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**NATIONAL CENTER FOR EDUCATION STATISTICS**

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Statistical Analysis Report

July 1998

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**Toward Better Teaching:  
Professional Development in  
1993-94**

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## **Toward Better Teaching: Professional Development in 1993-94**

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## **Executive Summary**

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Teachers' professional development has become a major focus of school reform initiatives as many policymakers, researchers, and other members of the education community have come to believe that further gains in teacher effectiveness and student achievement require significant changes in teachers' knowledge and teaching practices. Teacher professional development traditionally has been viewed as a local responsibility, but in recent years, the federal government and many state governments have assumed a more active role than in the past. At the federal level, a National Goal has been added, a set of principles for effective professional development has been articulated by the U.S. Department of Education, and funding for professional development activities has been provided through a variety of mechanisms. States' involvement with professional development has traditionally focused on funding, mandating the amount of in-service time and regulating recertification. Now, many states are taking a more active role in influencing the focus, scope, and quality of professional development as well.

In the context of these changes, this report uses the 1993–94 Schools and Staffing Survey (SASS) to examine who determines the content of professional development programs, the formats in which professional development activities are provided, the rate of participation in activities on certain topics and the amount of time for which teachers were engaged, the ways in which schools or districts supported teachers' participation in professional development activities, and teachers' perceptions of the impact of the activities in which they participated.

### **Determining the Content of Professional Development Programs**

Responsibility for determining the content of in-service professional development was shared in 1993–94. When asked how much influence they thought various groups had in determining the content of in-service programs in their schools, 72 percent of public school principals thought that they had a great deal of influence, 71 percent thought that teachers had a great deal of influence, and 66 percent thought that school district staff had a great deal of influence. Smaller percentages thought that State Departments of Education and school boards had a great deal of influence (21 percent in each case). Principals in states that mandated specific amounts of time for professional development and required districts to have professional development plans were

among those most likely to ascribe a great deal of influence to the State Department of Education. Teachers were less likely than principals to think that teachers had a great deal of influence: about three-quarters of all teachers thought that they had at least some influence over the content of in-service professional development programs, with 31 percent thinking they had a great deal of influence.

## Format of Professional Development

Participation in formal teacher induction programs is increasing in the public sector: 56 percent of public school teachers in their first 3 years of teaching reported having participated in such a program, compared with 44 percent of those with 4–9 years of experience and 17 percent of those with 10–19 years of experience. Private school teachers in their first 3 years of teaching were less likely to have participated in a formal teacher induction program (28 percent), but assistance to new teachers in private schools, which tend to be smaller than public schools, may be more informal.

In 1993–94, almost all teachers (96 percent of public school teachers and 91 percent of private school teachers) reported having participated in some professional development activity since the end of the last school year. Participation in district- and school-sponsored workshops and other in-service programs was particularly high, reflecting the mandatory nature of much of this type of professional development.

### Percentage of teachers who had participated in various types of professional development activities since the end of the last school year, by sector: 1993–94

	Total	Public	Private
Workshops or in-service programs sponsored by districts (or affiliated organizations for private schools)	85.3	87.5	70.3
School-sponsored workshops or in-service programs	80.3	81.3	73.4
University extension or adult education courses	24.7	25.2	21.2
College courses in their subject field	24.7	25.4	19.9
Growth activities sponsored by professional associations	50.3	51.4	43.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

Participation rates varied somewhat with teacher characteristics, but the sizes of the differences were relatively small. In the public sector, full-time teachers appear to rely more on their schools and part-time teachers more on professional associations for professional development, a pattern that may reflect the opportunities available to them. In both the public and private sectors, teachers with 10 or more years of experience were more likely than new teachers to participate in school- or district- (or affiliation-) sponsored programs and in professional growth activities sponsored by professional associations. New teachers, on the other hand, were more likely than the experienced teachers to enroll in college courses in their subject field, suggesting that they are focusing their professional development time on earning advanced degrees or credentials or, if they are not fully certified, taking courses they need for certification.

## Content and Duration of Professional Development Activities

Approximately one-half of all teachers had participated in professional development programs since the end of the last school year on at least one of three topics associated with recent school reform efforts: uses of educational technology for instruction, student assessment, and cooperative learning in the classroom. In addition, almost two-thirds had participated in professional development programs on methods of teaching in their fields, and 29 percent had undertaken in-depth study in their subject. Most of these programs lasted one day or less.

**Percentage of teachers who had participated in an in-service or professional development program that focused on various topics since the end of the last school year, by sector: 1993–94**

	Total	Public	Private
Uses of educational technology for instruction	47.2	49.4	32.5
Methods of teaching in their field	62.8	64.0	54.8
In-depth study in their subject	29.3	30.0	24.2
Student assessment	49.5	51.4	36.4
Cooperative learning in the classroom	49.2	50.9	38.0

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

Rates of participation in professional development programs reflect a variety of factors, including teachers' need for help, the availability of resources, the priority that schools and districts give to professional development generally, the extent to which training is voluntary or mandatory, and teachers' motivation to participate voluntarily. The SASS data show some variation by

school and teacher characteristics. For example, in both public and private schools, teachers with at least 10 years of experience, who are less likely to have learned computer skills while in college, were more likely than teachers in their first 3 years of teaching to have participated in professional development on the uses of educational technology for instruction. In the public sector, state variation was evident as well, and some of this variation appears to be related to specific initiatives that some states have implemented. For example, rates of participation by public school teachers in professional development programs on student assessment were particularly high in a few of the states that were developing or implementing new student assessment initiatives.

## **Support for Professional Development**

Effective professional development is dependent to a large extent upon institutional and financial support of teachers' professional development and a school culture that nurtures teacher learning. SASS asked teachers whether they had received various types of support for professional development activities in their main assignment fields. The most common types of support were release time from teaching (received by 47 percent of all teachers) and time for professional development built into their schedules (received by 40 percent). In addition, since the end of the previous school year, 24 percent of all teachers had been reimbursed for travel expenses, 24 percent had their tuition and fees paid, and 31 percent had received professional growth credits for professional development activities related to their main assignment fields. However, 23 percent of all teachers had received none of these types of support. The percentages of teachers receiving the various types of support varied by sector and school and district characteristics. In the public sector, the percentages also varied by state, reflecting varying state involvement in professional development.

Recently developed principles for effective professional development emphasize the importance of a collaborative environment where teachers and administrators develop common goals, share ideas, and work together to achieve their goals. Eleven percent of all teachers strongly agreed that their principal talked with them frequently about instructional practices, 37 percent strongly agreed that there was a great deal of cooperative effort among the staff members, and 39 percent strongly agreed that they made a conscious effort to coordinate their courses with other teachers.

## **Impact of Professional Development Activities**

Despite the widespread criticism of the current state of professional development by researchers and policymakers, teachers held generally positive views about the impact of professional development on their teaching practices. Eighty-five percent of teachers who participated in any professional development programs on the use of technology, teaching methods in their field, student assessment, or cooperative learning, or who undertook in-depth study in their subject field, reported that those programs provided them with new information. Sixty-two percent reported that the programs caused them to seek further information or training; 65 percent reported that they caused them to change their teaching practices; and 42 percent that they caused them to change their views on teaching. Ten percent thought that the programs had wasted their time. The greater the intensity of the participation, the more likely teachers were to think that their professional development experiences had an impact. There was also an association between participation in the various types of professional development and the use of certain instructional practices generally linked to contemporary teaching practices or new pedagogical approaches that are thought to be especially effective.

## **Conclusion**

The 1993–94 data provide important information on professional development as practiced during the mid-1990s. Although the conception and practice of professional development is changing as school reform strategies have increasingly focused on improving professional development, it will take some time for the impact of the policies and programs currently being developed to be evident at the school level. During the last few years, the federal government, state governments, and a wide range of professional associations and other organizations have initiated a host of serious efforts to improve teaching practice. The next administration of SASS in 1999–2000 will provide an opportunity to determine the extent to which reforms now being planned and implemented have started to make their influence felt by schools and teachers.

## Foreword

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This report uses data collected by the National Center for Education Statistics (NCES) from the Schools and Staffing Survey (SASS) to examine teacher professional development in 1993–94 in the context of current educational policy regarding professional development at the federal and state levels. It examines who determines the content of professional development programs, the format in which professional development is provided, the content and duration of professional development activities, support for professional development at the school level, and teachers' assessments of the impact of the professional development activities they have participated in on certain topics.

SASS, an integrated survey of public and private schools, school districts, principals, and teachers, is the most comprehensive survey of the school work force and teacher supply and demand ever conducted in the United States. It was first administered in 1987–88, and then repeated in 1990–91 and 1993–94. The next administration is planned for the school year 1999–2000. The 1993–94 SASS was the first to contain a section on participation in professional development activities.

A Teacher Followup Survey (TFS) has been conducted during the school year following SASS, sampling teachers who have left teaching and those who have continued to teach at the same or another school. The 1994–95 TFS included questions on teachers' instructional practices. These data were used in this study to examine the relationship between participation in professional development and instructional practices.

