at achieving a meaningful goal will always be central to the process. The review that follows draws on examples of student learning and sound instructional practices from a range of literature that bears on current conceptions of learning.

Academic Learning Time

In a study of teacher activities and environmental factors that influence student learning[1] (Fisher, Berliner, Filby, Marliave, Cahen, & Dishaw, 1980), researchers traced the origins of achievement to the amount of time students spend actively engaged in a certain kind of work. They called this "academic learning time" (ALT). The study was narrow in its focus--basic skills in third and fifth grade reading and math--but broadly encompassing in its conceptual frame. Although recent studies have pushed the boundaries of our understanding of the content and processes of learning in important dimensions, the concept of ALT permits us to orient these new ideas to our central concern. Intentional assessment--formal or informal, "authentic" or otherwise--provides the measure of learning after it happens; in contrast, ALT offers immediate and observable evidence that the teacher is providing usable opportunities for students to learn. While time spent on other school activities may have value, ALT contributes most directly to achievement.

ALT has two defining qualities:

- Student work is directly related to academic goals
- The work's level of difficulty is well-matched to the student's present level of competence

ALT is distinguished from "engaged time" by these quality indicators. Students may be engaged for long periods of time without learning much; most of what students and teachers both see as "busy work" is engaging without being thought-provoking or generative. Likewise, ALT is distinguished from allocated time, which is simply the amount of time scheduled for a lesson. Within limits sketched by contextual variables--for example, the development stage of the learners--the more ALT in a student's school day, the more learning.

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[1] The Beginning Teacher Evaluation Study, funded by the National Institute of Education, aimed initially to identify the knowledge and skills required to begin teaching successfully. However, it developed into a study of the nature of instruction that generated a need first to characterize student learning. Its description of a learning event, perhaps dated in some ways, remains conceptually cogent.

Resource shortages such as limited computer availability, lack of textbooks, and deteriorating physical plants are academically problematic because they impair the efficiency of student work. Many problems that should be solved for the general welfare of children and their families also put academic success at risk because they constrain students' engagement in schoolwork. To tie student learning to student work is not to hold the student solely accountable for learning or to discount the seriousness of factors that interfere with student work (and cause other problems as well); rather, it is to recognize that from an educational perspective the capacity of these factors to impede student work renders them worthy of attention. Limited investment of personal effort in learning, whatever the cause, results in limited learning.

Substantive Work

Substantive work directly and appropriately related to the desired outcome is an essential component of academic learning time. In an example suggested by the study of Fisher *et al.* (1980), if the fifth-grade lesson's goal is learning to solve "story problems," then substantively appropriate work presents effective solution strategies and involves the student in real solution activities, not just in routinely adding (subtracting, dividing, etc.) the two numbers buried in the narrative. Within the cycle of learning and assessment, ALT involves work on activities that cultivate capacity to meet the learning goal and satisfy the assessment standard. While in some ways self-evident, this point is important because it distinguishes a particular kind of classroom work from many other common classroom activities that may also be engaging and time consuming. Setting up and taking down equipment, copying assignments, and coloring worksheets may be enjoyable and/or necessary activities, but they do not contribute to achievement in the direct and efficient way that cognitively demanding tasks relevant to academic goals do.

In a recent report about authentic pedagogy (Newmann, Marks, & Gamoran, 1995), a team of researchers described a more detailed notion of productive academic work and showed its contribution to student achievement. "Authentic academic performance," in their view, engaged students in analytic thinking, demonstration of important disciplinary concepts, and elaborated communication. By analytic thinking, they meant such cognitive activities as "organizing, synthesizing, interpreting, hypothesizing, describing patterns, making models or simulations, constructing... arguments or inventing procedures." They construed engagement with important disciplinary concepts as not just applying rules, but extending definitions and making connections with other concepts within the discipline or to another discipline. By elaborated communication, they meant conveying information or ideas concisely, logically, and with appropriate explanation or argument. Where the researchers found evidence that students were more engaged in these ways, they also found superior student

achievement on assessments designed to measure this kind of outcome. In schools where advocacy of and support for such activities was strong overall but implementation was uneven across classrooms, classrooms scoring high in "authentic learning" activities were also the high scorers on achievement measures.

Despite the focus on different subjects, the similarity of findings in both Fisher *et al.* and Newmann *et al.* suggests the robustness of the notion that the quality of student work in substantive dimensions generally under the teacher's control is a primary contributor to students' achievement.

Matching Work to Learner

Task engagement is most productive when the goal is just beyond the reach of the student at the beginning of the work period, yet able to be mastered by the end of it. Initial studies of learning as a function of the level of difficulty of the learning task suggested that generally students learn more when they experience high rates of success in their academic work (Fisher *et al.*, 1980), especially in their independent work. Further analyses showed that the optimal rate of success is determined by the interaction of the student and the learning task. On the one hand, if the goal is to master a skill to the point of automaticity, for example in math facts or spelling, then students may learn most efficiently when practice activities can be completed with high levels of accuracy. On the other hand, if the goal is more complex, for example to learn more about causal relations in natural science or characterization in literature, then learning activities may usefully be more challenging. Furthermore, some students will persevere on very difficult tasks with ultimate success, while others may fail to grasp the elusive objective if it is too distant from what they already know. Finally, task engagement is influenced by the scaffolding of the event, that is, the amount of structure, explanation, and explicit direction offered to learners. Students who begin the lesson with different levels of skill and knowledge need to receive different support, provided to ensure optimal cognitive stretch to each without undue frustration.

Doyle captured students' experience of a lesson in his notion of academic task structures, which he called "the central organizing frameworks in classroom settings" (1992, p. 503). Academic tasks shape the way cognition is elicited in a learning event, whether it is a simple activity completed in one session or a complex activity spanning an extended time period. Each task is defined by its intended product, the kind of work needed to produce the product, the resources available to support the work, and the importance assigned to the product in the relevant accountability system (Doyle, 1986). These features communicate to the learner what is expected and how a given expectation is prioritized in the learning system (and therefore how much is to be invested in meeting expectations).

Academic tasks are a kind of "molecule" of learning--the smallest unit that engages students meaningfully.

Students experience ALT in the form of academic tasks. Analyses of observations of students at work on different kinds of tasks (cited in Doyle, 1992) revealed that familiar, routine tasks support order and the quick flow of work. While order and pacing are valuable, the content of familiar, routine activities is necessarily limited in scope and challenge. On the other hand, problem-centered tasks that engage students in interpreting and making decisions proceed more slowly and elicit anxiety in some students. These students may respond by soliciting more structure or disengaging from the task. The instructional goal is to maintain reasonable order while stimulating growth. When student efforts focus on academic tasks that have the right blend of substantive content and level of challenge, then learning is the result. Conversely, when substantive content is inadequate or the level of challenge is inappropriate, effort will be less fruitful.

Teaching Quality That Increases Student Learning

Teaching quality may be demonstrated by the capacity to generate and sustain effective student engagement. Teaching quality impinges directly on the efficacy of student work through professional competence in two areas:

- Teachers' content expertise, expressed as knowledge of a specific discipline and knowledge of how to teach that discipline
- Teachers' pedagogical expertise, expressed as ability to develop academic tasks with appropriate content and challenge, use a variety of instructional strategies, assess students' knowledge and skill, and manage the classroom environment for optimal working conditions

Content Expertise

Teachers' understanding of lesson content, their repertoire of strategies suitable for making particular content accessible to a given group of students, and their understanding of what students already know about that content influence the success of a learning activity.

First, teachers' *knowledge of specific content* is the foundation for setting up academic tasks. Whether students are listening to a lecture, puzzling out a discovery exercise, working with

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manipulatives, or acting out a scenario, the quality of the activity's content hinges to some degree on the teacher's understanding of the content. If the teacher's knowledge of the content is shallow or ill-formed, the teacher's instruction will reflect that limitation, for example by presenting erroneous characterizations or only the most trivial instances rather than those that truly illuminate a concept. Some studies reveal that teachers teaching out of their fields of expertise rely more heavily on drill and practice activities and entertain student questions less willingly than those who were prepared to teach the same subjects and thereby are able to navigate the sometimes unpredictable turns of a complicated lesson (Grossman, 1991). The explosion of knowledge in an information age makes it unlikely that even the most dedicated scholar could claim mastery over an entire discipline, and the ascendance of the model of teacher as guide suggests that dispensing information from one's personal store of knowledge is no longer a sufficient conception of teaching. However, understanding what Schwab called the "structure of a discipline" (1964) and how knowledge is construed and developed within a discipline remains essential. Knowing the terms and procedures of discourse enables a teacher to model for students the way learning is accomplished and expanded in a discipline.

Second, teachers' *knowledge of how to teach that content*--what Shulman (1987) and his colleagues call pedagogical content knowledge--supports insightful selection of explanatory frameworks in consideration of the content and the students. This form of expertise enables a teacher to choose the examples, metaphors, or applications of a concept or skill that make the content most accessible to a given group of students. Teachers with limited knowledge of a discipline may choose a handy example that only appears to illustrate the concept but doesn't hold up under scrutiny. They may have so limited a collection of instances that students generalize to the wrong conclusion or acquire a mistaken notion of the lesson's point. In contrast, teachers with pedagogical content knowledge present "the most useful forms of representation of those ideas, the most powerful analogies, illustrations, examples, explanations, and demonstrations--in a word, the ways of formulating the subject that make it comprehensible to others" (Grossman, 1991, paraphrasing Shulman). Such teachers flag the key ideas and defining principles of a discipline and are not easily distracted by issues at the margins.

This dimension of expertise overlaps with a third dimension: the *capacity to assess and recognize the significance of what students already know* in relation to what could be known about a topic. This capacity enables teachers to choose the right point of entry for lessons and the right learning goals for a given period of work. This dimension of content expertise helps the teacher compose a lesson framed to offer the most helpful and authentic view of the broader subject, a view that takes into account what the students can already "see" of the subject and helps them perceive new relationships and patterns. Knowledgeable teachers directly address the points that their experience

has taught are problematic to certain types of students and link new content to that which is already familiar to students.

Pedagogical Expertise

We use the term "pedagogical expertise" to refer to general teaching skills and knowledge, distinguished from those discussed above that are related primarily to specific subject-matter content. Pedagogical expertise includes the teacher's understanding and application of generally accepted principles of instruction, classroom management, and assessment of student learning.

First, a teacher's overall *instructional skill* is the basis on which subject-specific refinements are added. Process/product research, which examines the correlations between observable instructional factors and student learning, has established that certain teacher-controlled instructional conditions are reliably associated with student learning. A summary of this research (Brophy & Good, 1986) lists six factors that promote learning:

- Content coverage is extensive and the pace of instruction is brisk
- Content presentation is organized, clear, and appropriately redundant
- Questioning varies with respect to level of difficulty and cognitive complexity, in keeping with students' interest and engagement and the subject's nature
- Teacher reactions to students' contributions encourage participation without discouraging excellence
- Independent homework and seatwork assignments engage students at high rates of successful practice
- Practices with respect to individual and group work sustain productive engagement and make the best use of teacher resources

Teacher competence in any of these areas is a matter of knowledge, skill, and judgment. For example, research and simple logic suggest that students are more likely to learn what has been taught than what has not been taught, so teachers who cover more material establish the basis for increased learning. Racing from topic to topic to get to Grover Cleveland by April in a history course or finish the targeted chapters of the math text before spring testing does not necessarily produce real learning; engagement with the content is also a critical ingredient of mastery. Skillful teachers are those who

set a pace as brisk as students can manage, continuously adjusting it to ensure engagement and boost mastery while maintaining ambitious goals. Engagement and coverage both play roles.

Second, *classroom management skills* make a direct contribution to the amount of time available for learning and to the attitudes and motivation with which students approach the task. Studies begun in 1970 by Kounin and continuing have identified the teacher classroom management skills most commonly associated with student achievement (Evertson, 1987). At the elementary level, students who learned more had teachers who:

- Analyzed classroom tasks to understand the demands made on students
- Taught students how to follow key rules and implement routine procedures
- Viewed the classroom from the students' perspective to understand what directions students needed to function successfully
- Monitored student behavior closely and responded immediately to problems

At the secondary level, researchers observed that successful students had teachers who, in addition to explaining rules and monitoring behavior, also:

- Implemented effective accountability systems to keep track of students' work
- Communicated information and expectations clearly
- Organized instruction to get the most time for academic work

The specific ways that good teachers implement strategies directed toward establishing and maintaining civility and good work habits vary, but their effectiveness in this aspect of teaching, uniformly and directly influences how much time is available for students to work.

Third, teacher's skill in *assessment* also contributes to student learning. In Doyle's concept of an academic task (1992), the type and importance of assessment communicates to students which task dimensions are essential and how the task figures in the overall scheme of the course or lessons, and what resource allocations (e.g., students' time) are warranted. Students' motivation and learning is directly affected by the teacher's ability to design assessment strategies that target instructional goals precisely, capture evidence of learning effectively, and integrate the assessment into a sensible accountability system.

In their studies of "authentic pedagogy," Newmann, Marks, and Gamoran (1995) describe specific assessment strategies associated with an approach to instruction that leads to higher student achievement. In their view, "authentic" assessment involves students in, first, organizing information; second, evaluating alternatives; third, demonstrating understanding of disciplinary content; fourth, demonstrating discipline-appropriate methods of inquiry; and fifth, communicating understanding in an elaborated written assignment. The assessment task itself should show the value of the knowledge being tested outside of school, by centering on a problem that has real-world applications and eliciting communication with an audience besides the teacher.

Professional Development That Increases Teaching Quality

Teachers must provide meaningful academic tasks that engage students in work directly related to learning goals, and support students in a way that will ensure their success with appropriately challenging content. However, accomplishing these goals depends on mastery of an ever-expanding pedagogical knowledge base. Since the 1960's, 1970's, and even the 1980's, when most of today's teachers last studied their profession for an extended period, a major expansion has occurred in the education community's understanding of how to frame lessons, how to engage students, and what the curriculum should include. New techniques for diagnosing and assessing students' learning support more precise notions about how they may best be served in schools. Furthermore, the trend for more of the important instructional decisions to be made at the school or district level means that education systems rely on continuing education that targets specific programs or strategies to cultivate the skills and knowledge necessary to implement local decisions. Formal preservice education can lead to acquisition of the appropriate general knowledge and skills, but building capacity to implement school programs relies on tailor-made professional development. In addition, adopting new approaches requires that teachers learn enough to make informed decisions and to implement those choices in their classrooms and schools--another target for professional development.

Content expertise and pedagogical expertise are qualities that can be learned, and indeed they are focuses for preservice and continuing professional education. On the one hand, teachers, like other learners, gain expertise from practice. Their ongoing engagement in explaining content, planning lessons, and responding to students' questions deepens and probably extends their mastery of core professional skills and knowledge. For example, years of explaining the rules for comma usage will no doubt produce great adeptness in an English teacher's competence in teaching that aspect of punctuation. On the other hand, because some new professional knowledge arises outside the arena of classroom practice, those whose experience is circumscribed by practice will be limited in their

professional learning. An English teacher's successful implementation of a "writing workshop" approach is less likely to emerge spontaneously without deliberate study, because it is a complex strategy. Evidence from early, well-documented trial-and-error efforts is now available to show teachers how to ease adoption and enable them to elicit more immediate success for students. Professional development activities are designed to enhance practice directly by addressing the needs for expertise that emerge from a desire to boost instructional effectiveness.

Professional development enhances teachers' knowledge and skill, as well as their capacity to exercise professional judgment. Although some professional development programs, properly conceived and implemented, have succeeded in raising teaching quality, others have had little effect. This variation in outcomes suggests that all approaches to professional development are not created equal. Furthermore, while commonly held conceptions of what constitutes high-quality professional development have evolved over the last decade or so, in the minds of many educators, professional development is synonymous with training. Training activities include the workshops familiar to all teachers, as well as various kinds of individual coaching or technical assistance services. In all these arrangements, a trainer--generally recognized as having special expertise--directs the content and flow of professional development activities.

Well-designed training programs advance teachers' knowledge of instructional practice and support them in developing new classroom skills. Research on the implementation of innovations and specific professional development ventures (Sparks, 1986; Showers, Joyce, & Bennet, 1987; Joyce & Showers, 1988; Smylie, 1988) has refined our understanding of how and under what conditions effective training programs work. Depending on the desired outcomes, training might include exploration of theory, demonstration or modeling of a skill, practice of the skill under simulated conditions, feedback about performance, and coaching in the workplace (Joyce & Showers, 1988). Good training provides adequate opportunities for practice and for classroom consultation and coaching as teachers learn to apply new concepts. As teachers explore a new theory and knowledge base, they see these concepts applied to their own classroom situation, practice applying them as a coach observes, and receive feedback on an ongoing basis. Effective training supports teachers as they internalize a new practice and make decisions about how to use it to support student engagement in challenging academic tasks.

Judith Warren Little (1993) argues that traditional training works reasonably well to introduce teachers to those aspects of reforms that are "technical," understood as an expansion of the existing repertoire of classroom practices. Training can help teachers acquire the ability to use a new computer software program or interpret test scores and prescribe follow-up instruction. However, the traditional training model has limited capacity to help teachers meet the demands of current reforms

based on new conceptions of student learning, because adopting such reforms does not involve simply replicating proven behaviors in local settings; adoption involves making judicious changes that affect not only courses and lessons but the whole learning environment as well..

Similarly, the RAND Change Agent Study found that skill-specific training activities enabled teachers to implement new project methods and materials, but only in the context of the particular setting of the project. When the project ended, teachers stopped using the project methods and materials because they had never really learned how to adapt them to other settings. In contrast, various staff supports--resource personnel, outside consultants, project meetings, and teacher participation in project decisions--produced stronger long-term effects. The RAND study concluded that teacher training was less about technology transfer and more about ongoing program support by an organization. According to the study's authors, sometimes the learning task for teachers is more like problem solving than like mastering "proven" procedures (McLaughlin & Marsh, 1978).

The more recent literature on professional development (Little, 1993; Lieberman, 1995; Darling-Hammond & McLaughlin, 1995) proposes an expanded notion of what constitutes good learning opportunities for teachers. These authors contend that teachers' work in schools must be structured to allow teachers to learn together from the teaching and learning process and to work collaboratively to apply the broad principles of reform to specific classroom contexts. High-quality professional development, they hold, enables teachers to develop habits of collaboration and problem-solving within the school organization. These newer conceptions of teacher opportunity to learn derive less from research on alternative models of professional development--a field still developing--and more from research and theory on the professionalization of teaching and the contexts in which teachers work.

In this section, we summarize the arguments for setting new teacher learning goals that are more compatible with new learning goals for students, then present considerations of design, delivery, content, context, and outcomes critical to all improvement efforts. On these elements we build the system of professional development indicators described in a subsequent section.

New Learning Goals for Teachers

Most present reforms are not readily expressed in terms of specific, transferable skills and practices (Little, 1993). Rather, the reforms require that teachers grapple with translating broad principles (like the standards developed by the National Council of Teachers of Mathematics) into practice. Teachers must work with different concepts of valued student learning, but without specific

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prescriptions for how their practice must change in response. Professional development for reform no longer comprises transmission of knowledge, but study by teachers of the teaching and learning processes.

Little (1993) predicts that professional development responding to teachers' broader learning needs will look quite different from conventional training programs:

> This calls not for training, but for adequate "opportunity to learn" (and experiment, consult, or evaluate) embedded in the routine organization of teachers' work day and work year. It requires the kinds of structures and cultures, both organizational and occupational, compatible with the image of "teacher as intellectual" ... rather than teacher as technician. (p. 133)

This shift in professional development is a shift "from replication to reflection, in which practicing teachers focus less on the transfer of knowledge and strategy and more on analytical and reflective learning" (Dilworth & Imig, 1995). In this vision, professional development aims to support adoption of new approaches to curriculum and instruction by stimulating their critical thinking about students' needs and the teaching process. This reflective approach sharpens teachers' skills in problem solving, determining students' needs, and conducting action research that is designed to develop new knowledge and skills related specifically to their schools and classrooms. This level of professional development offers teachers meaningful intellectual, social, and emotional engagement with ideas, with materials, and with colleagues both in and out of teaching. In this more evolved model of professional development, teachers' prior knowledge and skill is seen as a resource for future learning, and the systems that influence the quality of their teaching are brought into alignment around the desired change.

What are Effective Designs of Professional Development?

Teachers do not stimulate student learning in isolation. Success for all students depends upon both teacher quality and school quality in areas that support students' academic engagement. Effective professional development programs, predicated on the principles advanced above, begin with designs that link teacher learning with broader school improvement goals. The blueprint for teacher learning activities arises from a coherent school plan, based on sound assessment of student needs and shared goals. When that happens, professional development activities are guided by a long-term plan that helps ensure that teacher learning will be sustained by the school environment rather than eroded by continual friction from disparate organizational forces. With a clear, coherent strategic plan in place, schools avoid the common pitfall of staff development programs that end up fragmented or piecemeal, with no thought given to follow-up or to how the new technique fits in with those

implemented in previous years. When they are crafted to support school improvement goals, professional development activities gain coherence and power by building upon those goals and reinforcing teachers' on-going learning.

While designs will vary according to local needs and conditions, many common elements will characterize the designs of some of the most promising programs. Good designs:

- Focus on organizational as well as individual support: Individual aptitudes and interests play an appropriate role in some professional development choices. However, to some extent, individual choices ought to be made in light of improving collective capacity, to ensure that school resources invested in professional development lead to enhanced school effectiveness.

- Accommodate the need for long-term learning: Some important changes in behavior or practice will require extended attention. Plans for professional development should assume the need for teacher experimentation and practice over time.

- Promote continuous inquiry, embedded in the daily life of the school: Effective practice involves continuous improvement. A professional development plan should allow participants to critique their own practice and the total program, to permit ongoing assessment of the match between what is needed and what is offered.

- Address teachers' evolving needs: Individual and team growth combined with normal staff turnover leads to new demands for professional development. The design should accommodate differences in professional needs.

- Reflect participant input: Each player in the education community has a unique and valuable perspective on the nature of any collective problem and the best way to solve it. In a situation where resources of time and other supports for professional development are finite, taking participants' opinions into account provides an important basis for prioritizing options.

- Include evaluation: The costs of professional development, both direct and indirect, are considerable. Reasonable accountability demands that some of the investment in professional development be used to determine whether it achieved the desired results.

- Ensure equitable access: Differences in available resources often result in a "poor-get-poorer" professional development system. That is, circumstances in the neediest schools and for teachers of disadvantaged or minority students do not often support professional development activities as well as those in the richest schools. Professional development designs should aim to compensate for these differences.

The way that the design of professional development links to broader school issues and incorporates elements that accommodate individual and organizational characteristics makes a strong contribution to its ultimate effectiveness in bringing about improved teaching quality.

How Can Professional Development be Delivered?

Four dimensions of delivery are commonly cited as germane to its effectiveness. First is the need to offer multiple points of entry and options for participation. Second is the importance of including in this range new forms of learning, such as collaboration, school or curriculum development projects, and inquiry. Third is the extent and nature of the offerings--ensuring that they occur with the intensity and duration necessary to promote real learning. Fourth is the integration of resources for learning available in many sectors of the professional community, making appropriate use of university faculty, central office experts, consultants, teacher leaders, and others.

Multiple ways to participate. The formerly prevalent view of learning as knowledge transmission supported formal professional development events--a university course, a district workshop, a professional association training session--offered in educational settings away from the teaching workplace. Sessions emphasized efficient presentation of information, with little attention to ongoing support of continuous learning and changed practices. The expanded vision of professional development includes multiple forms of learning, many of which are job-embedded (Sparks, 1995). This shift in the notion of where professional development can or should take place signals a reconception of teacher learning, expanding beyond the transmission of knowledge and skills to teachers' study of the teaching and learning processes. Teachers' knowledge and understanding may grow through involvement in decisions about the substance, the process, and the organization of support for learning in school, as well as through inquiry.

Lieberman (1995) comments that teachers must have opportunities to discuss, think about, try out, and hone new practices, suggesting that these opportunities to learn should be embedded in teachers' and schools' daily activities. Expanded professional learning opportunities for teachers require that schools:

- Build new roles for teachers: teacher leader, peer coach, teacher researcher
- Create new structures in which teachers can work together: problem-solving groups, decision-making teams

- Invite teachers to work on new tasks: journals and proposal writing, learning about assessment, writing or analyzing case studies, creating standards

- Create a culture of inquiry, wherein professional learning is expected, sought after, and an ongoing part of teaching and school life

The life span of these activities is no longer one or two days; they become an integral part of teachers' roles and an ongoing feature of the school.

New forms of learning. Although training and the independent search for knowledge motivated by individual questions or circumstances will continue to play a role in professional development, the importance of other forms of learning will also increase. Many aspects of new learning are simply matters of skill--how to use a new software program or apply certain kinds of rubrics--and training is an efficient way to acquire such skills. Other questions will be mostly of personal interest or relevance, and, like other professionals, teachers will search for answers in trade publications and other resources in a form of study sometimes called "individually guided development." Other models of learning experiences have begun to produce positive effects on teaching quality in enough instances to warrant optimism about their inclusion in the set of commonly used delivery systems for professional development. These include: collaboration through coaching, networking, and teaming to solve problems of practice; participating in school improvement and curriculum development activities; and conducting more formal inquiry, individually or with partners.

Collaboration. Coaching, networking, and teaming have generated improvements in teaching quality in many settings. Peer coaching and critiques may play a key role in learning new approaches. Good training provides adequate opportunities for practice and for classroom consultation and coaching as teachers learn to apply new concepts. As teachers explore a new theory and knowledge base, they see these concepts applied to their own classroom situation, practice applying them as a coach observes, and receive feedback on an ongoing basis. This approach supports teachers as they internalize a new practice and make decisions about how to use it to support student engagement in challenging academic tasks.

One professional development strategy that several recent projects have found useful for maintaining growth is the formation of teacher networks and subject-matter collaboratives. These informal arrangements draw together teachers interested in a particular problem or approach to teaching. Networks are usually created to deal with complex educational problems that defy simplistic solutions and pat answers--the teaching of writing, for example. Networks provide access to new ideas and a supportive community in which to begin translating these ideas into meaningful action in schools and classrooms. Shared activities and experiences not only encourage teacher

learning but also serve as organizing tools to keep teachers working together, sharing, and learning from one another over time (Lieberman & McLaughlin, 1992).

School improvement and curriculum development. Developing curriculum, experimenting with new assessments, writing student performance standards, and participating in systematic school-improvement processes can be valuable opportunities to learn. Adults learn most effectively when they have a problem to solve, and teachers' experiences may provide direction in framing problems and recognizing and/or developing relevant solutions (Sparks & Loucks-Horsley, 1990). Teachers also learn through such diverse means as conducting action research, participating in study groups or small-group problem solving, observing peers, keeping journals, and becoming involved in improvement processes.

Inquiry. The delivery of good professional development often emphasizes inquiry that involves teachers in formulating questions about their own practice and systematically pursuing objective answers to those questions. This approach recognizes and nurtures teachers' intellectual and leadership capacity. The overarching assumption is that:

> The most effective avenue for professional development is cooperative study by teachers into problems and issues arising from their attempts to make their practice consistent with their educational values. . . . [The approach] aims to give greater control over what is to count as valid educational knowledge to teachers (Ingvarson, cited in Sparks & Loucks-Horsley, 1990).

Teacher inquiry may take place formally or informally, inside or outside the school, with pairs or groups of teachers, but its defining quality is its recognition of the rules of evidence that govern a given area of investigation. One of the best articulated examples of teacher inquiry is action research. With the assistance of an advisor often based at a university, teachers formulate research questions, gather and analyze data, and use their findings to improve classroom instruction.

Duration and intensity. When the goal of professional education is implementation, its delivery should provide for participation over an extended time, so that teachers can explore new theories and practices, assess their meaning, and integrate them into their own repertoire. With rare exceptions, single events or "one-shot" workshops have little effect on teaching practice. Teachers who encounter a new idea or practice only once may gain awareness but seldom gain sufficient knowledge to change what they do in classrooms day in and day out. Professional development activities of all kinds are more powerful when they are coordinated so that understanding and skills can be built over time, reinforced continuously, and practiced in a variety of situations. To begin making the scope of changes envisioned by most reform movements, teachers clearly need more time

for learning than the three or four days each year devoted to professional development on most district calendars. Many engaging professional development activities require teachers to meet several times a month over the course of an entire school year. The measure of adequacy in intensity or duration of a learning activity is evidence of change in the targeted dimension of practice. Among the most common explanations for the absence of change is insufficient time for learning.

Integrating community resources. The current discourse about improving the education system highlights professionalizing teaching, reducing the "theory/practice gap" perceived between colleges of education and K-12 schools, and generating a more synergistic collaboration framework among those in different sectors of the educational community. University faculty, central office staff developers, school-based master teachers, consultants from professional associations, and others have contributions to make to teaching quality (Imig, personal communication, 5/14/96). The way they are used influences both cost and quality of activities.

What is the Appropriate Content of Professional Development?

Subject matter. Teaching to more rigorous standards embodied in new subject-specific content frameworks requires increased emphasis on content knowledge and content-specific pedagogical skills (AFT, 1995; Sparks, 1995). Concerns about standards in the broader community necessitate attention to new conceptions of what students should know and be able to do. Whether such standards are set locally or at some other level, they establish benchmarks for student learning, and therefore set expectations for teacher knowledge. Many teachers would benefit from professional development activities that acknowledge teachers' prior content knowledge and skill, and build on that base to extend and improve their content understanding. High-quality professional development ensures both depth of content knowledge and a strong foundation in the pedagogy of the particular discipline.

Instructional strategies. The professional development most likely to encourage teachers to examine and modify their practice with students is grounded in a "big picture" perspective on the purposes and practices of schooling (Little, 1993). Among the content features of effective professional development are the following characteristics (Darling-Hammond & McLaughlin, 1995):

- It engages teachers in concrete tasks of teaching, assessment, observation, and reflection that illuminate the process of learning and development
- It is connected to and derived from teachers' work with their students

Professional development on instructional strategies often target specific practices, such as inquiry-based lessons, use of manipulatives, cooperative learning strategies, and integrating technology. Activities also help participants determine where some tried and true methods may still make a contribution to student learning and where familiar routines can be adapted to new scenarios. Increasing skill in assessment related to new approaches is an important feature of high-quality professional development. Professional development may also facilitate access to and awareness of resources, both new and existing.

Interpersonal/organizational skills. In its recent KEYS initiative, designed to help schools assess their quality for the purpose of developing reform strategies, the National Education Association found that some kinds of professional development were associated with effectiveness by virtue of improving organizational climate or efficacy. Members reported that learning process skills, such as brainstorming, assertiveness, consensus building, decision making, and problem solving helped them support the work of the school community.

What are Effective Contexts for Professional Development?

The process of restructuring schools places demands on the whole organization that make it imperative that both individuals and schools redefine their work in relation to each other (Lieberman, 1995; Sparks, 1995). High-quality professional development jointly addresses the development of organizations and individual teachers within the context of the school's culture and institutionalized supports. Successful professional development depends upon the willingness and capacity of all teachers and the school itself to establish and work toward goals for high student performance. When well-designed professional development programs succeed, schools become learning organizations in which people work together to design goals, solve problems, and create collective solutions.

Institutional support. In a supportive environment, professional development is seen as an essential and indispensable tool for school improvement, rather than a frill that can be cut during difficult financial times (Sparks, 1995). Advocates argue that the public must support professional development as part of teachers' regular work; the professional development standards of the National Council for Staff Development, for example, call for school districts to designate professional development as a line item in their school budgets (National Staff Development Council, 1994; 1995a; 1995b). Institutional support also includes incentives for participation. These may be professional, for example increased opportunities for leadership or improved supervisory feedback, or material, for example stipends or salary increases. In order for these incentives to have their intended effects, it is important that they do not conflict with each other or set up competing expectations for teachers. For

example, a district may provide stipends and instructional leadership roles to teachers who work on developing new district curriculum standards, while state recertification requirements specify that teachers must earn a certain number of college credits every five years to keep their certification current. Teachers must then decide how to allocate their limited free time to meet the competing demands of the state and the district.

Financial support. At a practical level, at least modest financial support for professional development is necessary to ensure an adequate program of activities. Efforts to build and expand community backing for ongoing work and to tap external resources as needed highlight the value of professional development to overall school quality.

School culture. School culture can have a strong impact on the extent and the quality of teachers' opportunity to learn. In schools that work effectively as learning organizations, teacher learning is a collaborative enterprise, in which knowledge is shared and the focus is on teachers' communities of practice rather than on individual teachers. Schools characterized by norms of collegiality and experimentation are more likely to succeed in helping students achieve at high levels (Lieberman, 1995). Teachers are more likely to persist in using new behaviors in school where collaboration and professional risk taking (and its occasional failures) are encouraged.

Successful schools are organized as places for teachers to learn as well as to teach. Principals in these schools actively encourage teachers to invest in their own learning, and find the means for them to do so. Teachers have ample opportunity to collaborate on their work, and are encouraged--by the structure of the school day and the consistent support of their principal--to work together on problems of common interest.

In such an environment, schools and districts ensure that teachers have the time and opportunity to get away physically and mentally from their daily work in the classroom. For the entire school and for individual teachers, reforming the educational process often extends over a lengthy period of time. For most schools, this will require not merely months but years. Moreover, much of what teachers need to learn requires sustained time, not an afternoon here and a Saturday morning there. For many kinds of professional development activities, this may require restructuring the school day or week to free up prime time for teachers' learning and providing stipends to support teachers' participation in evening and weekend activities.

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What Outcomes Should Professional Development Seek?

Effective professional development produces changes on a variety of levels: in the organization and culture of schools; in teachers' knowledge, beliefs, and skills; in teachers' practice in the classrooms; and, ultimately, in student achievement. Effective professional development enables teachers to work as professionals, able to apply broad principles of "best" practice to specific contexts and heterogeneous groups of learners.

Teacher knowledge and attitudes. High-quality professional development enhances teachers' knowledge of subject matter and pedagogy and increases their belief that all students can achieve to high standards, at least in part as a result of teachers' own improved efforts. These are the explicit goals of national professional development activities in mathematics and science, most notably. High-quality professional development also gives teachers a deeper understanding of their students and how they learn. Teachers become better able to recognize and respond to students' cultural diversity and differences in learning styles. Finally, teachers demonstrate high expectations for all students.