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# 1. Introduction

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Teachers' professional development has become a major focus of school reform initiatives. As school reform strategies have evolved since the mid-1980s, policymakers, educators, researchers, and other members of the education community have gradually come to recognize that the kinds of changes in schooling and instruction envisioned by current reform efforts require fundamental changes in teachers' knowledge and their working relationships with students, and that traditional forms of professional development activity are inadequate for the task. Responding to these concerns, the federal government, states, districts, schools, and a host of professional organizations have launched a wide variety of efforts to improve the quality of teachers' professional development activities.

This report uses data from the 1993–94 Schools and Staffing Survey (SASS) to describe various aspects of professional development as practiced in the mid-1990s and to examine how they vary with teacher, school, and district characteristics and across states. Specifically, it examines who determines the content of in-service professional development programs, who participates in what kinds of activities, whether teachers are participating in professional development programs on certain topics, and if so, the duration of their participation; what kinds of support teachers receive from their schools and districts; and how participation has affected teachers. To place this analysis in context, the report begins with a brief history of the place of professional development in the school reform efforts that began in the 1980s, a short description of the new conception of teacher professional development, and a summary of changing roles and responsibilities.

## **School Reform and Professional Development**

In a review of state education reform and policymaking during the decade following publication of *A Nation at Risk* in 1983, researchers at the Consortium for Policy Research in Education (CPRE) described a major change in reform strategy during this period from a focus on inputs to an emphasis on results (Massell and Fuhrman 1994). They noted that the major thrust immediately following the release of *A Nation at Risk* was to develop new mandates about school inputs that called for changes such as longer school days and more days in each school year, more

standardized testing, more academic credits for high school graduation, higher salaries for teachers, more rigorous certification requirements for new teachers, and upgraded technology.

These post-*Nation at Risk* efforts to improve the schools by issuing new rules, creating new state mandates, and investing more state funds in education brought some positive results but not the significant advances in student learning that were being sought. For example, compared with students in 1982, high school students in 1992 were taking more academic courses and more difficult ones, and fewer students were dropping out of high school (U.S. Department of Education 1995). In addition, student achievement in mathematics and science, as measured by National Assessment of Educational Progress examinations of 9-, 13-, and 17-year-olds, improved between 1984 and 1992. However, by 1995, international assessments of U.S. students' science and mathematics achievement indicated that continued progress is necessary to reach the National Goal that U.S. students outperform those of other nations in these subjects (U.S. Department of Education 1997b, 1997c).

The focus of reform next shifted from a purely quantitative orientation—increasing time and test scores—to include a qualitative dimension. In the early 1990s, for example, goals expanded from more hours in class and higher test scores to standards that define both what students should know and be able to do and how teachers should instruct students to achieve those standards (Cohen 1996). States, teacher professional associations, and academic organizations began the process of setting explicit goals for students by defining new curriculum frameworks, proposing new instructional methods and materials, and devising new methods of assessment.<sup>1</sup>

These approaches to reform have placed new demands on teachers. Today, teachers are being called upon to provide the nation's children with a quality of education previously reserved for a small elite. Teachers are also being asked to use new technologies and change how they interact with students and each other. Federal, state, and local policymakers and researchers increasingly believe that the changes in teachers' knowledge and teaching practices that are needed to bring about substantial gains in student achievement will not occur solely from exhorting teachers to try harder or do something different. Fundamental change is called for. As summarized by the National Commission on Teaching and America's Future (NCTAF 1996),

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<sup>1</sup>Among teacher professional associations, the National Council of Teachers of Mathematics (NCTM), the National Council of Teachers of English (NCTE) and International Reading Association (IRA), and the National Council for the Social Studies (NCSS) have been active in developing curriculum frameworks in their respective subjects (NCTM 1989; NCTE/IRA 1996; NCSS 1994). In addition, the National Research Council (NRC) and the American Association for the Advancement of Science (AAAS) have created science education standards (NRC 1996; AAAS 1993).

After a decade of reform, we have finally learned in hindsight what should have been clear from the start: most schools and teachers cannot produce the kind of learning demanded by the new reforms—not because they do not want to, but because they do not know how, and the systems in which they work do not support them in doing so.

This understanding has prompted increased attention to professional training at all stages of teachers' careers, including teacher education programs at colleges and universities, induction programs for new teachers, and professional development to help teachers strengthen and update their skills throughout their careers. As the importance of teacher development to school reform has become evident, there is growing pressure to initiate professional development approaches and activities that promise gains in teacher instructional effectiveness and student achievement.

### **A New Concept of Professional Development**

For many years, professional development typically has consisted of district- or school-sponsored full- or half-day workshops and lectures held several times a year, supplemented by limited participation of individual teachers in professional conferences, course taking, and other activities offered by a variety of sponsors (Corcoran 1995a, 1995b; Little 1989, 1993). Districts have offered salary increments as incentives to participate, and states have required participation for recertification. The extent of teachers' participation has depended partly on local fiscal resources, partly on the priority schools and districts have assigned to professional development, and partly on teachers' interest and willingness to assume some of the costs themselves (Corcoran 1995b).

Many experts now believe that this approach to professional development is inadequate to the task of preparing teachers for the new demands being placed upon them. Lectures and short workshops typically have little effect on the practice of teaching or student outcomes because they lack focus, intensity, follow-up, and continuity, and often are not systematically linked to district or school goals for student improvement (Little 1993).<sup>2</sup> Many believe that for professional development to be effective, it must become an integral part of teachers' daily work, not something that teachers participate in a few times a year on staff development days. For example, rather than presenting three unconnected workshops over the course of a year, a district might provide extended training on one topic connected to a district goal for reform (Massel, Kirst, and Hoppe 1997).

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<sup>2</sup>It should be noted that despite the problems with the current overall system of professional development, many documented examples of effective professional development exist (see, for example, Sparks and Loucks-Horsley [1990]).

As attention has turned to professional development, members of the education community have attempted to identify and describe the characteristics of effective professional development. Various groups and individuals—including the U.S. Department of Education, the National Education Association, the American Federation of Teachers, researchers, and others—have developed guidelines for high-quality teacher professional development and for organizing and managing schools to support it (see, for example, U.S. Department of Education 1996; American Federation of Teachers 1995; Renyi 1996; Little 1993; Hawley and Valli 1996; Corcoran 1995a, 1995b).<sup>3</sup>

Although these various sets of guidelines differ in their details, they share a common focus and address the same broad issues. A consensus seems to be emerging that effective professional development involves teachers in planning their professional development activities; that professional development for individual teachers needs to be linked to the broader organizational goals of their schools, districts, and states; and that teachers need to work closely with other teachers inside and outside their schools to share ideas and coordinate activities. The principles set forth by the U.S. Department of Education (1996) provide an example of the types of guidelines being proposed. According to the Department, high-quality 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 community;
- Reflects the 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; and
- Is evaluated ultimately on the basis of its impact on teacher effectiveness and student learning, and this assessment guides subsequent professional development efforts.

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<sup>3</sup>See Gilford (1996) for a summary of these and other guidelines.

## **Changing Roles**

Teacher professional development has traditionally been considered primarily a local responsibility (although supported by state funds and, to a lesser extent, by federal funds as well). Recently, however, the federal government and many state governments have taken a greater interest and assumed a more active role in teacher professional development. In 1994, a goal for professional development was added to the National Education Goals, stating that “[b]y 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.” Both the Improving America’s Schools Act of 1994 and the Goals 2000: Educate America Act of 1994 provide new opportunities for teachers to upgrade their skills and emphasize flexible and creative use of resources.

In addition, the U.S. Department of Education has emphasized explicitly the importance of professional development by funding professional development activities through federal programs such as the Eisenhower Professional Development Program, the Comprehensive Technical Assistance Centers, and Title I. Federal funding is also available for professional development in categorical programs such as bilingual education, special education, and vocational education. In addition to the programs administered by the U.S. Department of Education, the federal government has supported professional development through other agencies such as the National Science Foundation (NSF) and by supporting the standards and assessment activities of the National Board of Professional Teaching Standards (NBPTS).

While the impact of these programs would not have been measurable in the 1993–94 SASS, evidence is accumulating that teaching practice in mathematics and science is being changed through such efforts. Beginning in 1993, NSF’s Statewide Systemic Initiative (SSI) awarded 5-year grants of about \$10 million each to 26 states for reform of science, mathematics, and technology education, and all states have focused funds on the professional development of teachers. A preliminary assessment found many examples of classrooms where teaching and learning have been improved in important ways (Zucker et al. 1995). An evaluation of the Eisenhower Mathematics and Science Education Regional Consortia Program conducted in 1996 found that nearly two-thirds (62 percent) of the individuals who had participated in the activities under study reported that they had incorporated some new behavior into their jobs as a result of what they had learned (Haslam, Turnbull, and Humphrey 1998).

States’ involvement with professional development has traditionally focused on funding, mandating in-service time, and regulating recertification. While state policies in these areas have

significantly influenced the amount and character of professional development activities, states historically have not played a lead role in shaping professional development except for their influence on the initial preparation of teachers through their regulation of teacher education programs. Now, however, many states are taking a more active role and trying to influence the focus, scope, and quality of professional development as well as its quantity (Corcoran 1995b).<sup>4</sup> In a 50-state study of state professional development policies and programs, CPRE (1997) identified the steps some states are taking, which include finding out how much is being spent for professional development and how it is being spent; conducting policy reviews to determine the impact of state policies on local decision making; developing guidelines, standards, and incentives for districts and schools; and re-examining how time for professional development is being used.

New actors are entering the arena as well. Teacher networks, school-university collaboratives, and teacher unions, for example, are now taking a more active role in designing and conducting professional development opportunities. In addition, the National Board for Professional Teaching Standards (NBPTS) is working with teachers and teacher organizations to establish standards for advanced practice and a rigorous assessment and certification process. In 1996, 23 states were actively encouraging teachers to seek NBPTS certification (CPRE 1997).

As government agencies and nongovernment organizations seek to develop new initiatives, policymakers need answers to questions such as: Who plans professional development activities? What is the basis for the plans? How are school, district, and state plans interrelated? How is professional development integrated into the organization and management of schools? In what kinds of professional development activities do teachers participate? What topics do they cover? How much time and money are devoted to professional development? How do professional development activities affect teachers? At least some of these questions can be addressed with the 1993–94 SASS data.

## **Data and Methodology**

The 1993–94 Schools and Staffing Survey (SASS:93–94) is a nationally representative, integrated survey of districts, schools, and teachers. The 1993–94 survey was the third in a series that began in 1987–88, with the next administration scheduled for 1999–2000. Approximately 13,000 public and private schools and administrators, 68,000 teachers, and 5,000 districts

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<sup>4</sup>The National Governors' Association has taken an active role in helping states by preparing guidelines for state policymakers seeking to review their approach to teacher professional development, and, with foundation support, has made grants to Colorado, Michigan, and Rhode Island to assist them in their review of state policies and policy options.

participated.<sup>5</sup> In response to the growing interest in professional development, SASS began collecting information from teachers on their professional development in 1993–94, and more items will be added in the 1999–2000 administration (Mullens et al. 1996; Gilford 1996).

Because many teacher, principal, school, and district characteristics are interrelated, it is important to take this covariation into account when examining the relationships between teachers' professional development activities and these characteristics. Therefore, multivariate statistical techniques were used in addition to bivariate analysis to examine variation in teachers' professional development experience. Logistic regression models were used to examine specific factors related to whether teachers participated in different types of professional development activities and in different content areas.<sup>6</sup>

Because of the large number of efforts to improve professional development currently under way, it is important to consider how the picture of professional development presented here matches current practice. When the 1993–94 SASS survey was designed in the early 1990s, teacher professional development was already becoming a major focus of attention. Consequently, an extensive series of questions on the kinds of professional development activities in which teachers commonly engaged at that time was included. Although the 1993–94 survey questions did not address the new approaches to professional development that have been recommended or introduced since that time, the 1993–94 data probably still provide a reasonably accurate portrait of professional development activities as they existed in the mid-1990s. Despite the many initiatives to improve teachers' professional development introduced in the early 1990s, researchers at the Consortium for Policy Research in Education (CPRE) concluded after a comprehensive review of reform in nine states that real change had been modest, at least as of 1994–95 (Massell, Kirst, and Hoppe 1997).<sup>7</sup> They found that implementation of reforms had been largely piecemeal and procedural, and that criticisms that professional development was fragmented, episodic, and loosely related to overall systemic reform remained applicable. The focus on professional development is continuing, however, and many promising reforms are in progress (NCTAF 1997). The next SASS administration, scheduled for 1999–2000, will be well timed to measure the extent to which local, state, federal, and other initiatives are changing how professional development is conceived and conducted.

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<sup>5</sup>For more information on SASS, see appendix C of this report. A number of reports related to the survey methodology reports are cited there.

<sup>6</sup>See appendix C for a detailed description of the methodology.

<sup>7</sup>The nine states studied include California, Connecticut, Florida, Georgia, Kentucky, Minnesota, New Jersey, South Carolina, and Texas.

Following a structure proposed by Mullens et al. (1996) for describing professional development, the analysis is divided into five sections, each addressing (to the extent possible with available data) one of the following aspects of professional development: design, format, content and duration, context, and outcomes. The report addresses how participation varies according to teacher, school, and district characteristics, and also presents some state-by-state comparisons, with illustrations from current initiatives in selected states. Because private schools and teachers often are not governed by state certification and other state, local, or contractual requirements, teacher professional development in the public and private sectors is examined separately. The report has three appendices: appendix A contains standard error tables corresponding to the text tables; appendix B shows the results of the logistic regression analyses; and appendix C describes the data and methodology used for this analysis.

## **2. Determining the Content of Professional Development Programs**

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All of the sets of principles for effective professional development of practicing teachers mentioned in the Introduction call for greater teacher involvement in the planning of their professional development and advocate integrating professional development activities with broader school, district, and state goals for school improvement. This section begins with a brief description of how responsibility for determining the content of professional development programs is typically allocated. It then uses Schools and Staffing Survey (SASS) data to describe principals' and teachers' perceptions regarding the amount of influence various groups had over the content of one type of professional development activity—in-service programs. These data provide an indication of how influence was distributed in 1993–94, at least from the principals' perspective, and also of the extent to which teachers thought that they had a voice in planning professional development activities in their schools.

### **Participants in the Process**

Decisions about professional development programs are made within a complex framework of shared activity and responsibility. The federal government has developed a National Goal related to professional development and has provided funding for professional development through a host of programs. States have always had a major influence on the quantity of professional development by requiring it for recertification and by providing funding through a variety of mechanisms. Now they are becoming more involved in other ways as well. For example, a number of states have state-level plans for professional development, and most have some type of professional development requirements. These requirements, however, vary greatly, ranging from general mandates, such as “districts must do professional development,” to specific prescriptions for or encouragement of particular amounts or types of professional development (CPRE 1997).

Districts frequently design and implement professional development programs directly and may have school improvement plans that schools use as frameworks for school-level plans. Schools may have site plans and, within schools, committees or departments may have responsibility for planning professional development directions or activities. In addition, teachers initiate a considerable amount of their own professional development.

For example, teachers may voluntarily enroll in courses, attend workshops, and participate in other types of activities to enhance their teaching skills and advance on the salary schedule, often using their own time and resources.

### **Principals' Perceptions of the Influence of Various Groups**

Principals' perceptions of the influence of various groups in determining the content of in-service programs provide an indicator—from one perspective at least—of how teacher professional development programs were designed in 1993–94. In SASS, public school principals were asked to rate (on a scale from 0 to 5) how much influence they thought various groups had in determining the content of in-service programs in their schools, including State Departments of Education, school district staff, school boards, principals, teachers, and parents. Overall, public school principals ascribed roughly equal influence to themselves and teachers, and only slightly less to school district staff: 72 percent of public school principals thought that they themselves had a great deal of influence (that is, they rated their influence as 4 or 5); 71 percent thought that teachers had a great deal of influence; and 66 percent thought that school district staff had a great deal of influence (table 1). State Departments of Education and school boards were seen as considerably less influential: in each case, 21 percent of principals thought that they had a great deal of influence. On the whole, parents were not seen as influential: in 1993–94, only 5 percent of principals thought that parents had a great deal of influence in determining the content of in-service programs for teachers.

The principals' perceptions of the distribution of influence described above are consistent with the traditional treatment of responsibility for professional development as a local issue. The relative allocation of decision-making power among states, districts, and schools is an important aspect of school reform. If states continue to become more deeply involved in professional development, the next SASS administration may show a shift in influence.

Because states can decide how much authority to allocate to local districts, it is not surprising to find considerable variation by state. The percentage of public school principals who thought that the State Department of Education had a great deal of influence ranged from a high of 70 percent in Delaware to a low of 6 percent in Maine, Michigan, and Washington. A strong regional pattern existed as well, with public school principals in the South nearly twice as likely as those in other regions to think that State Departments of Education had a great deal of influence (34 percent versus about 15 percent) (table 2).