Teacher classroom practice. High-quality professional development is designed to improve curriculum, instruction, and assessment practices in classrooms. As teachers attempt to engage students actively in authentic learning, they may use a redesigned curriculum with new teaching strategies--such as cooperative learning, hands-on activities, extended investigations, and new technology--that involve students in constructing their own understanding of a problem. A student-centered approach to teaching may use more time to cover less, necessitating choices about essential content. Teachers must also develop or adopt new assessment methods that probe students' understanding of content and examine their ability to integrate knowledge and apply it to real life problems.

School-level change. High-quality professional development encourages collaboration among teachers as they experiment with and reflect on their classroom practice. Schools become more collegial; school culture encourages teachers to develop new approaches to identifying and solving problems. Teachers work with each other to understand the effects of various curricula, instruction, and assessment practices on the desired student outcomes and to develop new practices that will enable their particular students to succeed. Through this process, schools come closer to achieving their improvement goals.

Student achievement. Increased student achievement is the ultimate objective of professional development. High-quality professional development helps teachers engage students in learning. Students who are deeply engaged in well-conceived academic tasks are on the way to achieving

meaningful educational goals. And as students work harder on focused instructional activities, their performance on measures of achievement aligned with the school's vision of teaching and learning increases.

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III. Professional Development Indicators

Adding professional development to the National Goals, emphasizing explicitly the importance of professional development in such federal programs as Title I, and launching a new recognition program for outstanding professional development programs (ED, May 1996) may signal the shift of policy support to this dimension of educational systems. Current conceptions of reform make professional development an integral component of improvements in the educational process. Effective and efficient professional development is essential in a context of high stakes and limited funding. In such an atmosphere, members of the education community--policymakers, parents, administrators, professional development providers, and teachers--need indicators with which to characterize professional development and its results. Such indicators are typically used to focus policymakers, educators, and the public on (1) key aspects of how an educational system is operating, (2) whether progress is being made, and (3) where there are problems (Blank, 1993). Unlike routine descriptive data, indicators contain a standard against which programs may be judged (Frechtling *et al.*, 1995).

This set of indicators uses professional development design, delivery, content, context, and outcomes as the framework for assessing the relevance and availability of data collection instruments that focus on professional development programs. The construction of this taxonomy of professional development indicators builds on earlier work by Horizon Research, Inc., the ED Professional Development Team, Frechtling *et al.*, National Staff Development Council Standards, and other state and local evaluations of professional development programs, although no existing set of indicators accommodates the broad range of needed perspectives on teaching quality related to reform. The following outline covers the dimensions that are key contributors to quality:

I. Design

A. Connection with broader school improvement goals

- Links to a coherent plan, with clear and shared goals, based on school needs
- Draws on a vision of teaching and learning that is congruent with appropriate standards
- Integrates with other improvement efforts operating at the school

B. Design elements

- Focuses on organizational as well as individual improvement
- Accommodates the need for understanding and skills to be built over time, reinforced continuously, and practiced in a variety of situations
- Promotes continuous inquiry and improvement embedded in the daily life of schools
- Addresses teachers' evolving needs
- Reflects input of those who will participate in professional development activities
- Includes an evaluation process that is ongoing, focuses on relevant levels of the organization, and informs future professional development activity
- Ensures equal access by teachers of disadvantaged or minority students

II. Delivery

A. Offers a range of roles and responsibilities with multiple ways to participate

B. Provides for specific types of professional development activity

- Training
- Individually guided development
- Collaboration
- School improvement and curriculum development
- Inquiry

C. Provides activities of sufficient duration and intensity to meet goals

D. Integrates professional community resources effectively

III. Content

A. Subject matter

- Presents important concepts and processes of disciplines accurately

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- Presents content aligned with relevant national, state, and local standards
- Builds on teachers' current knowledge of content, teaching, and learning

B. Instructional strategies

- Models effective pedagogy, including appropriate use of inquiry-based instructional strategies; hands-on/manipulative materials; cooperative groups; technology; and direct instruction (review, lecture, demonstration, guided practice, independent practice)
- Provides training in effective subject-specific pedagogy, i.e. instructional methods especially suited to conveying the content of a specific discipline
- Provides effective strategies for recognizing and responding to student diversity, including involvement of parents
- Provides effective assessment strategies, including performance assessment
- Provides generalizable and practical resources, strategies, and techniques

C. Interpersonal/organizational skills

- Addresses skills required to function effectively under new organizational arrangements (e.g., shared decisionmaking, instructional teams)

IV. Context

A. Institutional support

- Schools and districts provide adequate time during the school day for teachers to work together to accomplish the school's goals
- Schools and districts provide incentives to participate in professional development, e.g., stipends, salary increases, leadership responsibility, enhanced status, supervisory support
- School, district, and state incentives to participate in professional development are designed to function coherently, so that incentives do not conflict with each other or set up competing sets of expectations for teachers
- Schools and districts make it possible for teachers to attend to their professional development during the school day, e.g., by providing substitutes, rearranging the school schedule

B. Financing

- Builds community support for adequate funding
- Develops external sources of support as needed

C. School Culture

- Supports teacher collaboration, interaction
- Encourages teacher participation in designing professional development activities and in assessing need
- Allows teachers to take responsibility for their own professional development, balancing individual and collective needs

V. Outcomes

A. Teachers' knowledge/attitudes

- Teachers show improved mastery of subject matter
- Teachers express understanding of cultural diversity
- Teachers demonstrate high expectations for all students

B. Teachers' classroom practice

- Lesson content is aligned with appropriate discipline standards and matched to students' developmental level
- Teachers act as facilitators, maintaining a culture of inquiry
- Teachers employ a repertoire of methods that engage students deeply in appropriate academic tasks
- Teachers recognize and respond to student diversity, including involvement of parents
- Teachers use assessments appropriate to the full range of learning goals, including those that support inquiry-based instruction, and use the results to improve instruction

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C. School changes

- Teacher collaboration increases
- Schools meet their reform goals

D. Student changes

- Students perform better on measures of achievement aligned with the school community's vision of teaching and learning
- Disadvantaged students or students in schools with high concentrations of poverty improve performance
- Students become more actively engaged in learning

IV. Measuring Professional Development Process and Outcomes

Attempts to document professional development activity have used a variety of methods. Likewise, a variety of means have been employed to demonstrate links between professional development activity and outcomes for schools, classrooms, teachers, and students. Data collection strategies have included teacher surveys, interviews, observations of teachers in classrooms and professional development activities, and analysis of student achievement test data. This section summarizes some of the lessons learned from these measurement activities.

Teacher Surveys

Properly designed, employed, and timed, teacher surveys are a relatively inexpensive and efficient way to gather descriptive data on many elements of professional development. Surveys of teacher participants can collect data on the design of professional development, especially its connection with broader school improvement goals. Teachers may be in the best position to judge the congruence of professional development with the school plan and with other school-based reform efforts.

Surveys are an efficient means of gathering data on delivery and rates of participation in professional development. If results can be disaggregated, surveys will also yield information about the participation of teachers of special populations, such as disadvantaged or minority students. Surveys are a useful way to measure the quantity of professional development teachers receive--how many hours they spent in various kinds of activities, how recently they participated, and how long the activities extend over time.

Surveys are also useful in collecting data on the content of professional development activities. Surveys can solicit information on the academic subjects addressed in professional development programs, as well as content-specific or general pedagogical practices (for example, teaching mathematical concepts using manipulative materials or cooperative learning).

Teacher surveys can also gather data on the context within which professional development occurs, especially the institutional supports for professional development activities. Teachers can report on the policies in place to support their participation in professional development activities--

stipends, salary increases, or paid release time. Surveys can also collect data on teachers' opinions on school culture and how it supports or impedes professional development.

Properly administered, surveys can also measure some elements of outcomes related to professional development. For example, surveys given before and after specific training can measure respondents' perceptions of changes in practice, attitudes, and student outcomes. As with any data collection, however, the timing of both surveys is critical, since the pre-survey needs to be as close as possible to the beginning of the change period, and the post-survey given at an appropriate interval after the change could be reasonably expected to occur. Improper timing can lead to less than valid results. This is especially true when attempting to gauge the effect of a particular professional development event on classroom practice. Evaluating the extent of changes in teacher behavior and student outcomes is difficult and cannot be done very soon after a professional development experience, because many new practices take time to be implemented. However, surveys about some types of outcomes may be good sources of information about trends in perception and attitudes.

Items used to measure teacher satisfaction at the conclusion of a training session yield less useful information because they tend to generate improbably high ratings from participants. It is difficult to interpret what teachers mean when they say an event was "good" or "useful." It is sometimes apparent that high ratings reflect approval rather than acquisition of the desired knowledge, skills, or understanding. An engaging or amusing presentation or activity may elicit high approval ratings without necessarily producing the desired changes.

National surveys are most useful in gathering information to inform broad questions such as might be developed to track change in professional development over time. However, as self-reports they are subject to types of response bias that limit accuracy and reliability. Framing low-inference items may reduce the effect of response bias, but may also reduce coherence and validity. Interviews offer a richer data collection strategy, but one that is also more labor intensive and therefore less practical to use on a large scale.

Teacher Interviews

Structured or semi-structured interviews with teachers allow for a different type of assessment of teachers' experience with professional development and of changes in their knowledge and practices. Probing questions allow researchers to gather detailed data on the influence of professional development activities on teachers' belief systems and--to a lesser extent--practices. This kind of inquiry provides a basis for understanding the effectiveness of specific types of learning opportunities

and how the delivery of those opportunities benefits teachers most. One interview study of changes in teachers' knowledge, for example, presented hypothetical teaching situations to teachers and asked them how they would respond to these. Because the situations were standardized, the interview format reduced the amount of irrelevant, idiosyncratic differences in responses that make comparisons difficult among subjects. However, because it allowed for open-ended responses, the format generated detailed, contextualized information about teachers' perceptions of practice. In this case, the interview couched virtually all questions in the context of teaching situations, and thus it offered an opportunity to see how the various aspects of expertise--knowledge, beliefs, attitudes--about teaching, learning, and subject matter were drawn on to make teaching decisions (Kennedy, Ball, & McDairmid, 1993).

Some studies of professional development programs conduct a series of interviews with a group of teachers over time. Interviews at regular intervals over the lifetime of a professional development project allow researchers the opportunity to question directly changes in teachers' beliefs and knowledge of teaching and their students. Such interviews could reveal the extent to which opportunities for professional development emerge independently or as interlocking parts of a coordinated school program. Furthermore, inasmuch as professional development schools and other forms of coordinated, multiagency programs are increasing in number, this could be an important movement to track. For example, in Austin, Texas, professional development schools routinely include the faculty, teacher candidates, and graduate students from the local colleges of education and Americorps participants who are enrolled in a variety of degree programs but who work 15-20 hours a week in a single school for their entire undergraduate career. In Austin and other cities, many agencies participate in integrated service delivery programs that also play a role in professional development. Using survey data to first document emerging trends, case studies could then provide an important source of information for policy making.

Observations of Teacher Practice

Some evaluations of professional development observe how teachers' curriculum, instruction, and assessment practices have changed, either by sending observers into classrooms or by analyzing videotapes of a specific lesson. Direct observations of teaching allow researchers to assess teachers' classroom practices without relying on teachers' perceptions of how their curriculum and instruction have changed as a result of their professional development.

This method is not without liability, however. Among observers there may be a great deal of variability in perceptions of events. Researchers can increase the reliability of classroom observations

by using tightly focused protocols or detailed checklists asking for evidence of discrete skills or behaviors. These kinds of observations may tend to oversimplify the tasks of teaching and may emphasize relatively trivial, low-inference tallies of behavior (Darling-Hammond, 1995). On the other hand, protocols that require observers to make judgments about what they see are very difficult to use reliably. For example, a protocol for an evaluation of the National Science Foundation's Local Systemic Change Through Teacher Enhancement projects asked classroom observers to rate classrooms on whether "instructional strategies were appropriate for accomplishing the purposes of the lesson," or whether "the design of the lesson encouraged a collaborative approach to learning." The developers of this evaluation reported that they had no success in developing inter-rater reliability among observers using this instrument (Iris Wiess, personal communication, 2/12/96).

Nevertheless, between the extremes of overly detailed, trivial checklists and overly general calls for judgment are studies that combine observations with other data collection strategies to enhance the validity of portrayals of practice while preserving reliability with cost-effective strategies used on larger samples (e.g., Porter et al., 1995). Some studies use complex analytic strategies to construct reasonably coherent models of classroom activities from data collected with relatively low-inference items. In addition, some studies have used artifact collection as a proxy for observations, developing more accurate portrayals by "observing" the materials that shape the lessons of some teachers sampled from a larger group from whom survey responses were collected (Burstein *et al.*, 1995). The Third International Mathematics and Science Study (TIMSS, in progress) is testing an ambitious version of this combined approach, using curriculum analysis, teacher surveys, student surveys and testing, and videotapes of instruction to generate a comprehensive view of practice. These strategies hold promise for enabling researchers to extract more meaning from data bases intended to inform policy development.

Observations of Professional Development Activity

Some evaluations of professional development programs include observations of the professional development activity itself (e.g., Firestone & Pennell, 1995; Horizon Research, Inc., 1996). These observations allow researchers to develop detailed descriptions of the design, content, and pedagogy of specific professional development activities. Where other methods of data collection treat the professional development activity itself as a "black box," or generic treatment given to teachers, observation of professional development allows researchers to form hypotheses about what kinds of learning opportunities are most likely to engage teachers and result in changed classroom practice. Observers can evaluate how teachers interact with each other and engage in the task at hand, the fit between the professional development strategies used and the goals of the session, and

how well the session succeeded in engaging teachers in grappling with important ideas about teaching and learning.

Such observations are most useful in evaluating specific professional development strategies or projects. However, if researchers need to understand the effects of all of the professional development activities available to teachers at a school, for example, they would be hard-pressed to make systematic observations of a range of widely varying activities. And, as in the case of teacher observations, ensuring reliability among observers is very difficult.

Another major disadvantage of observations and interviews, of course, is the cost. Observations and interviews require a substantial investment prohibitive to most data collection efforts. For this reason, observations and interviews tend to be used in small studies or to validate information selectively from a larger data collection effort.

Analysis of Student Achievement Test Results

The ultimate goal of professional development is increased student learning. Policymakers and the public seek evidence that professional development is "working"--that students are learning more and performing better on publicly recognized measures of achievement as a result of the resources invested in teachers' professional development. The most obvious and publicly credible way to look for improvement in student learning is to examine changes in student achievement test results. A few states participating in the National Science Foundation's Statewide Systemic Initiative (SSI) have designed evaluations of their professional development efforts that incorporate student achievement data as evidence. The Kentucky SSI, for example, is tracking changes in student performance on state assessments in schools with SSI-trained and non-SSI-trained teachers. Greater increases in scores in SSI schools would provide convincing evidence that SSI training is making a difference.

Finding evidence of increases in student achievement provides a strong argument for the efficacy of professional development, but it is nonetheless a difficult argument to make unambiguously. Among the problems are (1) the mismatch between most achievement tests and the visions of authentic, inquiry-based learning promoted by many professional development programs; (2) the challenge of establishing a direct link between professional development activities, improvements in teaching quality, and a rise in achievement test scores; and (3) the likelihood that several concurrent "treatments"--professional development, new materials, and new organizational arrangements, for example--are leading to desired outcomes.

Aligned Assessments

Using student achievement tests to assess the effectiveness of professional development only works if the achievement tests are well-aligned with the kinds of teaching and learning targeted by professional development efforts. Most achievement tests measure some, but not all, of the goals of education; whether some tests measure even the most important outcomes is debatable. Thus, gains in tested student achievement may constitute a very narrow outcome for estimating the effects of professional development on student learning. Alternative assessments of student learning--performance tasks, portfolios of student work, paper-and-pencil tests containing open-response items--may provide a more complete picture of student learning. However, the reliability and validity of many of these new assessments have yet to be established when they are used in large-scale evaluations of student or school performance.

Causality

We have suggested that teacher quality is a primary in-school influence on student learning. However, other school factors directly influence student achievement (Brophy & Good, 1986) as well as teacher quality. Variation in school climate, community support for student learning, and school-level supports, such as the availability of high-quality teaching materials, may all affect both teaching quality and student achievement. The confluence of these variables makes it difficult to ascribe changes in student achievement directly to any one factor.

Because teaching quality is a close and direct mediator of student learning opportunities, however, it must be seen as one important contributor to student achievement. Professional development is designed explicitly to enhance teaching quality. Measuring professional development enables policy makers to assess the vitality of one important dimension of education quality. Surveys are often used for this purpose.

V. Professional Development as Measured Through Existing Surveys

Previous sections outlined the connections between professional development and teaching quality that promote student learning. Using a taxonomy of indicators, we suggested measures that, in totality, capture the range of variables related to current conceptions of high quality professional development. In this section, we discuss how professional development has been measured through surveys and display the results of our search for professional development survey items, using the taxonomy of professional development indicators.

We culled items from educational surveys representing a range of national, state, and university sources; more than twenty surveys were appropriate for this purpose. We sorted items by type, then compared stems, response options, and formats. We found substantial duplication; for instance, eight surveys used similar items to probe subject-matter content and six surveys asked for teachers' perceptions of school culture. Within these, we found many variants of common items. For example, in two items having identical stems, one offered response options measuring the frequency of the teacher's participation, while the other measured the recency of participation. There were also gaps in the collection, with no survey items measuring a few elements of our taxonomy.