**Table 1—Percentage of public school principals who thought that various groups had a great deal of influence\* in determining the content of in-service programs, by state: 1993–94**

	State Department of Education	School district	School board	Principal	Teachers	Parents
Total	21.3	66.4	20.5	72.4	70.6	5.1
Alabama	34.0	71.9	29.6	65.0	56.5	3.1
Alaska	16.7	60.7	26.8	71.6	65.8	6.4
Arizona	8.0	69.1	21.5	80.1	74.9	3.5
Arkansas	43.5	62.2	23.2	72.7	66.7	4.9
California	19.1	64.8	18.5	84.7	78.7	10.8
Colorado	6.5	55.7	19.4	76.9	73.9	10.3
Connecticut	22.0	80.2	16.2	68.7	71.1	2.9
Delaware	69.5	80.5	14.4	63.4	52.3	—
District of Columbia	28.6	65.9	41.0	58.6	52.6	7.8
Florida	29.1	70.1	34.8	65.1	66.6	7.6
Georgia	24.5	76.5	22.6	71.4	66.1	—
Hawaii	49.6	54.5	3.4	90.5	84.9	7.3
Idaho	11.4	65.9	17.3	67.3	77.1	2.9
Illinois	13.6	55.4	19.6	80.3	78.0	8.6
Indiana	15.0	57.7	16.1	69.9	65.5	—
Iowa	18.0	65.7	20.2	78.1	79.1	3.9
Kansas	19.1	61.0	20.3	71.9	71.3	—
Kentucky	50.2	65.6	20.7	65.0	74.7	11.0
Louisiana	51.7	80.2	31.5	65.9	41.9	2.3
Maine	5.5	64.9	11.9	80.1	86.8	3.5
Maryland	26.0	76.8	31.4	62.9	49.0	5.9
Massachusetts	10.2	65.8	22.6	75.9	66.2	5.0
Michigan	5.5	60.1	21.2	73.2	70.1	4.7
Minnesota	15.9	53.5	14.5	73.7	83.9	5.2
Mississippi	48.4	84.4	35.4	65.9	70.8	8.6
Missouri	23.6	60.7	19.2	69.8	80.6	3.8
Montana	10.9	58.0	19.5	77.7	81.1	5.1
Nebraska	16.7	55.5	18.0	79.1	78.5	1.0
Nevada	26.0	69.0	21.3	59.1	65.1	—
New Hampshire	8.1	60.8	23.8	80.5	81.8	7.4
New Jersey	16.4	70.3	20.7	65.9	61.6	2.7
New Mexico	20.6	66.2	20.0	74.1	69.3	7.1
New York	18.8	71.5	19.5	57.2	55.4	1.4
North Carolina	33.4	65.5	28.4	72.0	70.5	5.7
North Dakota	18.9	43.6	12.8	76.5	67.8	1.7
Ohio	15.6	69.8	14.2	70.7	63.1	2.3
Oklahoma	39.5	67.5	20.4	50.0	73.8	6.9
Oregon	17.9	61.0	20.7	87.9	77.6	3.6
Pennsylvania	11.7	74.1	17.0	65.8	70.5	2.2
Rhode Island	37.4	80.0	24.4	52.2	48.6	0.0
South Carolina	34.7	75.9	12.3	81.6	68.6	4.6
South Dakota	19.0	61.5	13.8	76.2	76.7	1.3
Tennessee	34.3	80.9	29.5	55.9	56.9	6.6
Texas	27.6	65.3	18.8	80.4	74.2	7.5
Utah	20.1	67.7	15.8	78.6	73.4	6.5
Vermont	11.8	55.8	7.9	81.0	88.6	—
Virginia	15.0	77.2	29.8	80.5	69.4	4.2
Washington	5.7	59.6	6.4	73.1	84.6	1.4
West Virginia	52.9	74.6	29.0	52.0	54.0	4.2
Wisconsin	10.7	63.6	15.9	71.0	79.4	4.3
Wyoming	12.0	66.9	19.2	71.5	77.4	3.9

— Too few cases for a reliable estimate.

\*Teachers were asked how much actual influence they thought teachers at their school had in determining the content of in-service programs. They were categorized as having “a great deal of influence” if they responded 4 or 5 on a scale of 0–5.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Principal Questionnaire).

## 2. Determining the Content of Professional Development Programs

**Table 2—Percentage of public school principals who thought that various groups had a great deal of influence\* in determining the content of in-service programs, by selected school characteristics: 1993–94**

	State Department of Education	School district	School board	Principal	Teachers	Parents
Total	21.3	66.4	20.5	72.4	70.6	5.1
Region						
Northeast	15.2	70.9	18.9	66.1	65.3	2.6
Midwest	14.8	60.4	17.7	74.0	73.7	4.0
South	33.8	71.4	25.4	69.4	66.1	5.9
West	15.7	63.3	17.7	80.1	77.5	7.4
District size						
Less than 1,000	19.8	53.8	17.1	76.6	72.7	4.4
1,000–4,999	18.2	69.9	17.6	70.8	71.7	2.8
5,000–9,999	20.5	72.0	21.8	67.8	67.7	4.2
10,000 or more	26.2	68.7	24.2	73.6	68.5	7.2
School size						
Less than 150	21.3	55.4	17.5	74.4	71.6	4.9
150–499	22.8	67.4	20.8	71.6	69.1	4.9
500–749	18.9	67.3	20.1	74.2	72.8	5.1
750 or more	21.7	69.4	21.9	70.7	70.6	5.8

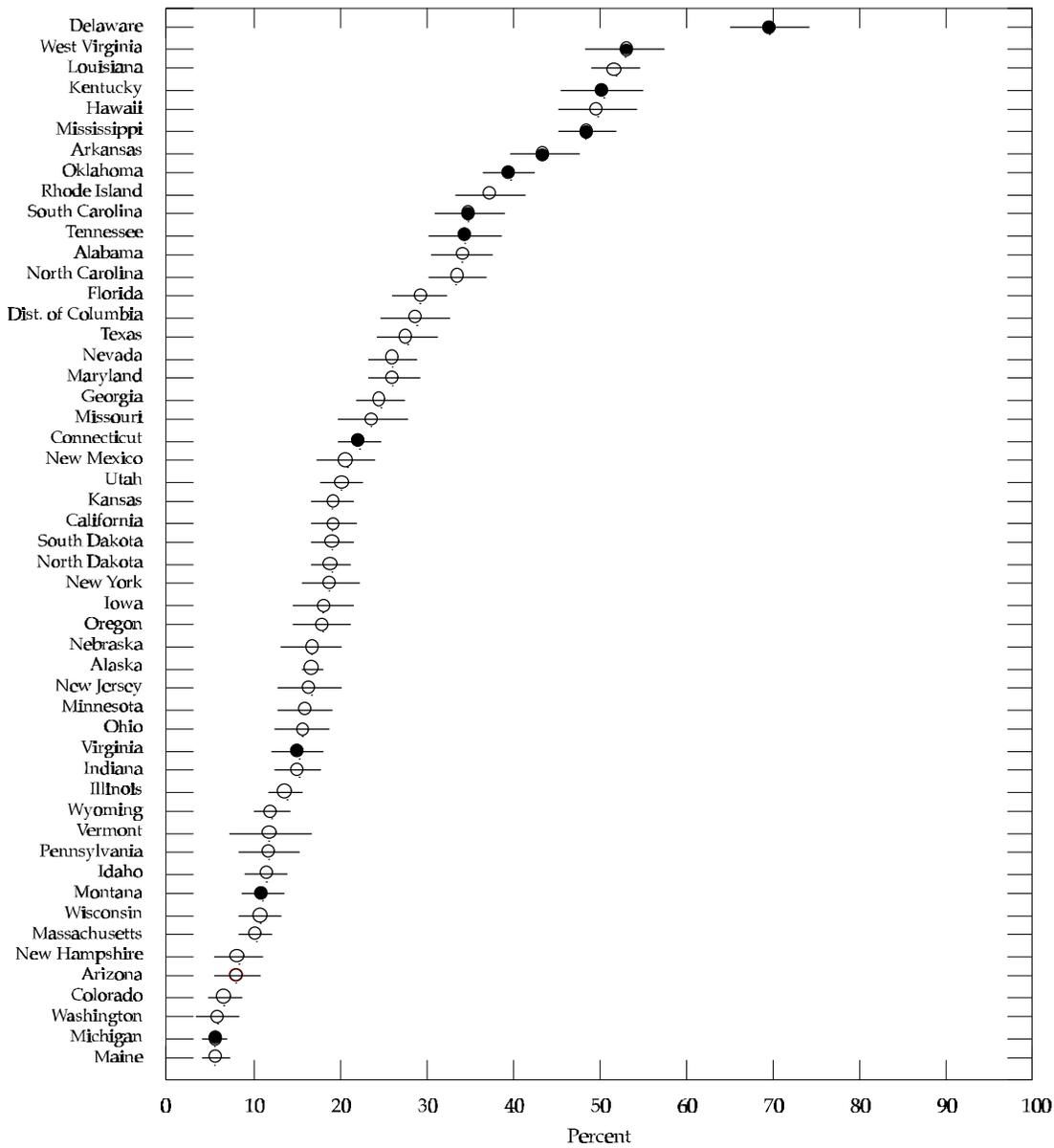
\*Teachers were asked how much actual influence they thought teachers at their school had in determining the content of in-service programs. They were categorized as having “a great deal of influence” if they responded 4 or 5 on a scale of 0–5.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Principal, School, and Teacher Demand and Shortage Questionnaires).

The CPRE (1997) study of professional development in all 50 states identified 12 states that (in 1996) mandated the amount of time local districts must dedicate to professional development and that also required districts to develop professional development plans.<sup>8</sup> (A number of other states required districts to fulfill one or the other of these requirements, but not both.) Many of these 12 states are among those in which the principals were most likely to report that the State Department of Education had a great deal of influence (figure 1). In most of the states with these requirements but in which relatively few principals thought that the state had a great deal of influence, legislation instituting such requirements was passed after the administration of the 1993–94 SASS.

<sup>8</sup>These included Arkansas, Connecticut, Delaware, Kentucky, Michigan, Mississippi, Montana, Oklahoma, South Carolina, Tennessee, Virginia, and West Virginia.