This section, organized according to the indicator list, describes and provides examples of professional development survey items. Appendix D, arranged in the same order, includes selected relevant items. A list of surveys examined is included as the first page of Appendix D.

Items About the Design of Professional Development

Design issues that affect the quality of professional development cluster in two groups. One group reflects connections with broader school improvement goals. Linking professional development to a coherent plan, basing it on a vision congruent with relevant standards, and integrating it with other school reform efforts strengthen the likelihood that new approaches will be adopted and implemented sensibly. The other group covers design elements such as balance of focus on individual and collective improvement, provision for reflection on practice, evaluation of effects, and equitable access. These elements contribute rigor to a plan.

ERIC

Very few current items ask specifically about professional development design or about issues from which one could infer dimensions of design. One item in the Schools and Staffing Survey (and repeated in Reform Up Close) asks the extent of teacher influence ("none" to "a great deal") over:

(44b) Determining the content of in-service programs

An item on the National Science Foundation's Local Systemic Change Teacher Questionnaire also touches on design, among other things:

(8) Generally speaking, to what extent has each of the following been true of science-related professional development you have experienced in your district in the past year? [Response options: "Not at all" (1) to "To a great extent" (5) and "Don't know" (6)]

c. I am involved in planning my science-related professional development.
i. Teachers in the district are involved in planning for professional development.
k. Professional development activities draw on expertise of teachers in the district.

National Science Foundation's Local Systemic Change Teacher Questionnaire

If the quality of the design of professional development is to be examined, then more items directly addressing the relevant aspects are needed.

Items About Delivery of Professional Development

The delivery of professional development influences the extent to which the program has the desired effect, and delivery is the focus of almost half of the survey items. These items ask about: the range of opportunities for participation; the amount of followup, coaching, and evaluation that occurs after an activity; the adequacy of the activity's duration and intensity to meet program goals; the extent of emphasis on inquiry, reflection, and collaboration; and encouragement to join informal professional learning groups. Most of these present either inventories of professional development options, from which respondents select those that apply to their experience, or questions about specific types of professional development activity.

Range of Opportunities for Participation

A sizeable portion (15 percent) of all items had the inventory format. Response options on such items offered respondents the chance to describe one of three dimensions of experience: (1)

participation: e.g., "check those offered" in a given period; (2) *recency*: when the last experience of each type had taken place; or (3) *duration*: how much time was spent on each activity.

A typical example of a recency participation inventory question, taken from the 1995 Standards-Based Professional Development Program survey, is presented below. This item asks about teacher participation in a combination of fairly traditional delivery modes, such as workshops, education conferences, or university courses, as well as highly specific activities reflecting a broader view of professional development, such as participation on a school-based management committee.

(12) What professional development experiences did you have in 1994-95? (CIRCLE ALL THAT APPLY)

a. I attended a state or national education conference
b. I attended a workshop on curriculum/instruction that was sponsored by the district or my school (including sessions associated with the Compact)
c. I attended a workshop on school organization and management that was sponsored by the district or my school
d. I took a graduate course through a college or university
e. I served on a school-based management committee
f. I read an education journal on a regular basis
g. I met with colleagues on a regular basis to review and analyze student work
h. I met with colleagues to develop curriculum, lessons, or assessments
i. I made a presentation at a conference or other professional meeting
j. Other (SPECIFY)

Standards-Based Professional Development Program

Specific Types

About 30 percent of all survey items focused on teacher participation in specific types of development activities, many of which included evolving approaches to professional development. We categorize them here with the terms used by Sparks (1995), which overlap with our delivery indicators.

Training

The "training" category includes such activities as workshops after school or on student early-release days in which a presenter (often someone external to the school or district) aims to increase awareness, knowledge, and development of new skills. This type of professional development may cut across content areas and grade levels. It may be offered in response to participant requests or selected as an option by participants who have a special interest. Although

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normally it would be included in a menu of offerings because the decisionmaker perceived it as responsive to general interest, it is not necessarily connected to the "big picture" of a school plan.

The following example of a training item is taken from the 1990-91 SASS; it asks teachers about workshops or in-service training, their relevance to their field, and teachers' reasons for participation.

24a.	In addition to the college courses you have already reported, have you ever participated in any teacher workshops or in-service training which included 30 hours or more of class attendance?	[098]	1 [] Yes–Continue with b 2 [] No–Skip to item 25a
b.	Was this training relevant to your current MAIN teaching assignment field?	[099]	1 [] Yes 2 [] No
c.	What was your MAJOR purpose for taking this training?	[100]	1 [] To fulfill initial certification requirements for current position 2 [] To maintain and/or improve qualifications for current position (including meeting recertification requirements) 3 [] To train to teach a different subject matter area 4 [] To train to teach at a different grade level 5 [] To train to teach handicapped students or students with learning disabilities 6 [] To train to teach other special student populations (e.g., Native American, limited English proficiency, etc.) 7 [] To acquire credentials in new nonteaching areas (e.g., administration, guidance counseling) 8 [] Other – Describe – _____

SASS, 1990-91

A similar item also appeared on 1987-88 version of SASS. NCES broadened its data collection in the 1993-94 version, after consulting with the National Education Goals Panel and other members of the education community about the need for more national information about teachers' professional growth. Rather than concentrate narrowly on in-service activities, NCES expanded the number of items on professional development in the 1993-94 survey to examine teachers' evaluation of such activities and their reports on support provided for professional development.

Individually Guided Development

In this arena of professional development, teachers individually identify learning needs, set their own goals, and engage in the activities with which they will meet their goals. Typical activities may include reading professional publications, collaborating with colleagues, and experimenting with new instructional strategies. Much of this activity is very informal, involving incidental or serendipitous learning rather than a planned program. Indeed, individual interpretation of exactly

what constitutes individually guided development may be a drawback to interpreting responses to items with that (low) level of specificity. Perhaps for that reason, many items on individually guided development ask simply for the frequency or recency of the teacher's participation in individual activities that are not necessarily connected with a school or district goal. Examples of such items ask about professional reading and "keeping up-to-date in my field."

7. How often do your read professional journals?
   ____Frequently ____Occasionally
   ____Seldom ____Never

8. Which of the following professional journals do you currently read?
   ____*Journal of Reading*
   ____*Reading Teacher*
   ____*Reading Research Quarterly*
   ____*Language Arts* ____Other ____None

9. How often do you apply what you read in professional journals to your classroom practice?
   ____Frequently ____Occasionally
   ____Seldom ____Never

Kentucky Title I Reading Teacher Survey

Collaboration

Most teaching has been a solitary occupation, in which collaborative effort with another professional was not a regular element. Including collaboration as a form of professional development explicitly recognizes the growth benefits accruing to teacher collaborators. This can take a variety of forms: investigating and solving a problem as a team; coordinating instruction between subject areas such that each builds on the other; combining classes to take advantage of different instructional strengths; or forming grade level or vertical program teams to improve continuity. Items about collaboration usually focus on the amount or the type.

(37) Since the beginning of this school year, how much time per month have you spent meeting informally with other teachers on lesson planning, curriculum development, or other instructional matters?

	(Circle one)
Less than 15 minutes	1
15-29 minutes	2
30-59 minutes	3
1 hour or more, less than 5 hours	4
5 hours or more, less than 10 hours	5
10 hours or more	6

Reform Up Close

Including survey items that probe teacher experiences with observation and assessment recognizes that professional development gains are sometimes realized from feedback based on an observation of teaching by a peer or supervisor. This observation can take the form of peer coaching, peer observation, or administrative observation for teacher evaluation. Whatever the purpose, the key defining element is that the teacher receives assessment or feedback that can support critical self-assessment and analysis. Response categories on survey items on observation or assessment are typically framed to identify the frequency of such activities. Examples of items, such as this one from Reform Up Close, ask primarily about non-evaluative observations by colleagues.

(38) Since the beginning of the school year, how many times has your teaching been observed for purposes other than formal evaluation?

Never	___1
Once	___2
Twice	___3
3-4 times	___4
5-9 times	___5
10 or more times	___6

Reform Up Close

School Improvement/Curriculum Development Process

This type of professional development usually involves teachers in a group process with the goal of solving a problem, improving instruction, or developing curriculum. Benefits may accrue both to the larger organization (e.g., grade level implementation of specific instructional strategies or schoolwide adoption of redesigned curriculum) and to the individual (e.g., new understanding of content, change in attitude or belief structure). Large-scale reform efforts, such as those involving the entire school or district, would be probed by items included in this category, but interestingly, we could find very few such items. Most questions asked about teacher participation in school improvement or curriculum development efforts, and many of these were included in larger items described as "inventories."

How many hours outside of class do you spend during a typical week on the following activities:	Zero	Less than 1	1-3	4-8	9+
LSC or LSC subcommittees	O	O	O	O	O
PPAC or PPAC subcommittees	O	O	O	O	O
Curriculum committees	O	O	O	O	O
Other school committees	O	O	O	O	O
Special Events/ Celebrations	O	O	O	O	O

Classroom Effects of Reform

Inquiry

In the context of professional development, inquiry refers to a systematic learning process by which teachers, individually or collectively, formulate research questions (generally about classroom practice), gather and analyze data to answer their questions, and then use the results to inform their own practice. Loucks-Horsley, et al. (1989) explain the usefulness of inquiry as a form of professional development. They note that teachers are intelligent, inquiring individuals who can develop new understandings that build on their previous expertise as they search for answers and formulate solutions to problems they have personally identified. Action research is a form of inquiry in which teachers try a new approach to some aspect of practice--sometimes an approach they have developed themselves--and then study its effects, with a view to improving effectiveness. It can be a productive way to discover "what works" in local contexts, focusing on observable and measurable outcomes of events under some local control. We found no surveys that included items about the use of inquiry in professional development.

Duration and Intensity

Among aspects of delivery that are not covered in Sparks' system but that appear in our indicator list is the intensity and duration of professional development. This issue is addressed directly in items that appear in other categories of items. For example, the item immediately above could be used to measure not only the presence of collaboration but also its extent. Items about the content of professional development often provide response options in terms of time spent. Relatively few items ask for judgments about the adequacy of time spent, but adequacy may be inferred from responses to other items. One item that does probe directly is found on a Horizon Research questionnaire:

> (8) Generally speaking, to what extent has each of the following been true of science-related professional development you have experienced in your district in the past year? [Response options: "Not at all" (1) to "To a great extent" (5) and "Don't know" (6)]
>
> m. Professional development programs are sustained over time, with ample followup activities and experiences.
>
> *Local Systemic Change Teacher Questionnaire*

Overall, most of the dimensions of interest regarding delivery of professional development are addressed directly or indirectly by existing survey items.

Resources for Professional Development

Post secondary faculties engaged in preservice and continuing teacher education have been increasingly involved in collaborative efforts to improve practice, with central office and school-based partners and sometimes consultants from the private sector. Advocates of establishing "professional development schools" cite the benefits all around--to novices, veterans, and institutions, as well as to students whose opportunities to learn may be enriched. Such collaborations may serve to maintain the vitality of all the partners' enterprises. We found no items that ask specifically about professional development schools or other joint efforts that focus on school programs. However, because this appears to be a growing trend, developing the capacity to track it may be useful.

Items About the Content of Professional Development

To improve teaching quality in areas related directly to student learning opportunities, professional development must address subject matter and general pedagogy. Subject matter elements include an accurate presentation of important concepts and processes, content that is aligned with relevant standards, and links to teachers' current knowledge base. Instructional elements may include reform-oriented strategies (e.g., inquiry-based instruction, use of manipulatives, cooperative learning), strategies for engaging student diversity, standard and alternative forms of student assessments, appropriate use of familiar methods, and finding resources for teaching.

Subject Matter

About 15 percent of the survey items focused on the actual content and concepts presented in professional development programs. Most of the items in this category are drawn from content-specific surveys, such as the NAEP instruments for mathematics teachers. They typically offer an inventory of topics, with response options for duration or frequency. From such responses, one could determine whether teachers are studying important concepts and whether the topics align with standards advanced by professional associations, such as the National Council of Teachers of Mathematics. This item from the National Assessment of Educational Progress teacher survey represents one common form.

What level of exposure, if any, have you had to each of the following topics or areas?

	One or more college or university courses	Part of a college or university course	In-service training	Little or no exposure
1. Methods of teaching elementary mathematics	O	O	O	O
2. Number systems and numeration	O	O	O	O
3. Measurement in mathematics	O	O	O	O
4. Geometry	O	O	O	O
5. Probability/ statistics	O	O	O	O
6. Abstract/ linear algebra	O	O	O	O
7. Calculus	O	O	O	O

National Assessment of Educational Progress Math Teacher Survey

Instructional Strategies

Professional development that enhances teaching quality with respect to repertoire addresses the need to stimulate student engagement in academic work. Issues of interest include whether such professional development models effective pedagogy, promotes appreciation of diverse student resources and abilities, increases participants' skill in assessing student learning, and identifies sources of material support. Items about subject matter instructional strategies were also drawn primarily from content-specific surveys. Few items ask about availability of the resources necessary for implementation. Like the items about delivery, items about strategies use an inventory approach. The NAEP teacher survey item below is typical.

Questions 1-14. During the past five years, have you ever had training in any of the following, either in college courses or in in-service education? Fill in one oval on each line.

	Yes	No
1. Study strategies	[A]	[B]
2. Motivational strategies	[A]	[B]
3. Teaching critical thinking	[A]	[B]
4. The role of students' prior knowledge in their reading	[A]	[B]
5. Diagnosis and remediation of reading difficulties	[A]	[B]
6. Ability grouping	[A]	[B]
7. Literature-based reading instruction	[A]	[B]
8. Reading assessment	[A]	[B]
9. Content area reading	[A]	[B]
10. Combining reading and writing	[A]	[B]
11. The whole language approach to teaching reading	[A]	[B]
12. Phonics in the teaching of reading	[A]	[B]
13. Individual reading programs	[A]	[B]
14. Teaching students from different cultural backgrounds	[A]	[B]

National Assessment of Educational Progress Reading Teacher Survey

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Interpersonal/Organizational Knowledge and Skills

A recent survey of the National Education Association, developed for the KEYS project, included an item asking about skills that many think are essential for participating in shared governance and team teaching.

(16) How often is the following training offered in your school?

		Monthly or More Often	Several Times A Year	Once A Year	Every Few Years	Not Offered
a.	Assertiveness training	1	2	3	4	5
c.	Brainstorming techniques	1	2	3	4	5
e.	Communication skills	1	2	3	4	5
g.	Conflict resolution	1	2	3	4	5
h.	Consensus building	1	2	3	4	5
m.	Decisionmaking skills	1	2	3	4	5
o.	Leadership skills	1	2	3	4	5
s.	Problem solving skills	1	2	3	4	5
u.	Teamwork training	1	2	3	4	5

National Education Association

Items About Context for Professional Development

Realizing the goals of professional development is often as dependent on context support as it is on design and content. Adapting new approaches requires institutional, financial, and cultural backing. Items found in our surveys address two aspects of support. Institutional support takes the form of time "on the clock" for professional development and material and professional incentives for participation (e.g., as release time, stipends, salary increases, leadership responsibilities, improved supervisory feedback). Support in the school culture may nurture teacher collaboration, permit participation in designing professional development, and encourage teachers to take responsibility for their own professional development. A third important form of context support is funding. Reports of major professional development initiatives have cited the historic problem of funding: when resources fail to keep pace with needs, professional development is often among the first activities to be curtailed. However, no items about this aspect of context were found.

Institutional Support

About 14 percent of the survey items inquire about school policies and practices that support professional development programs. Examples include this one from the Upgrading Mathematics Teacher survey, which was replicated in many other surveys:

(11) What type(s) of support have you received for participating in formal in-service programs? (Circle all that apply.)

	General	Math
None	1	1
Released time from teaching	2	2
Travel and/or per diem expenses	3	3
Stipends	4	4
Professional growth credits	5	5
Other (please specify)	6	6

Upgrading Mathematics Study

Other survey items inquire about practices that support more informal types of professional development, such as having common preparation or planning time.

Financing

We found no items that collect data on how professional development activities are funded by schools, districts, communities, or other external sources of support. While this is an important element in understanding the overall picture of professional development, such data may be less appropriate for surveys, and more easily gathered through other means such as interviews.

School Culture

The most common survey item on school culture typically seeks teacher perception on specific institutional aspects that affect overall atmosphere. Norms supporting collaboration are often targeted. Six surveys include such items, collecting data on up to 26 specific elements thought to affect school culture. For example, two SASS items ask about teacher behaviors that are essentially voluntary and that reveal professional norms:

(T47) Do you agree or disagree with each of the following statements?

		Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
f.	Teachers participate in making most of the important educational decisions in this school.	☐	☐	☐	☐
p.	There is a great deal of cooperative effort among the staff members.	☐	☐	☐	☐

1993-94 Schools and Staffing Survey, Teacher Questionnaire

Items About Outcomes

The focus of interest in this area is whether professional development outcomes are observed in:

- Teachers' knowledge and attitudes about content, cultural diversity, and expectations for all students
- Teachers' classroom practice in which content is aligned with standards; teachers employ a repertoire of methods appropriate to the subject and students; and teachers use assessments that support the full range of learning goals
- School-level changes such as institutional reform goals
- Student-level changes such as improving performance on appropriate measures of achievement, narrowing the achievement gap between disadvantaged students and others, and engaging students more actively in learning

Few surveys attempt to assess the effect of professional development through items asking whether teacher behavior changed as a result of their participation. Similarly, few have sought data on whether teachers apply their new learning in the classroom. Such questions are subject to response bias and misperceptions, which limits the usefulness of the data they generate. Therefore, the shortage of such items may reflect some experts' concern about the validity of teacher reports of behavioral changes. One example is adapted from the CER:

	Please rate the extent to which the following have changed in the past three years		
	Worse	No Change	Better
My teaching effectiveness	[]	[]	[]
Curriculum quality	[]	[]	[]
Professional growth opportunities	[]	[]	[]
Sense of community in the school	[]	[]	[]
My commitment to the school	[]	[]	[]
The quality of student academic performance	[]	[]	[]
Student behavior	[]	[]	[]
The school's relations with parents	[]	[]	[]
How students get along with other students	[]	[]	[]
How parents get along with teachers	[]	[]	[]
How the school relates to the community	[]	[]	[]
How teachers get along with students	[]	[]	[]

Classroom Effects of Reform

Noticeably missing from this list of items measuring outcomes are items about "teacher satisfaction" with professional development. While personal satisfaction is most definitely an element of a productive and engaged workplace, knowledge of what participants report about satisfaction sheds little light on the presence or absence of high quality outcomes from professional development, not even outcomes related to improved teacher attitudes. Surveys of staff development from the 1970's focused almost exclusively on recipient satisfaction with in-service programs (Sparks, 1995), yet did not clarify the inherent ambiguities. The complexity of forms of professional development today and the number of dimensions on which any one might be deemed "satisfactory" make it inevitably difficult to interpret data on satisfaction. Because of this, recent studies do little to assess directly teacher attitudes toward professional development, choosing instead to assess less ambiguous indications of teacher support and approval.

Summary of Existing Survey Items

In general, some areas of current interest are already well covered by items whose use has been sufficiently extensive to produce insight about their data collection properties. These areas include the delivery of professional development, its curriculum and instructional content, and some

aspects of institutional support and school culture. Design elements, financial support, and outcomes related to student achievement or the teaching qualities that contribute to achievement are less often the focus of survey research.

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VI. Recommendations for NCES Data Collection on Professional Development

NCES could enhance its capacity to characterize and report on professional development as a component of educational systems nationwide by extending current efforts in key ways and by making relatively few additions to its existing data collection efforts. In this section, we propose measurement strategies for the five dimensions we have identified as important: design, delivery, content, context, and outcomes. We organize our recommendations using the four types of data collection strategies described in Section III above (and repeated in Table 1 below): surveys, interviews, observations, and analysis of student performance. Within our discussion of surveys, we recommend modifications to existing SASS items, suggest additional SASS items to improve the range of data collected, then suggest supplemental surveys where appropriate. We follow a similar reporting process with the remaining data collection strategies. In developing revised or new items for this section, we borrowed heavily from the surveys listed in Appendix D and from a recent paper by Dorothy Gilford (1996).

To make these recommendations most useful to NCES, we followed three guidelines. First, we strove to maintain continuity of NCES data collections to permit comparisons over time. Second, we planned our recommendations with budget considerations in mind, since they would necessarily limit expansive modifications. Finally, when we contemplated extending or contracting the boundaries of collected data to inform policy making in particular directions, we considered both the emerging developments and the enduring issues of professional development.

In Table 1, we summarize the data collection strategies we recommend for each dimension of the professional development taxonomy. We next describe the recommendations in greater detail. We conclude this Section with a summary of our specific recommendations for amending current items in SASS and creating new ones.

Table 1: Data collection methods recommended for collecting information on the dimensions of professional development outlined in the taxonomy.

Dimension of Professional Development	Data Collection Methods					
	Surveys		Interviews	Observations		Student Performance
	SASS	Supplemental		Teacher Practice	PD Activity	
Design	✓		✓		✓	
Delivery	✓	✓	✓		✓	
Content	✓	✓			✓	
Context	✓	✓	✓		✓	
Outcomes	✓	✓	✓	✓		✓

Measuring Design

Few existing survey items or data collection methods address the design of professional development directly. This is unfortunate since the design provides the foundation for effectiveness, ensuring that the knowledge and skills cultivated through the professional development have a direct bearing on the needs of the organization, its members, and their ability to achieve their mission.

Three aspects of design can be measured initially with surveys, then described more fully with related studies: connection with larger school programs, responsiveness to teachers' needs, and the extent to which evidence of effectiveness is gathered. In order to produce a long-lasting effect that matters in the broader context of schooling, professional development should arise from a coherent plan that addresses school needs. To stimulate teachers' learning and maintain their competence in educating students, professional development should generally accommodate the teacher-learners' range of prior knowledge and potential use of new information or skills. Provision should be made for all instructional staff: beginning teachers; those who are ready for advanced opportunities; and those whose roles are tangential or complementary to the teacher-learners' roles. Additionally, to ensure the quality of the professional development experience, some form of ongoing evaluation should determine whether the investment of resources is generating the desired results. Evaluation of professional development may well focus initially on whether it leads to improvement of teachers' knowledge and skill. Although improvements in students' knowledge and skills are the ultimate goals of professional development, an unambiguous connection with teachers' professional development will be more difficult to document.

Surveys

SASS. Currently, SASS collects little information on the design of professional development activities. We recommend continuing to use Item T44b on the extent of teacher influence on design, and gathering additional data by making minimal changes to current items in the Teacher Questionnaire, and by adding new items to the Principal Questionnaire.[2]

Item 30 in the current teacher questionnaire should be modified to collect additional specific data on professional development design. Adding an additional option (in italics below) would identify possible links between professional development activities and broader school improvement goals (Taxonomy element IA).

(T30) Since the end of last school year, in which of these activities related to teaching have you participated? Mark (X) to all that apply.

1 ☐ School District sponsored workshops or in-service programs
2 ☐ School Sponsored workshops or in service programs
3 ☐ University extension or adult education courses
4 ☐ College courses in your subject field
5 ☐ Professional growth activities sponsored by professional associations
6 ☐ Committee to integrate academic skills into the vocational curriculum
7 ☐ Other curriculum committee
8 ☐ Committee on selecting textbooks or materials
9 ☐ *Professional growth activities directly related to implementing a school improvement plan*
0 ☐ None of the above

SASS 93-94

Adding a statement (modified from the Local Systemic Change Teacher Questionnaire) to item 47 in the current Teacher Questionnaire would collect data on the extent to which the design of professional development accommodates the need for teacher understanding and skills to be built over time, reinforced continuously, and practiced in a variety of situations (Taxonomy element IB).

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[2] In this section, we identify items according to their particular SASS questionnaire. Existing items in the Teacher Questionnaire, for example, are labeled T30 or T47, corresponding to items 30 and 47. Proposed new items are also identified with the particular survey for which they are recommended. TX1 and PX1, for example, signify proposed items for the Teacher and Principal Questionnaires, respectively.

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(T47) Do you agree or disagree with each of the following statements?

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
Professional development activities are sustained over time, with ample participant followup and teacher support.	☐	☐	☐	☐

SASS 93-94

New items could also be added to the SASS Administrator Questionnaire to measure additional dimensions of design (Taxonomy element IB). The first item below identifies elements of the school's process for evaluating the effectiveness and design of professional development activities. The second collects information on multiple elements of professional development design.

(PX1) Please identify the strategies your school uses to gather information on the effectiveness of professional development: Mark (X) to all that apply.

1 ☐ Surveys asking for teachers' perceptions of professional development program effectiveness
2 ☐ Observations of changes in teachers' practice
3 ☐ Artifact collection illustrating implementation of new practices
4 ☐ Narrative reports of related changes in teaching
5 ☐ Portfolios documenting new teacher behavior or knowledge
6 ☐ Videotapes of new practices

(PX2) Please indicate which of the following statements describe your school-sponsored professional development programs. Mark (X) to all that apply.

Professional development programs...

1 ☐ are planned to meet the needs of teachers at different career stages
2 ☐ are sustained over time, with ample followup activities and experiences
3 ☐ provide for and encourage continuous inquiry
4 ☐ are tied to school improvement plans
5 ☐ reflect significant teacher input
6 ☐ have content aligned with broad district goals
7 ☐ are evaluated formally for evidence of effectiveness

Supplemental surveys. Survey data on the design of professional development activities can be collected at sufficient depth through SASS, and we recommend no additional survey data collection.

Interviews

Clear, detailed knowledge of the design could be gained from the right collection of interviews at a given site. Interviews with district and school personnel, and with professional development trainers could be conducted efficiently using semi-structured interview protocols in telephone interviews or site visits with key planners or implementers of programs and a few participants. A semi-structured protocol would permit data collection that captures some low-inference, comparable aspects of practice while preserving the opportunity for informants to communicate their conceptions of learning experiences for teachers. Sites could be chosen on the basis of the similarity of their survey response patterns to high-frequency patterns evident from analysis of the whole sample, as illustrative rather than random cases. Mandel (1995) and Gilford (1996) also recommend using case studies to help define SASS questions about the range and character of professional development.

Observations

Some of the essential elements of design could be garnered by analyzing observational data obtained during a particular professional development activity. Such data could provide information on how well the particular design accommodates the need for understanding and skills to be built over time, practiced in a variety of situations; reflects input of participants; and ensures equal access by teachers of disadvantaged or minority students. Little information about design would be obtained by observing teacher practice.

Student Performance

Collecting data on student performance would not inform our understanding of how professional development is designed.

Measuring Delivery

The delivery of professional development influences effectiveness through provision of an adequate range of entry points and roles; its inclusion over time of opportunities suited to a spectrum of school structures and purposes (e.g., workshops, networks, committee work, inquiry); the

adequacy of its duration and intensity; and its involvement of various sectors of the education community such as university faculty, central office specialists, subject matter experts.

Information on the delivery of professional development can be adequately gathered using large-scale surveys, although more intensive surveys of specialized groups of teachers might yield more indepth information relative to specific content areas.

Surveys

SASS. Currently, SASS includes an item (T30) that addresses two of these four elements of delivery--a range of roles and responsibilities with multiple ways to participate (Taxonomy element IIA) and the specific types of activities (Taxonomy element IIB). No current SASS items examine the adequacy of professional development activities (Taxonomy element IIC), or their integration of community resources (Taxonomy element IID). Two relatively simple modifications to item T30, however, will collect additional information for IIB and address IIC. Expanding the types of professional development activities queried in the item will respond to Taxonomy element IIB, while replacing the current single (yes/no) response option with time and adequacy response options will accommodate element IIC. Using appropriate analytic methods with this modified item will generate answers to multiple queries of the most important delivery elements. New elements are in italics.

(T30) Since the end of last school year, in which of these activities related to teaching have you participated. how much time have you spent on each, and was the amount of time adequate?

	0 Hours	*8 Hours or less*	*9-32 Hours*	*More than 32 hours*	*Adequate*
1. School District sponsored workshops or in-service programs	☐	☐	☐	☐	☐ Yes ☐ No
2. School Sponsored workshops or in service programs	☐	☐	☐	☐	☐ Yes ☐ No
3. University extension or adult education courses	☐	☐	☐	☐	☐ Yes ☐ No
4. College courses in your subject field	☐	☐	☐	☐	☐ Yes ☐ No
5. Professional growth activities sponsored by professional associations	☐	☐	☐	☐	☐ Yes ☐ No
6. Committee to integrate academic skills into the vocational curriculum	☐	☐	☐	☐	☐ Yes ☐ No
7. Other curriculum committee	☐	☐	☐	☐	☐ Yes ☐ No
8. Committee on selecting textbooks or materials	☐	☐	☐	☐	☐ Yes ☐ No
9. Professional growth activities directly related to implementing a school improvement plan	☐	☐	☐	☐	☐ Yes ☐ No
10. Single event workshops with little or no followup	☐	☐	☐	☐	☐ Yes ☐ No
11. Individual activities you planned	☐	☐	☐	☐	☐ Yes ☐ No
12. Collaboration with other teacher(s) at your school	☐	☐	☐	☐	☐ Yes ☐ No
13. Individual inquiries in which you identified and researched a content or instructional topic of interest	☐	☐	☐	☐	☐ Yes ☐ No
14. Other	☐	☐	☐	☐	☐ Yes ☐ No
15. None of the above ☐					

The extent to which community resources are used in professional development (Taxonomy element IID) could also be assessed through a new SASS teacher item. A modified item from the Scholastic Research Institute Pilot Teacher Survey may be appropriate:

(TX1) 'On a scale of 1 to 5. to what extent did the professional development activities you participated in since the end of last school year involve the following local community resources?

	Not at All				A Great Extent
a. Other teachers	1	2	3	4	5
b. Subject specialists or experts	1	2	3	4	5
c. Business/industry professionals	1	2	3	4	5
d. College/university professors	1	2	3	4	5
e. Other college/university educators	1	2	3	4	5
f. Community representatives	1	2	3	4	5

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Supplemental surveys. Delivery of professional development can be measured by a supplementary survey of teachers within specific high-interest content areas asking for more details than could be gathered with an item that is sufficiently general for inclusion in SASS. For example, in targeting teachers in high-profile subjects in alternating years (such as mathematics one year and science the next year), responses to content-specific survey items might reveal important patterns in the use of external resource people: What experts do schools tap for various kinds of subject-matter workshops? Is there any change over time in the extent of use of university consultants, private contractors, and community partners? The delivery possibilities are sufficiently well known that it should be possible to construct a short content-specific survey in a multiple-choice format. Such a survey could enhance our view of the offerings, their delivery and change over time without sacrificing quality or generating too great a response burden.

Interviews and Observations

Combining interviews and observations into long term case studies tracking professional development over a year or longer at several sites chosen for representativeness could shed light on how configurations of opportunities develop and are sustained (or not). This information might be useful in understanding the interplay of forces within a system attempting broad reforms. Intensive case studies could be used to characterize professional development over a span of time using data collected in several ways over a short period. Observations of teacher practice would not materially aid our understanding of professional development delivery.

Student Performance

Collecting data on student performance would not inform our understanding of how professional development is delivered.

Measuring Content

Whether professional development activities influence educational outcomes depends in part on their content, and we have suggested that three types of content are most relevant to contemporary school improvement efforts: subject matter (e.g., mathematics, history); instructional strategies, including assessment; and process skills essential to functioning effectively in shared decisionmaking.

Surveys

SASS. With modification, one of the current SASS teacher items on professional development could provide information on all three aspects of content (Taxonomy dimension III), plus data on teachers' perceptions of the outcomes (Taxonomy dimension V). Currently, item T31 supplies some information on content areas (Taxonomy element IIIA), instructional methodologies (Taxonomy element IIIB), and duration (Taxonomy element IIIC), while item T32 provides outcome data (Taxonomy element VA and VB) generalized across all professional development programs. As Gilford (1996) suggests, combining T31 with T32 could create the potential to collect additional content data and more specific information on respondents' opinions about the results of specific types of professional development. Such a merged item could be the following:

(T31/T32) For professional development programs focusing on each of the topics listed, indicate which you have participated in since the end of last school year by writing first the amount of time spent (in total hours) and second whether outcomes listed were achieved.

Focus of Content	Time spent in activities since the end of last year (to the nearest hour)	This professional development activity... *(Indicate yes or no for each outcome)*				
		...provided information that was new to me.	...changed my views on teaching.	...caused me to change my teaching practices.	...caused me to seek more information or training.	...were generally a waste of my time.
a. All professional development activities	____hr(s)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
b. Uses of educational technology for instruction (e.g., use of computer, satellite learning)	____hr(s)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
c. Methods of teaching your subject field	____hr(s)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
d. In-depth study in your subject field	____hr(s)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
e. Student assessment (e.g, methods of testing, evaluation, performance assessment)	____hr(s)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
f. Cooperative learning in the classroom	____hr(s)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
g. *Methods of teaching students with limited English proficiency*	____hr(s)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
h. *Classroom management skills*	____hr(s)	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No

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Including element *a. All professional development activities* continues the time series for current item T32; including element *g. Methods of teaching students with limited English proficiency* allows us to eliminate current item T63.

In addition, one new item might offer insights about whether professional development builds on teachers' current knowledge of content, teaching, and learning (Taxonomy element IIIA).

(TX2) Please indicate the extent to which you agree that the following statements are true of your professional development opportunities during the last school year.

	Not at All				Completely
a. Professional development programs recognize and build upon individual teachers' knowledge about topics as they enter the program.	1	2	3	4	5
b. Professional development programs assume that all teachers have the same level of knowledge.	1	2	3	4	5
c. Professional development programs promote collaboration among teachers.	1	2	3	4	5

Supplemental surveys. Surveys could complete our understanding of the specific content of professional development and its potential to improve education workforce competence in key subjects. For example, math and science are areas where new content is emerging daily and significant numbers of faculty are teaching out of field, generating an obvious need for even teachers who were originally well prepared in their fields to pursue further study. Because of these factors, continuing education in disciplinary content may play a key role in the quality of teaching. Surveys targeting subpopulations of teachers in different fields could produce more detailed portrayals of content knowledge development in each discipline than could items on a general survey.

Interviews

Interviews with district and school administrators and teachers involved in planning professional development could round out the whole picture of professional development content, answering such questions as: How are topics for professional development chosen? What forms of professional development spin off from what forms of reform activity? However, the details of

Observations

One of the primary goals of professional development is to change teachers' knowledge and attitudes and their classroom practices. Observational data can provide important primary data here. Observing teacher practice is likely to generate important information that could support or refute hypotheses about teacher learning and change in teacher behaviors attributable to professional development.

Combining interviews and observations into case studies offers the lowest-inference strategy (in an inevitably high-inference game) to gather evidence to direct and support national policy decisions. Greater insight about actual practices could be gained and used to support policy development at all levels.

Student Performance

The ultimate goal of professional development is to improve student learning, and measuring student performance in relation to the professional development undertaken by teachers, and their changed instructional practices, offers direct evidence to make those theoretical connections explicit. Moreover, substantiated increases in student achievement unambiguously linked to specific professional development experiences and changed classroom behavior, offers a strong public statement about the value of professional development.

practices (Taxonomy element VB), and, if modified according to earlier suggestions, it could provide even more comprehensive data. New items could assess these changes more completely, along with possible school-level changes. Suggestions for new items follow.

(TX3) Check any of the changes you have observed in your own teaching that are the result of professional development you have participated in this past year:

- ☐ Use of new instructional strategies
- ☐ Use of new curriculum
- ☐ Use of new assessments
- ☐ Use of new instructional materials.

The 1993-94 SASS also measures elements of school change (Taxonomy element VC) in item T30 (teacher collaboration), but has no provision to measure student changes (Taxonomy element VD). In fact, linking professional development and changes in student achievement outcomes necessarily goes beyond the current conception of SASS. As explained in Section II, measuring this taxonomy element can only be accomplished by combining measures of student learning with measures of teacher development and instructional practices.

Supplemental surveys. Using a survey with more in-depth items asking for more details from a targeted sample of teachers would greatly increase the specificity of data that could be collected. Targeting high interest content areas, such as mathematics and science, could significantly increase our understanding of the specific ways in which teachers' knowledge and attitudes are improved, their classroom actions changed, and the school culture improved. Many, but not all, of these changes may be content-specific; specialized surveys can collect that type of information.

Interviews

Telephone interviews based on semi-structured protocols with a diverse sample of teachers could result in a usefully rich description of how teachers change as a result of professional development. While the data are still subject to the unreliability introduced by response bias and faulty memory, some of the ambiguities can be reduced by asking the right questions in the right order and by probing for clarity.

Supplemental surveys. A supplemental and more specialized survey would be helpful to track this dimension, particularly some of the important aspects of financing. Much of that data collection, such as that proposed by Chambers (1996), is conducive to supplemental surveys.

Interviews and Observations

The interplay of institutional support, financial support, and school culture is not well documented, yet it appears to be a key ingredient of systemic reform. Selected case studies of sites that fit common profiles observed in survey responses could offer insight into how those three factors operate with respect to teaching quality. Blending teacher and principal interviews with school observations of a random subsample of teachers, their principals, and their schools could result in a richer data set and a better characterization of that interplay in a manageable number of sites and periods of time, than surveys alone could provide.

Student Performance

Collecting data on student performance would not inform our understanding of the context of professional development.

Measuring Outcomes

Educational outcomes related to practice or professional learning are very difficult to measure reliably with surveys, but it seems nevertheless important to try, because alternative measurement strategies are time-consuming, burdensome to respondents, and costly. The professional development outcomes most proximate to student learning concern teacher attitudes and practice, which underlie teaching quality. Linkages to student achievement outcomes will be hard to prove, but a case can be sketched with data from teachers' reports of their perceptions of change.

Surveys

SASS. The 1993-94 SASS collects data on two of the four elements of outcomes. Currently, item 32 of the 1993-94 SASS Teacher Questionnaire provides some information on changes in teacher attitudes and knowledge (Taxonomy element VA), along with the possible impact on classroom

(PX3) Do you agree or disagree with each of the following statements?

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
a. Evaluations of the principal are based, in part, on the school's professional development activities.	☐	☐	☐	☐
b. Participation on a school-based committee that works on curriculum, instruction, or assessment earns a teacher benefits typically associated with traditional professional development.	☐	☐	☐	☐
c. Teacher evaluations are tied to their professional development activities.	☐	☐	☐	☐
d. Participation in professional growth activities brings increased responsibility, status, or recognition to teacher.	☐	☐	☐	☐

Data on the financing of professional development activities (Taxonomy element IVB) can also be obtained from administrators.

(PX4) Please answer the following questions about financing professional development in this school.

a. Is professional development an identifiable line item in your budget?

☐ No (Go to part b)
☐ Yes

If yes,
- What percentage does it represent of the total budget? _____
- What percentage of the total professional development budget comes from non-school district sources, such as special grants or federal funds? _____

b. Does completion of sufficient professional development lead to increases in teacher salary?

☐ Yes
☐ No

c. Are teachers reimbursed for their expenses incurred attending professional development activities (e.g., tuition, conference fees, workshop fees)?

☐ Yes
☐ No

We also recommend maintaining item P25e on teacher influence in determining the content of in-service programs.

(T33) Check all the types of support that have you received during the current school year for in-service education or professional development in your main teaching assignment field.

- ☐ Released time from teaching (*i.e., when your regular teaching responsibilities are covered by someone else*)
- ☐ Scheduled time (i.e., time built into your schedule for professional development)
- ☐ *Sabbatical or leave*
- ☐ Travel and/or per diem expenses
- ☐ Tuition and/or fees
- ☐ Professional growth credits
- ☐ None of the above

SASS 93-94

Similarly, adding an additional query to item 47 can help researchers understand the functioning of school culture (Taxonomy element IVC) in supporting professional development efforts of individual teachers.

(T47) Do you agree or disagree with each of the following statements?

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
I have time outside of my regular teaching during the regular school week to work with my peers on curriculum and instruction.	☐	☐	☐	☐

In addition, two new items would help provide supplementary insights as to whether school and district policies reinforce the importance of professional development and would gather needed information about the financial aspects of professional development. School administrators could answer the following question about administrative incentives to provide adequate time and support for teachers' professional development (Taxonomy element IVA):

professional development content produced from interviews would not represent a significant improvement over those obtained from surveys.

Observations

Observational data from specific professional development activities can better document details of the enacted content of professional development and lead to a more accurate understanding of content than that provided by survey responses. Such observational data can move analysts beyond interpreting only intended lesson plans to analyzing observational data with which to better understand the enacted curriculum of professional development. Observing teacher practice would not provide substantive information on the content of professional development programs.

Student Performance

Collecting data on student performance would not inform our understanding of the content of professional development.

Measuring Context

To effect sustained change, professional development has to be supported at key junctures by institutional practices, financed reliably and adequately (as measured against some standard), and integrated into social expectations so that teacher learning activities are part of the taken-for-granted realities of school life.

Surveys

SASS. Several items in the 1993-94 SASS address the issues of institutional support, financing, and school culture, but judicious modification could improve and expand the information collected without interrupting existing time series data. For example, in item T33 collecting data on institutional support for professional development (Taxonomy element IVA), the parenthetical expression further explains the intention of the item; the third item fills a gap in the original question.

Summary of Specific Recommendations for SASS Items

We recommend revising five current items on the SASS Teacher Questionnaire (items 30, 31, 32, 33, 47), and adding three items to the Teacher Questionnaire and four items to the Principal Questionnaire. We also recommend combining two current items (T31/T32), maintaining two items as they are (T44b, P25e), and eliminating one item (T63). Finally, we recommend investigating analysis of student outcome data for one element (Taxonomy element VD). We summarize here our recommendations for revisions and additions to SASS according to the taxonomy elements they support.

	Revise	Add	Maintain	Eliminate
I. Design				
A. Connects with goal	T30			
B. Specific elements	T47	PX1 and PX2	T44b	
II. Delivery				
A. Range of options			T30	
B. Specific types	T30			
C. Duration and intensity	T30			
D. Community resources		TX1		
III. Content				
A. Subject matter	T31/T32	TX2		
B. Instructional strategies	T31/T32			T63
C. Organizational skills	T31/T32			
IV. Context				
A. Institutional report	T33	PX3		
B. Financing		PX4		
C. School culture	T47		P25e	
V. Outcomes				
A. Teachers' knowledge	T31/T32			
B. Instructional practice	T31/T32	TX3		
C. School changes	T30			
D. Student changes		Other		

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VII. Conclusion

In its simplest conception, student learning is a product of sustained work on substantively sound academic tasks appropriately matched to the student's needs. Future refinements or more elaborated notions of what it really means to know something or know how to do something may change the terms of discourse about student learning, but will not alter the need to keep the quality and quantity of student engagement and effort as the focus of improvement efforts. Teaching quality influences student work in very direct ways: through the degree of substantive rigor and appropriateness of academic tasks, through task structures that engage students, through the classroom climate that governs the extension of work time within the boundaries of schooltime, and through appropriate integrated assessment systems that in themselves promote improved student learning. Professional development, properly conceived and realized, is the obvious process through which our experienced teacher corps will incorporate new understandings of student learning into their practice and incoming teachers will sustain their own professional learning curve.

As new understanding of the processes of learning has informed assumptions about good teaching for children, it has also stimulated new approaches to professional development. These approaches provide for teachers to construct professional knowledge, participate in identification of their learning needs, and share the work of creating organizational arrangements that support their teaching more effectively. While some may argue that the lack of high correlation between investments in professional development and student achievement outcomes offers little support for diverting scarce resources to professional development, many are now coming to understand that investments in teacher learning could pay high dividends in student achievement. Limitations of present measurement capacity do not dim the logic of the assumptions that teaching quality contributes to student learning, that teaching quality is itself the product of teacher learning experiences, and thoughtful, well-planned professional development activities can be significant teacher learning experiences.

The immediate goal of professional development is to improve the quality of teaching, striving to maximize teachers' skills in assessment, classroom management, pedagogy, and specific forms of content expertise. And the ultimate objective of high-quality teaching is to maximize student learning by matching the task to the learner, providing substantive and appropriate work, and creating sufficient academic learning time for the task to be successfully completed.

Similarly, the ultimate goal of data collection about professional development ought to be to provide the basis for charting and understanding the current state of the art, its prevalence in the

nation's schools, and its change over time. To do this, we must identify and agree on the elements that are important, measurable, and representative of the professional development process. The taxonomy on pages 25 through 29 provides a basis for that judgment. Research on professional development to date suggests that adding to SASS the items suggested, initiating periodic supplementary surveys to enrich the picture of particular aspects of professional development, and occasionally using more labor-intensive data collection strategies to validate other methods and expand the data pool will improve the adequacy and utility of the information used to develop and implement federal education policy.

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Appendix A

The National Education Goals
Goal 4
Teacher Education and Professional Development

By the year 2000, the Nation's teaching force will have access to programs for the continued improvement of their professional skills and the opportunity to acquire the knowledge and skills needed to instruct and prepare all American students for the next century.

Objectives:

- All teachers will have access to preservice teacher education and continuing professional development activities that will provide such teachers with the knowledge and skills needed to teach to an increasingly diverse student population with a variety of education, social, and health needs.

- All teachers will have continuing opportunities to acquire additional knowledge and skills needed to teach challenging subject matter and to use emerging new methods, forms of assessment, and technologies.

- States and school districts will create integrated strategies to attract, recruit, prepare, retrain, and support the continued professional development of teachers, administrators, and other educators, so that there is a highly talented work force of professional educators to teach challenging subject matter.

- Partnerships will be established, whenever possible, among local educational agencies, institutions of higher education, parents, and local labor, business, and professional associations to provide and support programs for the professional development of educators.

National Education Goals Panel, 1994

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Appendix B

U.S. Department of Education
Professional Development Principles

Principles of High-Quality Professional Development

The mission of professional development is to prepare and support educators to help all students achieve to high standards of learning and development.

Professional Development:

... focuses on teachers as central to student learning; yet includes all other members of the school
... focuses on individual, collegial, and organizational improvement;
... respects and nurtures the intellectual and leadership capacity of teachers, principals, and others in the school community;
... reflects best available research and practice in teaching, learning, and leadership;
... enables teachers to develop further expertise in subject content, teaching strategies, uses of technologies, and other essential elements in teaching to high standards;
... promotes continuous inquiry and improvement embedded in the daily life of schools;
... is planned collaboratively by those who will participate in and facilitate that development;
... requires substantial time and other resources;
... is driven by a coherent long-term plan;
... is evaluated ultimately on the basis of its impact on teacher effectiveness and student learning; and this assessment guides subsequent professional development efforts

U.S. Department of Education, 1996

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Appendix C

American Federation of Teachers Professional Development Guidelines

Summary

Professional development is a continuous process of individual and collective examination of practice. It should empower individual educators and communities of educators to make complex decisions, identify and solve problems, and connect theory, practice, and student outcomes. It should also enable teachers to offer students the learning opportunities that will prepare them to meet world-class standards in given content areas and to successfully assume adult responsibilities for citizenship and work.

1. Professional development should ensure depth of content knowledge.

2. Professional development should provide a strong foundation in the pedagogy of particular disciplines.

3. In addition to content and pedagogical content knowledge, professional development should provide more general knowledge about the teaching and learning processes and about schools as institutions.

4. Effective professional development is rooted in and reflects the best available research.

5. Professional development should contribute to measurable improvement in student achievement.

6. Effective professional development expects teachers to be intellectually engaged with ideas and resources.

7. Effective professional development provides sufficient time, support, and resources to enable teachers to master new content and pedagogy and to integrate these into their practice.

8. Professional development should be designed by representatives of those who participate in it, in cooperation with experts in the field.

9. Professional development ought to take a variety of forms, including some we have not typically considered.

American Federation of Teachers, 1995

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APPENDIX D

Professional Development Survey Items

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Appendix D-1
Abbreviated Taxonomy of Professional Development Indicators

I. **Design**

A. Connection with broader school improvement goals

B. Design elements

II. **Delivery**

A. Offers a range of roles and responsibilities with multiple ways to participate

B. Provides for specific types of professional development activity

C. Provides activities of sufficient duration and intensity to meet goals

D. Integrates professional community resources effectively

III. **Content**

A. Subject matter

B. Instructional Strategies

C. Interpersonal/Organizational Skills

IV. **Context**

A. Institutional Support

B. Financing

C. School Culture

V. **Outcomes**

A. Teachers' knowledge/attitudes

B. Teachers' classroom practice

C. School level changes

D. Student level changes

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Appendix D-2
Surveys with Professional Development Items

American Public School Teacher Survey: National Education Association, 1991

California Learning Assessment System: Teacher Survey, 1994

Classroom Effects of Reform: Chicago Panel on School Policy, Teacher Surveys, 1994

Computers in Education Survey: International Education Association (IEA), 1992

Connecticut State Department of Education: Teacher Survey, 1994

Instructional Practices and Content Survey: Policy Studies Associates, 1995

Kentucky Title I Reading Teachers Survey: Muchmore, 1994

Local Systemic Change Teacher Questionnaire: Horizon Research Inc., 1995

National Assessment of Educational Progress: Reading, Math, and Social Studies Teacher Surveys, 1991-92

National Education Longitudinal Study, Teacher Surveys, Base Year, First Followup and Second Followup: National Center for Education Statistics, 1988, 1990, 1992

National Longitudinal Study of Youth: Bureau of Labor Statistics, 1994

National Survey of Science and Mathematics Education: Horizon Research Inc., Math Teacher Questionnaire, 1993

Pilot Teacher Survey: SRI, International, 1994

Reform Up Close: Consortium for Policy Research in Education (CPRE), University of Wisconsin, 1994

School Based Management Study: CPRE Teacher Surveys, 1993

Schools and Staffing Survey: National Center for Education Statistics, 1990-91, 1993-94

Standards-Based Professional Development Program: Policy Studies Associates, 1995

State Collaborative on Assessment and Student Standards: Council of Chief State School Officers, 1995

Survey of the Conditions of Teaching and Learning: National Education Association, 1991-1992

Survey of Elementary Mathematics Education in California: Center for Research on the Context of Teaching, Teacher Questionnaire, 1994

Third International Mathematics and Science Study: IEA, Teacher Questionnaires, 1995

Upgrading Mathematics Study: CPRE, Teacher Survey, 1992

Validating National Curriculum Indicators: RAND, 1994

APPENDIX D-3

Existing Professional Development Survey Items

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I. Design

A. Connection With Broader School Improvement Goals

(19) Now indicate your opinion about how well each statement applies to your school and district. (Circle one for each statement.)

	Strongly Disagree				Strongly Agree	Don't Know
a. The principal of this school is well-informed about [standards and curriculum guides]	1	2	3	4	5	9
b. There is a school-wide effort to achieve the kind of mathematics education promoted by [standards and curriculum guides].	1	2	3	4	5	9
c. Our district is providing extensive staff development based on or more of [standards and curriculum guides].	1	2	3	4	5	9

Center for Research on the Context of Teaching

(20) Which of the following does your school make available to you? (Circle one on each line.)