**Figure 1 – Percentage of public school principals who thought that the State Department of Education had a great deal of influence in determining the content of in-service programs, by state: 1993-94**



● Denotes states that, in 1996, both mandated the amount of time local districts must dedicate to professional development and required districts to develop local professional development plans (CPRE 1997).

NOTE: The circles denote the mean percentages for the states. The horizontal lines through the circles denote the 95 percent confidence intervals for the means.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993-94 (Principal Questionnaire).

It is worth noting that in many of the states with these requirements, a relatively large percentage of principals also reported that districts had a great deal of influence over the content of in-service programs (figure 2). In other words, the influence of one (states or districts) was not at the expense of the other. This pattern could be interpreted as illustrating how state requirements and local control co-exist.

The percentage of principals who thought that they and teachers had a great deal of influence in determining the content of in-service programs varied by state. However, the pattern was not obviously linked to whether or not the state mandated the amount of time for professional development or required a local plan (figures 3 and 4).

Just as states can decide how much responsibility to give to districts, districts in turn can decide how much authority to share with schools, and principals how much to share with teachers. The percentage of public school principals who thought that various groups had a great deal of influence in determining the content of in-service programs varied by region (table 2). Specifically, public school principals in the Northeast and South were more likely than their colleagues in the Midwest and West to think that districts had a great deal of influence, and were less likely to think that they themselves or teachers had a great deal of influence.

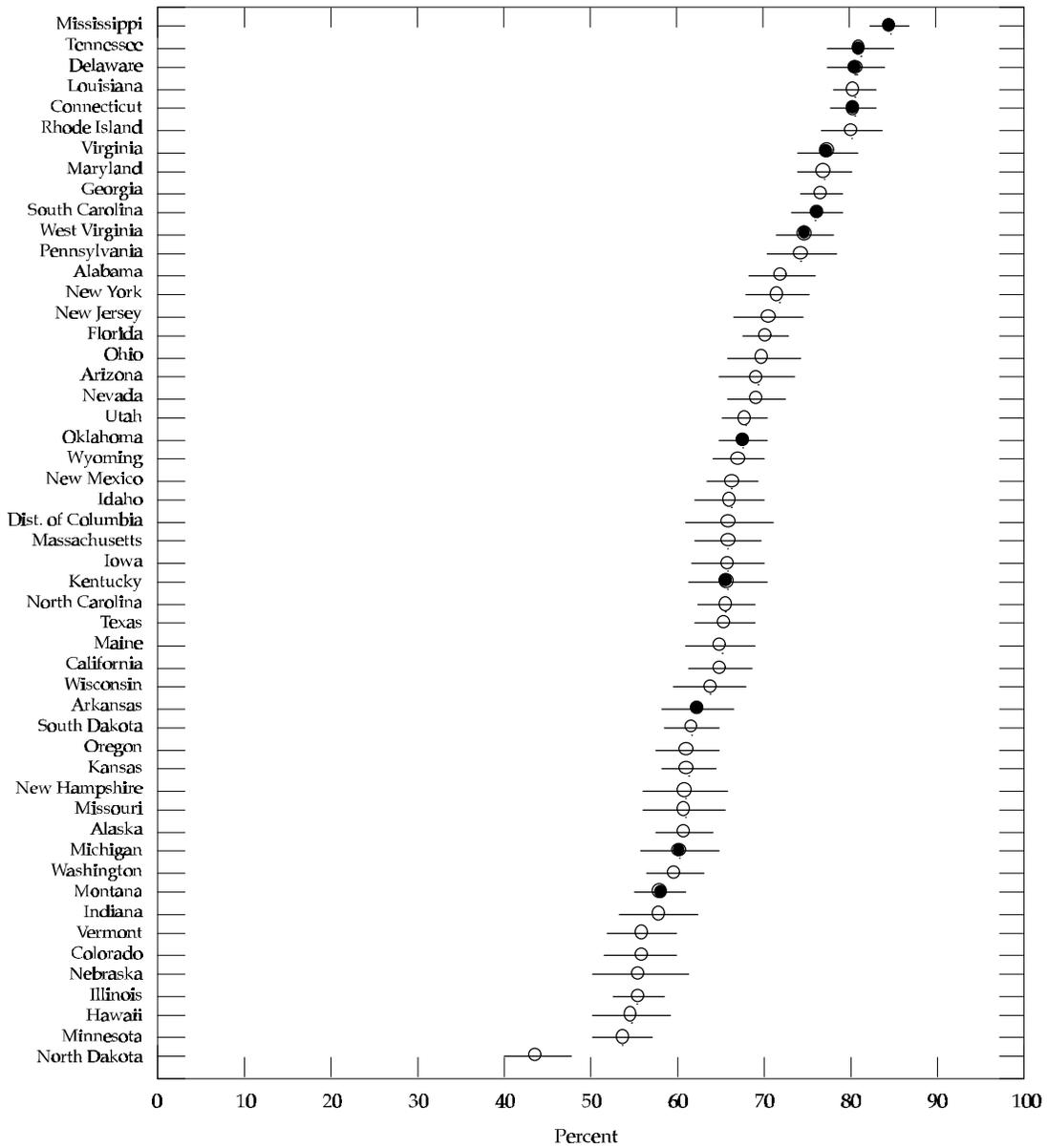
In the private sector, Catholic and nonsectarian school principals were more likely than those in other religious schools to think that they had a great deal of influence in determining the content of in-service programs (93 percent in each case versus 83 percent) (table 3). With respect to teachers' influence, principals in Catholic schools were the most likely to think that teachers had a great deal of influence (75 percent), followed by principals in nonsectarian schools (65 percent), and then principals in other religious schools (50 percent).

The data described above are principals' perceptions only. If district or State Department of Education staff were asked to state their opinions, their answers might be different. Differences in perspective are illustrated in the next section, where principals' and teachers' perceptions about teachers' influence are compared.

## **Teachers' Perceptions of Their Influence**

As indicated previously, new conceptions of effective professional development emphasize that teachers should participate in designing their professional development activities. Teachers are presumed to be good judges of what they need and to get more out of the activities if they

**Figure 2 – Percentage of public school principals who thought that the district had a great deal of influence in determining the content of in-service programs, by state: 1993-94**



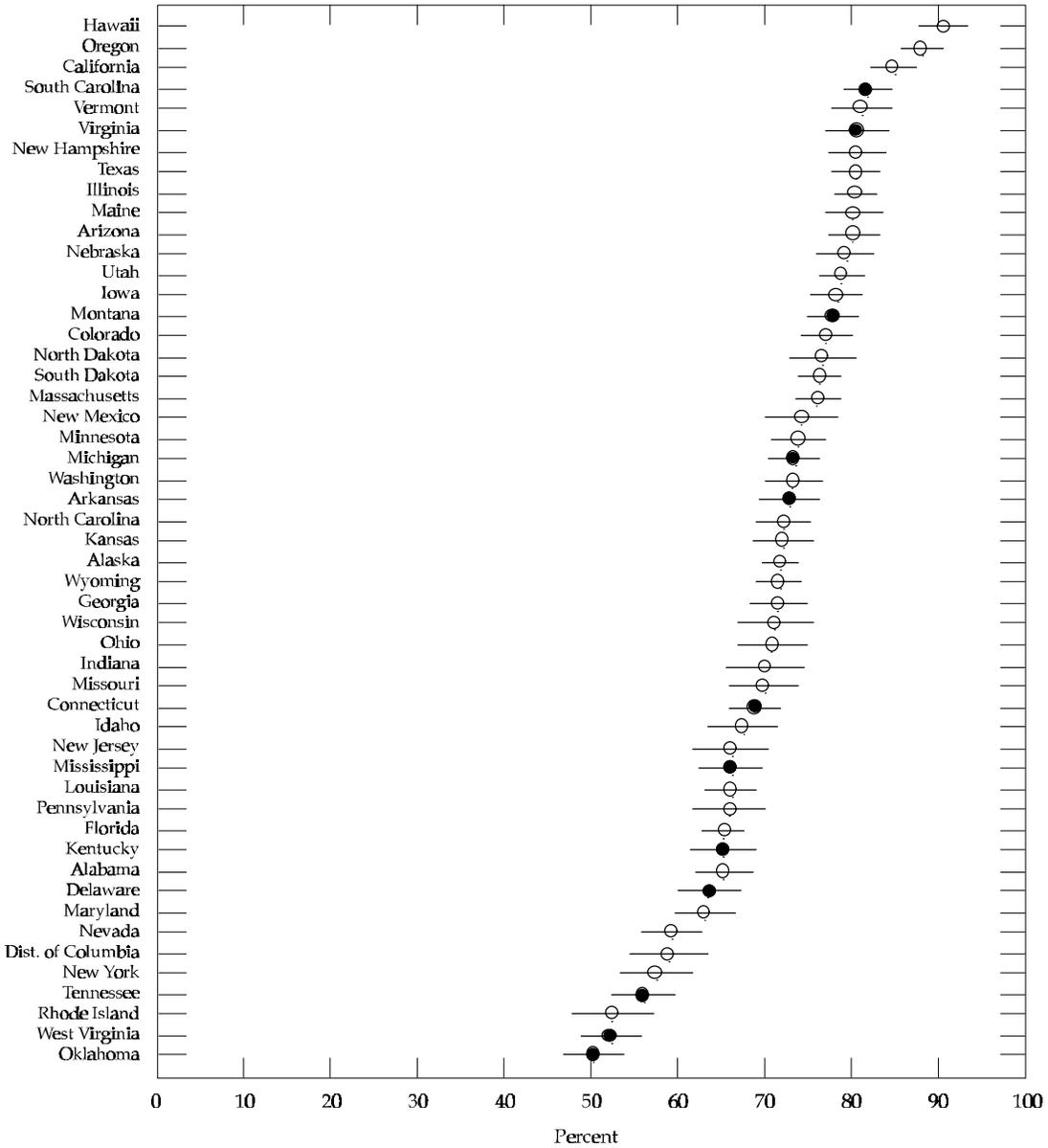
● Denotes states that, in 1996, both mandated the amount of time local districts must dedicate to professional development and required districts to develop local professional development plans (CPRE 1997).

NOTE: The circles denote the mean percentages for the states. The horizontal lines through the circles denote the 95 percent confidence intervals for the means.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993-94 (Principal Questionnaire).

2. Determining the Content of Professional Development Programs

**Figure 3 – Percentage of public school principals who thought that they themselves had a great deal of influence in determining the content of in-service programs, by state: 1993-94**

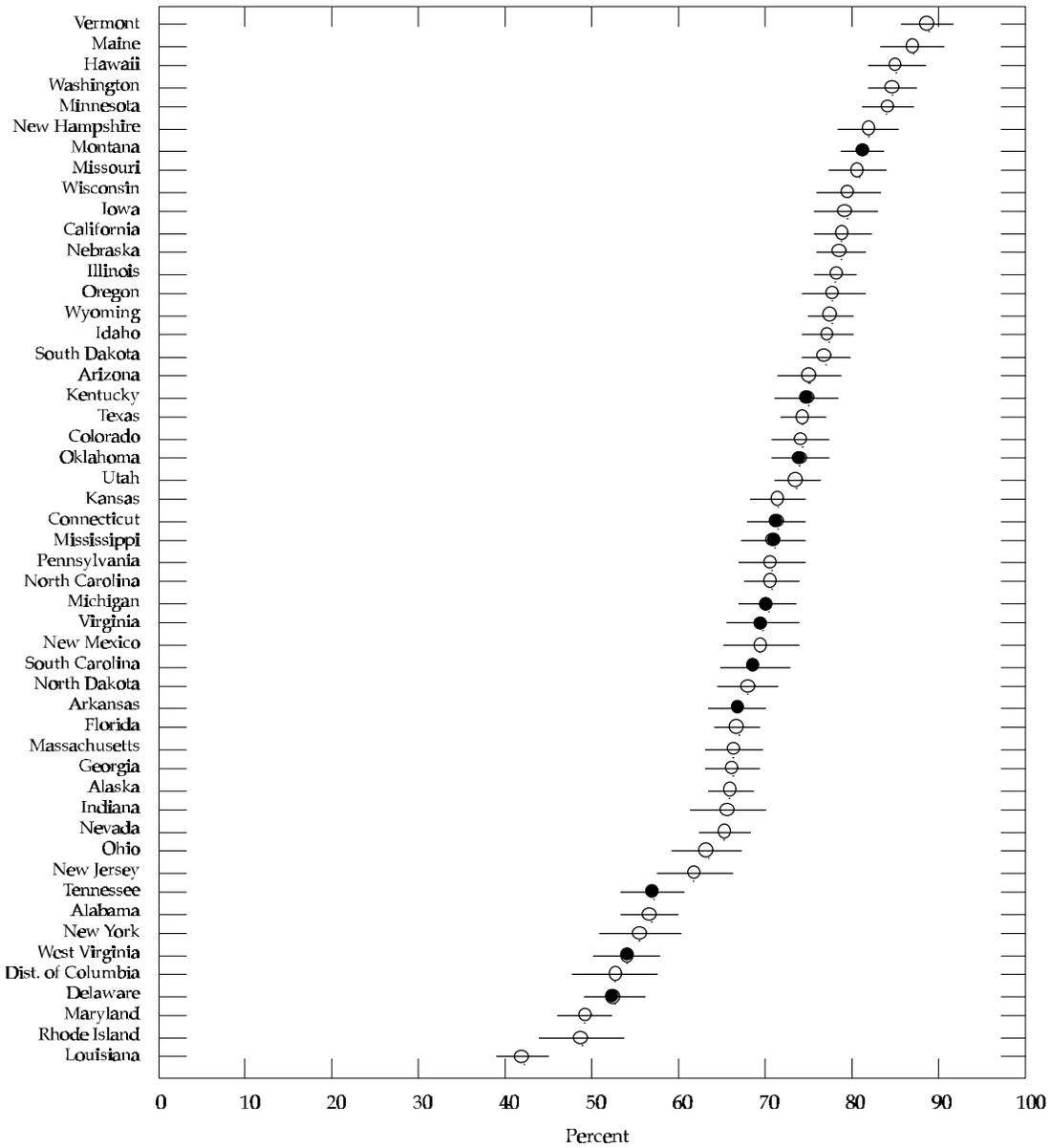


● Denotes states that, in 1996, both mandated the amount of time local districts must dedicate to professional development and required districts to develop local professional development plans (CPRE 1997).

NOTE: The circles denote the mean percentages for the states. The horizontal lines through the circles denote the 95 percent confidence intervals for the means.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993-94 (Principal Questionnaire).

**Figure 4—Percentage of public school principals who thought that the teachers in their school had a great deal of influence in determining the content of in-service programs, by state: 1993-94**



● Denotes states that, in 1996, both mandated the amount of time local districts must dedicate to professional development and required districts to develop local professional development plans (CPRE 1997).

NOTE: The circles denote the mean percentages for the states. The horizontal lines through the circles denote the 95 percent confidence intervals for the means.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993-94 (Principal Questionnaire).

**Table 3—Percentage of private school principals who thought that various groups had a great deal of influence\* in determining the content of in-service programs, by private school affiliation: 1993–94**

	Governing/ Diocesan board	Principal/ school head	Teachers	Parents
Total	26.1	88.4	61.6	4.7
Affiliation				
Catholic	37.8	92.6	75.0	3.6
Other religious	25.0	83.3	50.1	5.7
Nonsectarian	10.1	92.6	65.2	4.2

\*Teachers were asked how much actual influence they thought teachers at their school had in determining the content of in-service programs. They were categorized as having “a great deal of influence” if they responded 4 or 5 on a scale of 0–5.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Principal and School Questionnaires).

have participated in planning the content and format. Like principals, teachers in 1993–94 were asked how much influence they thought that teachers in their schools had in determining the content of in-service programs using a scale of 0–5. (Unlike principals, however, teachers were not asked about others’ influence on the content of professional development activities.)

About three-quarters of public school teachers thought that they had influence over the content of in-service programs (31 percent thought they had a great deal of influence, and another 42 percent thought they had some influence), leaving about one-quarter (28 percent) who thought they had little or no influence (table 4). Public and private school teachers were about equally likely to think they had little or no influence; however, private school teachers were more likely than public school teachers to think that they had a great deal of influence.

Among public school teachers, there appears to be some minor variation according to school and teacher characteristics. As school size increased, the proportion of teachers who thought they had a great deal of influence tended to decrease. This variation may be at least partly related to school level, as elementary teachers were more likely than secondary teachers to think that they had a great deal of influence, and elementary schools tend to be smaller than secondary schools (Henke et al. 1996). There was also variation by teacher experience. As years of teaching experience increased, teachers were slightly more likely to think that they had a great deal of influence. This may reflect the added responsibility typically given to more senior teachers.