	No	Yes, but I do not use	Yes, and I use	Don't Know
b. Workshops/in-services related to new mathematics standards	1	2	3	9
c. Release time to attend off-site workshops or conferences related to new mathematics standards	1	2	3	9

Center for Research on the Context of Teaching

	Please rate the extent to which the following have changed in the past three years			Then indicate what impact Chicago School Reform has had on each		
	Worse	No Change	Better	Negative	None	Positive
Professional growth opportunities	☐	☐	☐	☐	☐	☐

Classroom Effects of Reform

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(1) To what extent do you agree with the following statements about your school? (Circle the appropriate number, using the following scale: 1=Strongly agree, 2=Tend to agree, 3=Tend to disagree, 4=Strongly disagree.)

n.	Staff development activities relate to my school's goals or needs	1	2	3	4

Conditions of Teaching and Learning

B. Design Elements

(T44) At this school, how much actual influence do you think teachers have over school policy in each of the following areas?

	No influence					A great deal of influence
b. determining the content of inservice programs	0☐	1☐	2☐	3☐	4☐	5☐

Schools and Staffing Survey 93-94

Variations appeared in: RUC (32) and CER (20).

(41) Please indicate which of the following statements are true of your participation in staff development activities during the [past] year.

	Yes	No
a. I was required to participate in staff development activities prior to the start of academic year.	1	0
b. I have participated in staff development activities on a regular basis throughout the academic year.	1	0
c. I have participated in staff development activities a few times during the academic year.	1	0
d. I have participated in no staff development activities during the academic year.	1	0

National Longitudinal Study of Youth

(8) Generally speaking, to what extent has the following been true of science-related professional development you have experienced in your district in the last year?

	Not at all	Just a little	A fair amount	A substantial amount	To a great extent	Don't know
c. I am involved in planning my science-related professional development.	1☐	2☐	3☐	4☐	5☐	6☐
i. Teachers in the district are involved in planning for professional development.	1☐	2☐	3☐	4☐	5☐	6☐
k. Professional development activities draw on expertise of teachers in the district.	1☐	2☐	3☐	4☐	5☐	6☐

Local Systemic Change Teacher Questionnaire

(12) In your opinion, how much influence do employees--other than administrators--have on decisions made in your school in the following areas? (Circle the appropriate number.)

	Great Influence	Moderate Influence	No Influence
g. Training opportunities	1	2	3

Conditions of Teaching and Learning

II. Delivery

A. Offers a Range of Roles and Responsibilities With Multiple Ways to Participate

(T30) Since the end of last school year, in which of these activities related to teaching have you participated? Mark (X) to all that apply.

1 ☐ School District sponsored workshops or in-service programs
2 ☐ School Sponsored workshops or in service programs
3 ☐ University extension or adult education courses
4 ☐ College courses in your subject field
5 ☐ Professional growth activities sponsored by professional associations
6 ☐ Committee to integrate academic skills into the vocational curriculum
7 ☐ Other curriculum committee
8 ☐ Committee on selecting textbooks or materials
0 ☐ None of the above

Schools and Staffing Survey 93-94

Variations appeared in: PTS (21 and 23); CER (19); CRCT (3); SCASS (17-23); NSSME (11); NELS First Followup (20); and CLAS (7).

(12) What professional development experiences did you have in 1994-95?

a. I attended a state or national education conference . . . . . ____
b. I attended a workshop on curriculum/instruction . . . . . ____
c. I attended a workshop on school organizations and management that was sponsored by the district or my school . . . . . ____
d. I took a graduate course through a college or university . . . . . ____
e. I served on a school based management committee . . . . . ____
f. I read an educational journal on a regular basis . . . . . ____
g. I met with colleagues on a regular basis to review and analyze student work . . . ____
h. I met with colleagues to develop curriculum, lessons, or assessments . . . . . ____
i. I made a presentation at a conference or other professional meeting . . . . . ____

(13) Of these professional development experiences, which one was the most beneficial for you?

_____

(14) What kinds of professional development activities would you like to participate in the coming year?

a. Attend a state or national education conference . . . . . ____
b. Attend a school- or district-sponsored workshop on curriculum/instruction . . . . ____
c. Attend a school- or district-sponsored workshop on school organizations and management . . . . . ____
d. Take a graduate course through a college or university . . . . . ____
e. Serve on a school-based management committee . . . . . ____
f. Read an educational journal on a regular basis . . . . . ____
g. Meet with colleagues on a regular basis to review and analyze student work . . . ____
h. Meet with colleagues to develop curriculum, lessons, or assessments . . . . . ____
i. Make a presentation at a conference or other professional meeting . . . . . ____

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(43) Below are listed several types of professional growth activities. Please indicate if you have participated in any of these activities during the past three years.

		This Year 1990-1991	Last Year 1989-1990	Year Before Last 1988-1989
a.	Sabbatical leave:			
	Full-time study at a college or university	☐	☐	☐
	Travel	☐	☐	☐
	Other	☐	☐	☐
b.	Other educational travel	☐	☐	☐
c.	System-sponsored workshops during the school year	☐	☐	☐
d.	System-sponsored workshops during the summer	☐	☐	☐
e.	Work on curriculum committee	☐	☐	☐
f.	Committee work or special assignment (other than curriculum)	☐	☐	☐
g.	University extension courses	☐	☐	☐
h.	College courses in education during school year	☐	☐	☐
i.	College courses in subject fields other than education during the school year	☐	☐	☐
j.	College courses in education during the summer	☐	☐	☐
k.	College courses in subjects other than education during the summer	☐	☐	☐
l.	Professional growth activities sponsored by professional association(s)	☐	☐	☐
m.	Educational TV	☐	☐	☐
n.	Exchange teaching, domestic	☐	☐	☐
o.	Exchange teaching, foreign	☐	☐	☐
p.	International education meetings	☐	☐	☐

American Public School Teacher Survey

B. Provides for Specific Types of Professional Development Activity

(8) Generally speaking, to what extent has the following been true of science-related professional development you have experienced in your district in the last year?

	Not at all	Just a little	A fair amount	A substantial amount	To a great extent	Don't know
f. I am given time to reflect on my learning and how to apply it to the classroom.	1☐	2☐	3☐	4☐	5☐	6☐
g. I am given time to work with other teachers as part of my professional development.	1☐	2☐	3☐	4☐	5☐	6☐
l. Professional development includes activities other than training workshops (e.g., study groups, peer coaching, mentoring).	1☐	2☐	3☐	4☐	5☐	6☐

Local Systemic Change Teacher Questionnaire

(12) Approximately how many hours per week do you normally spend on each of the following activities outside of the formal school day?

	none	less than 1 hour	1 - 2 hours	3 - 4 hours	more than 4 hours
f. professional reading and development activity	☐	☐	☐	☐	☐

Third International Mathematics and Science Study

(7) How often do you read professional journals?

___Frequently ___Occasionally
___Seldom ___Never

Kentucky Title I Reading Teachers Survey

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(9) How often do you apply what you read in professional journals to your classroom practice?

___Frequently ___Occasionally
___Seldom ___Never

Kentucky Title I Reading Teachers Survey

(39) Excluding any team teaching partners, how often do you visit another teacher's classroom to observe their teaching?

Never . . . . . ☐
Annually . . . . . ☐
Semi-Annually . . . . . ☐
Bimonthly . . . . . ☐
Monthly . . . . . ☐
Weekly . . . . . ☐
More than once a week . . . . . ☐

Third International Mathematics and Science Study

(40) Excluding any team teaching partners, how often does another teacher observe your teaching to provide you with feedback?

Never . . . . . ☐
Annually . . . . . ☐
Semi-Annually . . . . . ☐
Bimonthly . . . . . ☐
Monthly . . . . . ☐
Weekly . . . . . ☐
More than once a week . . . . . ☐

Third International Mathematics and Science Study

A variation appeared in PTS (17 and 18).

(38) Since the beginning of the school year, how many times has your teaching been observed for purposes other than formal evaluation?

Never	___1
Once	___2
Twice	___3
3-4 times	___4
5-9 times	___5
10 or more times	___6

Reform Up Close

Variations appeared in: CRCT (37) and NSSME (11).

This school year how often have you:

	Never	Once	Twice	3 - 4 Times	5 - 9 Times	10 Or More
Had colleagues observe your classroom	☐	☐	☐	☐	☐	☐
Visited other teachers' classrooms	☐	☐	☐	☐	☐	☐
Received meaningful feedback on your performance from colleagues	☐	☐	☐	☐	☐	☐
Received useful suggestions for curriculum materials from colleagues	☐	☐	☐	☐	☐	☐
Invited someone in to help teach your class	☐	☐	☐	☐	☐	☐

Classroom Effects of Reform

(37) This question concerns how teachers interact in your school. Please indicate about how many teachers in your school do each of the following. (Circle one for each statement.)

		No teachers	Some teachers	Most teachers	All teachers	Don't Know
a.	Work together to develop curriculum and instructional materials	1	2	3	4	9
b.	Observe each other teaching	1	2	3	4	9
c.	Offer advice or help to each other	1	2	3	4	9
d.	Share ideas on teaching	1	2	3	4	9
e.	Promote innovative teaching practices	1	2	3	4	9

Center for Research on the Context of Teaching

(25) Please indicate the approximate number of hours you have spent on each of the following types of professional development in science/science education in the past 12 months. (Do not count preservice preparation.)

	Number of Hours							
	0	1-6	7-15	16-35	36-50	51-75	76-100	100+
Structured Professional Development (approximate total)	☐	☐	☐	☐	☐	☐	☐	☐
District-level activities (summer institutes, seminars)	☐	☐	☐	☐	☐	☐	☐	☐
School-level activities (workshops or study groups)	☐	☐	☐	☐	☐	☐	☐	☐
Individual activities (coaching, formal action research projects)	☐	☐	☐	☐	☐	☐	☐	☐
Unstructured Professional Development (approximate total)	☐	☐	☐	☐	☐	☐	☐	☐
Group activities (informal discussions with teachers about teaching/learning)	☐	☐	☐	☐	☐	☐	☐	☐
Individual activities (professional reading)	☐	☐	☐	☐	☐	☐	☐	☐

(26) Please indicate the approximate number of hours you have spent on each of the following types of professional development in science/science education in the past five years. (Do not count preservice preparation.)

	Number of Hours							
	0	1-6	7-15	16-35	36-50	51-75	76-100	100+
Structured Professional Development (approximate total)	☐	☐	☐	☐	☐	☐	☐	☐
District-level activities (summer institutes, seminars)	☐	☐	☐	☐	☐	☐	☐	☐
School-level activities (workshops or study groups)	☐	☐	☐	☐	☐	☐	☐	☐
Individual activities (coaching, formal action research projects)	☐	☐	☐	☐	☐	☐	☐	☐
Unstructured Professional Development (approximate total)	☐	☐	☐	☐	☐	☐	☐	☐
Group activities (informal discussions with teachers about teaching/learning)	☐	☐	☐	☐	☐	☐	☐	☐
Individual activities (professional reading)	☐	☐	☐	☐	☐	☐	☐	☐

(52) Which of the following topics have you learned about primarily in formal training experiences and which have you learned primarily on your own?

a. How to integrate software into existing math lessons	Formal training	Learned on own	Have not learned
b. How to organize class activities to allow for computer use during class time	Formal training	Learned on own	Have not learned
c. How to write programs in a computer programming language	Formal training	Learned on own	Have not learned
d. Use of word-processing programs	Formal training	Learned on own	Have not learned
e. Use of other computer applications	Formal training	Learned on own	Have not learned

Computers in Education Survey (Math Teachers)

(37) Since the beginning of this school year, how much time per month have you spent meeting informally with other teachers on lesson planning, curriculum development, or other instructional matters?

Less than 15 minutes	___1
15-29 minutes	___2
30-59 minutes	___3
1 hour or more, less than 5	___4
5 hours or more, less than 10	___5
10 hours or more	___6

Reform Up Close

Variations of the above item ask teachers about collaboration and time spent formally or informally with other teachers on teaching approaches, guidance, or other instructional matters. These include: UGM (12); NELS Base Year (30), First Followup (23); TIMSS (10 and 13); and PTS (16).

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This school year, how often have you had conversations with colleagues about:

	Less Than Once A Month	2 or 3 Times A Month	Once or Twice A Week	Almost Daily
What helps students learn best	☐	☐	☐	☐
Managing classroom behavior	☐	☐	☐	☐
Development of new curriculum	☐	☐	☐	☐
The goals of this school	☐	☐	☐	☐

Classroom Effects of Reform

(6) Did you collaborate with anyone outside your school on curriculum, instruction, assessment, or student achievement in 1994-95?

a. Yes, I collaborated with someone at another school in my school's feeder pattern . . . . . ____
b. Yes, I collaborated with someone at a college or university . . . . . ____
c. Yes, I collaborated with a community member . . . . . ____
d. Yes, I collaborated with (SPECIFY): _____ . . . . . ____
e. No, I did not collaborate with anyone outside of my school in 1994-95 . . . . . ____

Standards-Based Professional Development Program

I. Design
II. Delivery
III. Content
IV. Context
V. Outcomes

(24a) In addition to the college courses you have already reported, have you ever participated in any teacher workshops or in-service training which included 30 hours or more of class attendance?

☐ Yes - (continue)
☐ No

(b) Was this training relevant to your current MAIN teaching assignment field?

☐ Yes
☐ No

(c) What was your MAJOR purpose for taking this training? (Mark only one box.)

☐ To fulfill initial certification requirements for current position
☐ To maintain and/or improve qualifications for current position (including meeting recertification requirements)
☐ To train to teach a different subject matter area
☐ To train to teach at a different grade level
☐ To train to teach handicapped students or students with learning disabilities
☐ To train to teach other special student populations (e.g., Native American, limited English proficiency, etc.)
☐ To acquire credentials in new nonteaching areas (e.g., administration, guidance counseling)
☐ Other (Describe):_____

Schools and Staffing Survey 90-91

C. Provides Activities of Sufficient Duration and Intensity to Meet Goals

(8) Generally speaking, to what extent has the following been true of science-related professional development you have experienced in your district in the last year?

	Not at all	Just a little	A fair amount	A substantial amount	To a great extent	Don't know
h. I receive follow-up support as I try to implement what I learn in professional development activities.	1☐	2☐	3☐	4☐	5☐	6☐
m. Professional development programs are sustained over time, with ample follow-up activities and experiences.	1☐	2☐	3☐	4☐	5☐	6☐

Local Systemic Change Teacher Questionnaire

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(38) How much do you agree or disagree with each of the following statements?

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
38. I am provided with satisfactory staff development training in new teaching methods.	☐	☐	☐	☐

Connecticut State Department of Education

D. **Integrates Professional Community Resources Effectively**

We found no items to address this aspect of delivery.

III. Content

A. **Subject Matter**

(T31) Since the end of last school year, have you participated in any in-service or professional development programs which focused on the following topics?

b. Methods of teaching your subject or field

☐ Yes - How many hours did the program last? → ☐ 8 hours or less
☐ No ☐ 9-32 hours
☐ More than 32 hours

c. In-depth study in your subject field

☐ Yes - How many hours did the program last? → ☐ 8 hours or less
☐ No ☐ 9-32 hours
☐ More than 32 hours

Schools and Staffing Survey 93-94

(1-7) What level of exposure, if any, have you had to each of the following topics or areas?

	One or more college or university courses	Part of a college or university course	In-service training	Little or no exposure
1. Methods of teaching elementary mathematics	O	O	O	O
2. Number systems and numeration	O	O	O	O
3. Measurement in mathematics	O	O	O	O
4. Geometry	O	O	O	O
5. Probability/ statistics	O	O	O	O
6. Abstract/ linear algebra	O	O	O	O
7. Calculus	O	O	O	O

National Assessment of Educational Progress Math Teacher Survey

A variation appeared in the NAEP Reading Teacher Survey (1-7).

(35) Since the beginning of this school year, how many half-days have you spent in formal inservice programs related directly to improving math/science curriculum and instruction?

None	___1
1-2 half-days	___2
3-4 half-days	___3
5-6 half-days	___4
7-8 half-days	___5
More than 8 half-days	___6

Reform Up Close

Variations appeared in: UGM (10); SCASS (15, 16); PTS (23); NAEP 92 Reading/Math (14, 15); NAEP 92 Social Studies (10); NSSME 93 (10); and CRCT (2).

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B. Instructional Strategies

(T31) Since the end of last school year, have you participated in any in-service or professional development programs which focused on the following topics?

a. Uses of educational technology for instruction (e.g., use of computer, satellite learning)

☐ Yes - How many hours did the program last? → ☐ 8 hours or less
☐ No ☐ 9-32 hours
☐ More than 32 hours

d. Student assessment (e.g, methods of testing, evaluation, performance assessment)

☐ Yes - How many hours did the program last? → ☐ 8 hours or less
☐ No ☐ 9-32 hours
☐ More than 32 hours

e. Cooperative learning in the classroom

☐ Yes - How many hours did the program last? → ☐ 8 hours or less
☐ No ☐ 9-32 hours
☐ More than 32 hours

Schools and Staffing Survey 93-94

(T63a) Have you received any training for teaching limited English proficient (LEP) students?

☐ Yes
☐ No

Schools and Staffing Survey 93-94

(8-14) Have you ever had training in any of the following either in college courses or in in-service education?

		Yes	No
8.	Estimation	[A]	[B]
9.	Problem solving in mathematics	[A]	[B]
10.	Use of manipulatives	[A]	[B]
11.	Use of calculators in mathematics instruction	[A]	[B]
12.	Understanding students' thinking about mathematics	[A]	[B]
13.	Gender issues in the teaching of mathematics	[A]	[B]
14.	Teaching students from different cultural backgrounds	[A]	[B]

National Assessment of Educational Progress Math Teacher Survey

(1-14) During the past five years, have you ever had training in any of the following, either in college courses or in in-service education? Fill in one oval on each line.