**Table 4—Percentage distribution of teachers according to the amount of influence\* they thought teachers in their school had in determining the content of in-service programs, by sector and selected teacher and school characteristics: 1993–94**

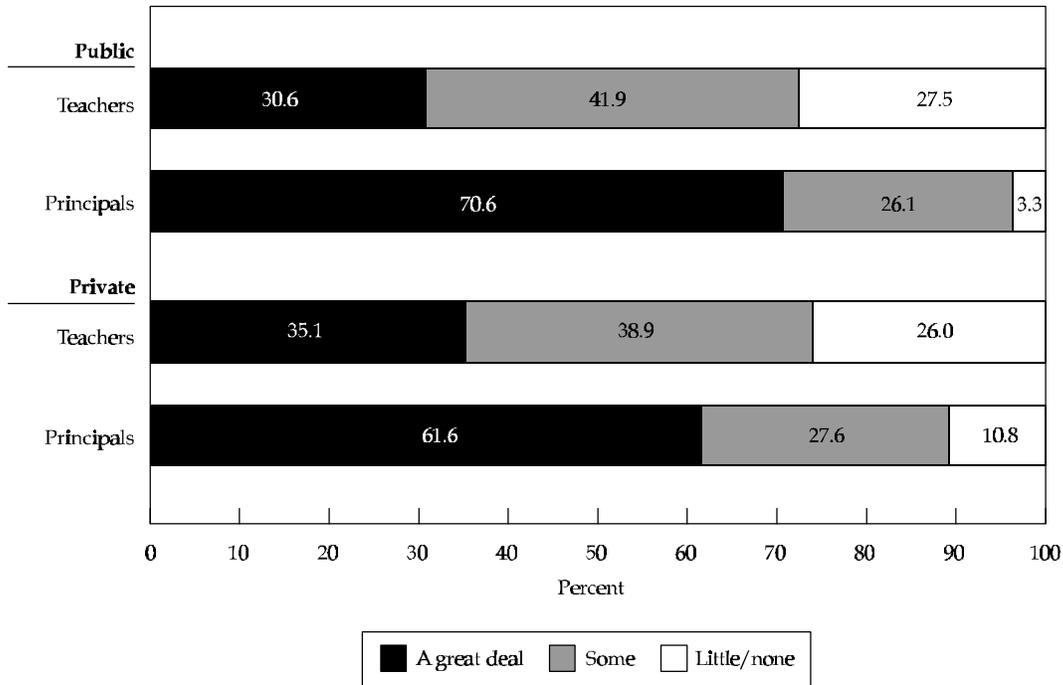
	Public			Private		
	A great deal	Some	Little or none	A great deal	Some	Little or none
Total	30.6	41.9	27.5	35.1	38.9	26.0
Main assignment field						
K–General elementary	33.7	40.7	25.6	35.4	36.9	27.6
Math or science	25.5	42.7	31.8	34.2	40.6	25.2
English, language arts	30.4	39.3	30.2	33.8	39.4	26.7
Social studies	30.2	42.0	27.8	37.8	38.8	23.4
Special education	31.2	43.6	25.2	36.4	37.7	25.8
Bilingual/ESL	31.0	39.7	29.3	—	—	—
Vocational education	31.1	43.1	25.8	23.9	50.9	25.2
Other	28.5	43.7	27.9	35.1	40.6	24.3
Level						
Elementary	32.6	41.6	25.8	36.1	37.7	26.2
Secondary	28.5	42.2	29.3	33.7	40.5	25.7
Teaching experience						
0–3 years	27.2	44.9	27.9	31.2	38.6	30.3
4–9 years	29.8	40.7	29.5	32.4	39.7	27.9
10–19 years	31.4	42.5	26.1	36.8	38.4	24.9
20 or more years	31.6	41.0	27.4	39.8	38.9	21.3
School size						
Less than 150	35.7	38.3	26.0	40.0	34.5	25.5
150–499	31.4	41.9	26.7	33.3	39.4	27.3
500–749	31.8	41.9	26.4	33.9	41.2	24.9
750 or more	28.5	42.7	28.8	32.6	42.8	24.7

\*Teachers were asked how much actual influence they thought teachers at their school had in determining the content of in-service programs. They were categorized as “a great deal” if they responded 4 or 5 on a scale of 0–5; “some” if they responded 2 or 3; and “little or none” if they responded 0 or 1.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher and School Questionnaires).

Principals were far more likely than teachers to think that teachers had a great deal of influence in determining the content of in-service programs. The incongruent opinions of principals and teachers were especially notable in public schools (figure 5). While this might reflect real

**Figure 5—Percentage of teachers and principals who reported that teachers in their schools had various amounts of influence in determining the content of in-service programs: 1993-94**



SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993-94 (Teacher and Principal Questionnaires).

differences of opinion, it might also be related to the way in which the questionnaires were designed, because principals and teachers were asked the same question in different contexts. Principals were asked about teachers' influence in a set of questions asking about the influence of other groups as well, while teachers were asked about their influence in a set of questions asking about their own influence over various school policies.

Another possible explanation for the differences between teachers' and principals' perceptions lies in the mechanism by which teacher influence often occurs. For example, if an elementary school principal consults with 5 or 6 teachers on a faculty of 20, this principal may feel that teachers in her school have a great deal of influence, as might the 5 or 6 teachers who were consulted. Those who were not consulted, on the other hand, may perceive teachers as having little influence on professional development in their school. Or, if most of the teachers in a school are consulted

but the decisions made do not reflect their opinions, teachers may feel they have little actual influence despite their consulting role.

## **Conclusion**

Responsibility for determining the content of at least one aspect of teacher professional development—in-service programs—was shared in 1993–94. From the principals’ perspectives, district staff, principals, and teachers had the most influence. However, there appears to have been considerable variation across states in the amount of influence each group believed that it had. As school reform efforts related to professional development proceed, the distribution of influence may change. How control will be shared among states, districts, schools, and teachers in the future will depend to some degree on the extent to which states choose to promote specific policies related to professional development by providing incentives or instituting mandates and policies promoting site-based management. Little (1993) noted that much reform legislation reflects tension between, on one hand, providing incentives and expanding teachers’ leadership opportunities and, on the other hand, tightening controls over teachers and teaching through credential requirements and curriculum standards.



### **3. Format of Professional Development**

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Whereas professional development once was thought of as a particular kind of activity such as a workshop or course, more recent conceptions include a broader range of activities that emphasize ongoing rather than one time events and focus on teachers' own practice rather than someone else's pedagogical formula. Thus, activities such as joint work (where teachers share responsibilities that require teacher cooperation and interdependence), teacher networks, collaborations between schools and colleges, professional development schools, and participation in the assessment process leading to National Board certification are now viewed as professional development activities (Corcoran 1995a; Darling-Hammond 1994; Little 1993; NCTAF 1996; Renyi 1996). In 1993–94, when SASS was administered, professional development participation in these types of activities was not widespread enough to measure meaningfully through a national survey. However, this may change in the future.

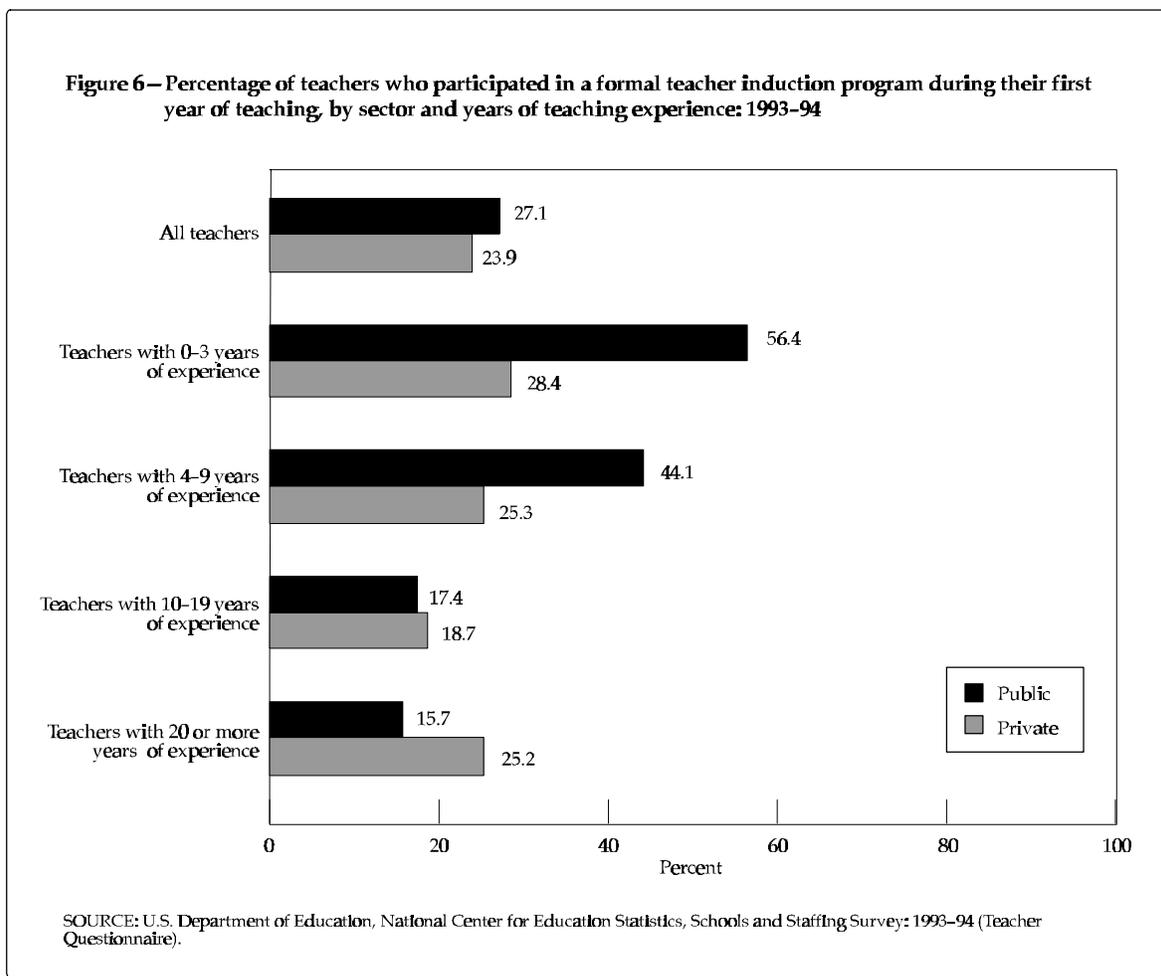
The 1993–94 SASS questions on professional development asked teachers about their participation in district- or school-provided workshops and lectures and about enrolling in courses or participating in professional growth activities provided by professional associations. They were also asked if they had participated in a formal induction program in their first year of teaching or served as a mentor in a formal induction program. This section examines teacher participation in these various forms of professional development without regard to their content or duration, both of which are discussed in the next section.