		Yes	No
1.	Study strategies	[A]	[B]
2.	Motivational strategies	[A]	[B]
3.	Teaching critical thinking	[A]	[B]
4.	The role of students' prior knowledge in their reading	[A]	[B]
5.	Diagnosis and remediation of reading difficulties	[A]	[B]
6.	Ability grouping	[A]	[B]
7.	Literature-based reading instruction	[A]	[B]
8.	Reading assessment	[A]	[B]
9.	Content area reading	[A]	[B]
10.	Combining reading and writing	[A]	[B]
11.	The whole language approach to teaching reading	[A]	[B]
12.	Phonics in the teaching of reading	[A]	[B]
13.	Individual reading programs	[A]	[B]
14.	Teaching students from different cultural backgrounds	[A]	[B]

National Assessment of Educational Progress Reading Teacher Survey

(8) Generally speaking, to what extent has the following been true of science-related professional development you have experienced in your district in the last year?

	Not at all	Just a little	A fair amount	A substantial amount	To a great extent	Don't know
j. Professional development experiences emphasize inquiry in science and science teaching.	1☐	2☐	3☐	4☐	5☐	6☐

Local Systemic Change Teacher Questionnaire

C. **Interpersonal/Organizational Skills**

(16) How often is the following training offered in your school?

		Monthly or More Often	Several Times A Year	Once A Year	Every Few Years	Not Offered
a.	Assertiveness training	1	2	3	4	5
c.	Brainstorming techniques	1	2	3	4	5
e.	Communication skills	1	2	3	4	5
g.	Conflict resolution	1	2	3	4	5
h.	Consensus building	1	2	3	4	5
m.	Decisionmaking skills	1	2	3	4	5
o.	Leadership skills	1	2	3	4	5
s.	Problem solving skills	1	2	3	4	5
u.	Teamwork training	1	2	3	4	5

National Education Association

IV. Context

A. **Institutional Support**

(T33) What types of support have you received during the current school year for in-service education or professional development in your main teaching assignment field?

- ☐ Released time from teaching
- ☐ Scheduled time (i.e.. time built into your schedule for professional development)
- ☐ Travel and/or per diem expenses
- ☐ Tuition and/or fees
- ☐ Professional growth credits
- ☐ None of the above

Schools and Staffing Survey 93-94

Variations appeared in: NELS (19); UGM (11); RUC (36); and CRCT (20).

(8) Generally speaking, to what extent has the following been true of science-related professional development you have experienced in your district in the last year?

	Not at all	Just a little	A fair amount	A substantial amount	To a great extent	Don't know
a. Adequate opportunities are available to me for science-related professional development.	1☐	2☐	3☐	4☐	5☐	6☐
b. I am provided with incentives for participation (e.g., released time, substitute pay, renewal credit, stipends).	1☐	2☐	3☐	4☐	5☐	6☐
e. I am provided with opportunities to try out new teaching strategies.	1☐	2☐	3☐	4☐	5☐	6☐

Local Systemic Change Teacher Questionnaire

(42) Please provide your opinion about each of the following statements.

	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
r. I have time during the regular school week to work with my peers on science curriculum and instruction.	1	2	3	4	5

Pilot Teacher Survey

Variations appeared in: NSSME (1r) and SCASS (56).

(38g) How well does (this statement) describe conditions in your school?

	Strongly Disagree				Strongly Agree
g. A specialist in mathematics education regularly works with teachers in this school.	1	2	3	4	5

Center for Research on the Context of Teaching

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(17) How would you rate your personal satisfaction with each area below? (Circle the appropriate number.)

		Very Satisfied			Very Dissatisfied
c.	Your learning opportunities	1	2	3	4

Conditions of Teaching and Learning

B. Financing

We found no items to address this aspect of context.

C. School Culture

(T47) Do you agree or disagree with each of the following statements?

		Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
f.	Teachers participate in making most of the important educational decisions in this school.	☐	☐	☐	☐
p.	There is a great deal of cooperative effort among the staff members.	☐	☐	☐	☐

Schools and Staffing Survey 93-94

Variations appeared in: PTS (32); RUC (30); and NELS First Followup (2).

(T47) Do you agree or disagree with each of the following statements?

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
t. I make a conscious effort to coordinate the content of my courses with that of other teachers.	☐	☐	☐	☐

Schools and Staffing Survey 93-94

Variations appeared in: PTS (32); RUC (18); NELS First Followup (1); and CER (6).

(P25) Using the scale 0-5, where 0 is none and 5 is a great deal, indicate how much actual influence you think each group or person has on decisions concerning the following activities.

e. Determining content of in-service programs

	No influence					A great deal of influence
State Department of Education	0☐	1☐	2☐	3☐	4☐	5☐
School District Staff	0☐	1☐	2☐	3☐	4☐	5☐
School Board	0☐	1☐	2☐	3☐	4☐	5☐
Principal	0☐	1☐	2☐	3☐	4☐	5☐
Teachers	0☐	1☐	2☐	3☐	4☐	5☐
Parent Association	0☐	1☐	2☐	3☐	4☐	5☐

Schools and Staffing Survey 93-94

(8) Generally speaking, to what extent has the following been true of science-related professional development you have experienced in your district in the last year?

	Not at all	Just a little	A fair amount	A substantial amount	To a great extent	Don't know
d. I am encouraged to develop an individual professional development plan to address my needs and interests related to science education.	1☐	2☐	3☐	4☐	5☐	6☐

Local Systemic Change Teacher Questionnaire

(32) To what extent does each of the following statements describe your school?

	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
t. In this school, I am encouraged to experiment with my teaching.	☐	☐	☐	☐
u. The department chair of curricular area coordinator's behavior toward the staff is supportive and encouraging.	☐	☐	☐	☐
v. The school administration's behavior toward the staff is supportive and encouraging.	☐	☐	☐	☐
w. Teachers in this school are continually learning and seeking new ideas.	☐	☐	☐	☐

Pilot Teacher Survey

Variations appeared in: NELS First Followup (2) and CER (6).

(19) To what extent does each of the following statements describe your relationships with the teachers in your primary subject area in this school?

		Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
a.	We share ideas about teaching openly.	1	2	3	4	5
b.	It is common for us to share samples of work done by our students.	1	2	3	4	5
c.	We regularly meet to discuss particular common problems and challenges we are facing in the classroom.	1	2	3	4	5
d.	We often work together to develop teaching materials or activities for particular classes.	1	2	3	4	5
e.	We have little idea of each other's teaching goals and classroom practices.	1	2	3	4	5
f.	We often seek each other's advice about professional issues and problems.	1	2	3	4	5
g.	There is a lot of disagreement among us about how to teach the subject.	1	2	3	4	5
h.	We share views of students and how to relate to them.	1	2	3	4	5
i.	Most take a "hands off" attitude toward each other's careers.	1	2	3	4	5
j.	We admire one another's teaching on the whole.	1	2	3	4	5

Pilot Teacher Survey

Please mark the extent to which you agree or disagree with each of the following statements.

	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Experienced teachers invite new teachers into their rooms to observe, give feedback, etc.	1	2	3	4	5
It is common to find a teacher demonstrating some new classroom practice to colleagues. Teachers design instructional programs together.	1	2	3	4	5

Classroom Effects of Reform

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How many teachers in this school:

	None	Some	About Half	Most	Nearly All
Feel responsible to help each other do their best	1	2	3	4	5

Classroom Effects of Reform

(42) Please provide your opinion about each of the following statements.

		Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
i.	I feel supported by colleagues to try out new ideas in teaching science.	1	2	3	4	5
k.	Science teachers in this school regularly share ideas and materials.	1	2	3	4	5
l.	Science teachers in this school regularly observe each other teaching classes as part of sharing and improving instructional strategies.	1	2	3	4	5
p.	Most science teachers in this school contribute actively to making decisions about the science curriculum.	1	2	3	4	5

Pilot Teacher Survey

Variations appeared in NSSME (1) and CRCT (38).

V. Outcomes

A. Teachers' Knowledge/Attitudes

(T32) Please give your opinion about the impact of the professional development programs, described in item 31, in which you have participated since last school year.

		Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
a.	Provided information that was new to me	☐	☐	☐	☐	☐
b.	Changed my views on teaching	☐	☐	☐	☐	☐
d.	Caused me to seek further information or training	☐	☐	☐	☐	☐
e.	Were generally a waste of my time	☐	☐	☐	☐	☐

Schools and Staffing Survey 93-94

B. Teachers' Classroom Practice

(T32) Please give your opinion about the impact of the professional development programs, described in item 31, in which you have participated since last school year.

		Strongly Agree	Agree	No Opinion	Disagree	Strongly Disagree
c.	Caused me to change my teaching practices	☐	☐	☐	☐	☐

Schools and Staffing Survey 93-94

(25) On a scale of 1 to 5, please rate the overall impact that the SSI programs have had on your science/mathematics instruction. (1 = no impact, 5 = large positive impact)

1 2 3 4 5 N/A

Pilot Teacher Survey

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(7) Please rate the effect of each of the following on your science instruction.

		Not a problem	A minor problem	Somewhat of a problem	A substantial problem	A major problem	NA/ don't know
j.	opportunities for professional development	☐	☐	☐	☐	☐	☐

Local Systemic Change Teacher Questionnaire

C. School Level Changes

(29) On a scale of 1 to 5, to what extent has your participation in the SSI program increased the involvement of each of the following in your planning and/or teaching science?

	Not at All				A Great Extent
a. other teachers	1	2	3	4	5

Pilot Teacher Survey

D. Student Level Changes

We found no items to address this aspect of outcomes.

Listing of NCES Working Papers to Date

Please contact Ruth R. Harris at (202) 219-1831
if you are interested in any of the following papers

Number	Title	Contact
94-01 (July)	Schools and Staffing Survey (SASS) Papers Presented at Meetings of the American Statistical Association	Dan Kasprzyk
94-02 (July)	Generalized Variance Estimate for Schools and Staffing Survey (SASS)	Dan Kasprzyk
94-03 (July)	1991 Schools and Staffing Survey (SASS) Reinterview Response Variance Report	Dan Kasprzyk
94-04 (July)	The Accuracy of Teachers' Self-reports on their Postsecondary Education: Teacher Transcript Study, Schools and Staffing Survey	Dan Kasprzyk
94-05 (July)	Cost-of-Education Differentials Across the States	William Fowler
94-06 (July)	Six Papers on Teachers from the 1990-91 Schools and Staffing Survey and Other Related Surveys	Dan Kasprzyk
94-07 (Nov.)	Data Comparability and Public Policy: New Interest in Public Library Data Papers Presented at Meetings of the American Statistical Association	Carrol Kindel
95-01 (Jan.)	Schools and Staffing Survey: 1994 Papers Presented at the 1994 Meeting of the American Statistical Association	Dan Kasprzyk
95-02 (Jan.)	QED Estimates of the 1990-91 Schools and Staffing Survey: Deriving and Comparing QED School Estimates with CCD Estimates	Dan Kasprzyk
95-03 (Jan.)	Schools and Staffing Survey: 1990-91 SASS Cross-Questionnaire Analysis	Dan Kasprzyk
95-04 (Jan.)	National Education Longitudinal Study of 1988: Second Follow-up Questionnaire Content Areas and Research Issues	Jeffrey Owings
95-05 (Jan.)	National Education Longitudinal Study of 1988: Conducting Trend Analyses of NLS-72, HS&B, and NELS:88 Seniors	Jeffrey Owings

Listing of NCES Working Papers to Date--Continued

Number	Title	Contact
95-06 (Jan.)	National Education Longitudinal Study of 1988: Conducting Cross-Cohort Comparisons Using HS&B, NAEP, and NELS:88 Academic Transcript Data	Jeffrey Owings
95-07 (Jan.)	National Education Longitudinal Study of 1988: Conducting Trend Analyses HS&B and NELS:88 Sophomore Cohort Dropouts	Jeffrey Owings
95-08 (Feb.)	CCD Adjustment to the 1990-91 SASS: A Comparison of Estimates	Dan Kasprzyk
95-09 (Feb.)	The Results of the 1993 Teacher List Validation Study (TLVS)	Dan Kasprzyk
95-10 (Feb.)	The Results of the 1991-92 Teacher Follow-up Survey (TFS) Reinterview and Extensive Reconciliation	Dan Kasprzyk
95-11 (Mar.)	Measuring Instruction, Curriculum Content, and Instructional Resources: The Status of Recent Work	Sharon Bobbitt & John Ralph
95-12 (Mar.)	Rural Education Data User's Guide	Samuel Peng
95-13 (Mar.)	Assessing Students with Disabilities and Limited English Proficiency	James Houser
95-14 (Mar.)	Empirical Evaluation of Social, Psychological, & Educational Construct Variables Used in NCES Surveys	Samuel Peng
95-15 (Apr.)	Classroom Instructional Processes: A Review of Existing Measurement Approaches and Their Applicability for the Teacher Follow-up Survey	Sharon Bobbitt
95-16 (Apr.)	Intersurvey Consistency in NCES Private School Surveys	Steven Kaufman
95-17 (May)	Estimates of Expenditures for Private K-12 Schools	Stephen Broughman
95-18 (Nov.)	An Agenda for Research on Teachers and Schools: Revisiting NCES' Schools and Staffing Survey	Dan Kasprzyk
96-01 (Jan.)	Methodological Issues in the Study of Teachers' Careers: Critical Features of a Truly Longitudinal Study	Dan Kasprzyk

Listing of NCES Working Papers to Date--Continued

Number	Title	Contact
96-02 (Feb.)	Schools and Staffing Survey (SASS): 1995 Selected papers presented at the 1995 Meeting of the American Statistical Association	Dan Kasprzyk
96-03 (Feb.)	National Education Longitudinal Study of 1988 (NELS:88) Research Framework and Issues	Jeffrey Owings
96-04 (Feb.)	Census Mapping Project/School District Data Book	Tai Phan
96-05 (Feb.)	Cognitive Research on the Teacher Listing Form for the Schools and Staffing Survey	Dan Kasprzyk
96-06 (Mar.)	The Schools and Staffing Survey (SASS) for 1998-99: Design Recommendations to Inform Broad Education Policy	Dan Kasprzyk
96-07 (Mar.)	Should SASS Measure Instructional Processes and Teacher Effectiveness?	Dan Kasprzyk
96-08 (Apr.)	How Accurate are Teacher Judgments of Students' Academic Performance?	Jerry West
96-09 (Apr.)	Making Data Relevant for Policy Discussions: Redesigning the School Administrator Questionnaire for the 1998-99 SASS	Dan Kasprzyk
96-10 (Apr.)	1998-99 Schools and Staffing Survey: Issues Related to Survey Depth	Dan Kasprzyk
96-11 (June)	Towards an Organizational Database on America's Schools: A Proposal for the Future of SASS, with comments on School Reform, Governance, and Finance	Dan Kasprzyk
96-12 (June)	Predictors of Retention, Transfer, and Attrition of Special and General Education Teachers: Data from the 1989 Teacher Followup Survey	Dan Kasprzyk
96-13 (June)	Estimation of Response Bias in the NHES:95 Adult Education Survey	Steven Kaufman
96-14 (June)	The 1995 National Household Education Survey: Reinterview Results for the Adult Education Component	Steven Kaufman
96-15 (June)	Nested Structures: District-Level Data in the Schools and Staffing Survey	Dan Kasprzyk

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Listing of NCES Working Papers to Date--Continued

Number	Title	Contact
96-16 (June)	Strategies for Collecting Finance Data from Private Schools	Stephen Broughman
96-17 (July)	National Postsecondary Student Aid Study: 1996 Field Test Methodology Report	Andrew G. Malizio
96-18 (Aug.)	Assessment of Social Competence, Adaptive Behaviors, and Approaches to Learning with Young Children	Jerry West
96-19 (Oct.)	Assessment and Analysis of School-Level Expenditures	William Fowler
96-20 (Oct.)	1991 National Household Education Survey (NHES:91) Questionnaires: Screener, Early Childhood Education, and Adult Education	Kathryn Chandler
96-21 (Oct.)	1993 National Household Education Survey (NHES:93) Questionnaires: Screener, School Readiness, and School Safety and Discipline	Kathryn Chandler
96-22 (Oct.)	1995 National Household Education Survey (NHES:95) Questionnaires: Screener, Early Childhood Program Participation, and Adult Education	Kathryn Chandler
96-23 (Oct.)	Linking Student Data to SASS: Why, When, How	Dan Kasprzyk
96-24 (Oct.)	National Assessments of Teacher Quality	Dan Kasprzyk
96-25 (Oct.)	Measures of Inservice Professional Development: Suggested Items for the 1998-1999 Schools and Staffing Survey	Dan Kasprzyk
96-26 (Nov.)	Improving the Coverage of Private Elementary-Secondary Schools	Steven Kaufman
96-27 (Nov.)	Intersurvey Consistency in NCES Private School Surveys for 1993-94	Steven Kaufman
96-28 (Nov.)	Student Learning, Teaching Quality, and Professional Development: Theoretical Linkages, Current Measurement, and Recommendations for Future Data Collection	Mary Rollefson

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