#### **Induction Programs for New Teachers**

The National Commission on Teaching and America's Future (NCTAF 1996) noted that new teachers are often simply assigned to classes and left to "sink or swim" with little or no support from more experienced teachers, and argued that this lack of support for new teachers contributes to high turnover and less effective teaching. Increasingly, schools and districts are implementing formal induction programs to help beginning teachers adjust to their new responsibilities and working environments. Through these programs, experienced teachers help new teachers by providing guidance on pedagogical challenges and chores, ethical dilemmas, student

assessment, and classroom management, and by familiarizing new teachers with school programs, policies, and resources.

In 1993–94, about one-quarter of all teachers (27 percent of public school teachers and 24 percent of private school teachers) reported that they had participated in a formal teacher induction program during their first year of teaching (figure 6 and table 5). Participation rates appear to have increased dramatically in the public sector in recent years. This conclusion is based on the observation that participation rates were much higher for public school teachers who had been teaching for less than 10 years in 1993–94 than for those who had been teaching longer, and that 56 percent of public school teachers who were in their first 3 years of teaching in 1993–94 reported having participated in such a program.<sup>9</sup>



<sup>9</sup>This conclusion assumes similar retention rates over time and between sectors regardless of participation in an induction program and that teachers started their teaching career in the same sector as they are currently teaching.

**Table 5—Percentage of teachers who reported that they had participated in a formal teacher induction program during their first year of teaching, by sector and selected teacher, school, and district characteristics: 1993–94**

	Total	Public	Private
Total	26.7	27.1	23.9
Teaching experience			
0–3 years	51.0	56.4	28.4
4–9 years	41.0	44.1	25.3
10–19 years	17.6	17.4	18.7
20 or more years	16.5	15.7	25.2
School size			
Less than 150	18.0	16.9	19.2
150–499	23.7	23.7	24.0
500–749	27.6	27.6	28.3
750 or more	29.9	30.0	27.5
Region			
Northeast	24.8	24.4	26.9
Midwest	21.1	21.4	19.5
South	30.8	31.5	24.7
West	28.4	28.9	24.9
Community type			
Central city	30.8	31.8	26.2
Urban fringe/large town	26.6	27.1	23.5
Rural/small town	23.5	23.8	19.4
District size			
Less than 1,000	(*)	16.9	(*)
1,000–4,999	(*)	22.9	(*)
5,000–9,999	(*)	25.9	(*)
10,000 or more	(*)	33.2	(*)

\*Not applicable to private schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher, School, and Teacher Demand and Shortage Questionnaires).

Private schools appear to have had formal induction programs in place for a longer period of time than public schools: among teachers with 20 or more years of teaching experience, private school teachers were more likely than public school teachers to report that they had participated in an induction program in their first year of teaching (25 percent versus 16 percent). However, the participation rate of private school teachers in their first 3 years of teaching (28 percent) was similar to that of their colleagues with 20 or more years of experience (25 percent). In other

words, the participation rate appears to have remained relatively stable over time in the private sector.

Although participation in a formal induction program by new teachers (those in their first 3 years of teaching) was much greater in the public than private sector in 1993–94 (56 percent versus 28 percent), the lower participation rate of private school teachers does not necessarily signify a lesser commitment on the part of private schools to helping new teachers. Because private schools tend to be small, assistance to new teachers may be more informal. There may be a similar explanation for the decline in participation rates in public schools as school and district size decrease.

About 11 percent of all teachers served as a mentor or master teacher in a formal teacher induction program in 1993–94 (table 6). As one might expect, the percentage of teachers serving in this capacity increased with their experience and education. In addition, teachers' participation increased with school size (in both sectors) and district size for public school teachers.

### **Ongoing Professional Development Activities**

Most teachers participate in a variety of formal and informal professional development activities on a continuing basis throughout their teaching careers. Traditional formats for these activities include half- or full-day workshops and programs sponsored by districts, schools, professional associations, and other organizations,<sup>10</sup> and courses taken outside the K–12 education system, such as university extension, adult education, or college courses.

Some of this participation is mandatory, involving either a fixed commitment of time or required attendance at a particular event. Many districts and schools set aside a certain number of noninstructional days each year for staff development, and some build time into teachers' work schedules for staff development (dismissing students early once a week or once a month, for example). Course taking and continuing education to meet state requirements for certification and recertification would probably be considered mandatory by most teachers because of the consequences of failing to participate, but these requirements typically involve quite modest commitments of time.

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<sup>10</sup>In addition to the subject-specific teacher organizations mentioned earlier, teacher professional associations such as the American Federation of Teachers (AFT), the National Education Association (NEA), and their state and local affiliates provide a range of professional development programs. Other organizations that provide teacher professional development programs include the regional education laboratories funded by the U.S. Department of Education; private, non-profit organizations such as the Association for Supervision and Curriculum Development; and private, for-profit consultants and companies.

**Table 6—Percentage of teachers who reported that they were currently a master or mentor teacher in a formal teacher induction program, by selected teacher and school characteristics: 1993–94**

	Total	Public	Private
Total	10.9	11.0	10.4
Teaching experience			
0–3 years	2.5	2.5	2.5
4–9 years	8.8	8.8	8.7
10–19 years	12.7	12.7	12.6
20 or more years	13.8	13.6	16.7
Highest degree earned			
Bachelor’s degree or less	9.0	9.2	7.7
Master’s degree	12.6	12.3	15.1
Education specialist	17.6	17.5	19.3
Ph.D. or professional	17.6	18.1	16.0
School size			
Less than 150	8.4	7.5	9.3
150–499	9.5	9.6	9.2
500–749	10.6	10.6	11.3
750 or more	12.6	12.5	15.4
Percent minority enrolled in school			
0	8.0	7.9	8.1
1–10	9.1	9.2	8.6
11–30	11.5	11.2	13.4
31–50	12.3	12.6	9.3
More than 50	12.2	12.3	10.7
District size			
Less than 1,000	(*)	8.6	(*)
1,000–4,999	(*)	10.1	(*)
5,000–9,999	(*)	10.8	(*)
10,000 or more	(*)	12.7	(*)

\*Not applicable to private schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher, School, and Teacher Demand and Shortage Questionnaires).

The extent to which levels of participation are attributable to requirements associated with certification and recertification will vary from state to state because the requirements vary widely among states, and did so at the time the SASS data were collected. For example, in 1993–94, teachers in Alabama could be certified at four different, but overlapping, levels (preschool through

grade 6, grades 4–8, grades 9–12, and all grades). Requirements for the standard certificate for each level included internships and a fixed number of semester hours of study in general studies, to which were added semester hour requirements in one’s teaching field and pedagogy for an advanced certificate. In Alaska, on the other hand, certification requirements were not differentiated by level, in part because they were stated in terms of program completion (e.g., completion of a bachelor’s degree and approved teacher education programs from an accredited institution), rather than semester hours of coursework in particular fields. Certification requirements in Alaska also included recommendations from the postsecondary institution in which training was undertaken. In neither state was an examination required, although examinations were required in almost every other state (Tryneski 1993).

Similarly, recertification requirements varied among states in 1993–94. In Alaska, renewal of initial certification required completion of six semester hours of training, three of which could be nonacademic training (i.e., workshops, institutes, or travel) that had been approved prior to completion of the training in question. In California, renewal of certification required 150 clock hours of planned professional growth activities and one semester of teaching experience (Tryneski 1993).

Other professional development activity may be voluntary, as when teachers choose to attend workshops, institutes, or classes or participate in activities sponsored by professional associations or other organizations. Sometimes teachers are given financial support or release time (discussed later in this report), but often they use their own time and money. Districts encourage some voluntary professional development by providing financial incentives. For example, because teacher compensation is almost always based on a combination of education and experience, teachers have a strong incentive to earn additional college credits and advanced degrees or certificates in order to be eligible for promotions and salary increases. In 1993–94, the scheduled salary for public school teachers with a bachelor’s degree and no experience averaged \$21,900. The average scheduled salary for teachers with a master’s degree and no experience, however, was \$24,000, a difference of more than \$2,000 per year (Henke et al. 1997).

The 1993–94 SASS asked teachers whether they had participated in certain types of professional development activities since the end of the last school year, including district- and school-sponsored workshops or in-service programs, university extension or adult education courses, college courses in their fields, and professional growth activities sponsored by professional associations. These data provide information on the number of teachers who participated in specific types of professional development activities during the summer and current school year and

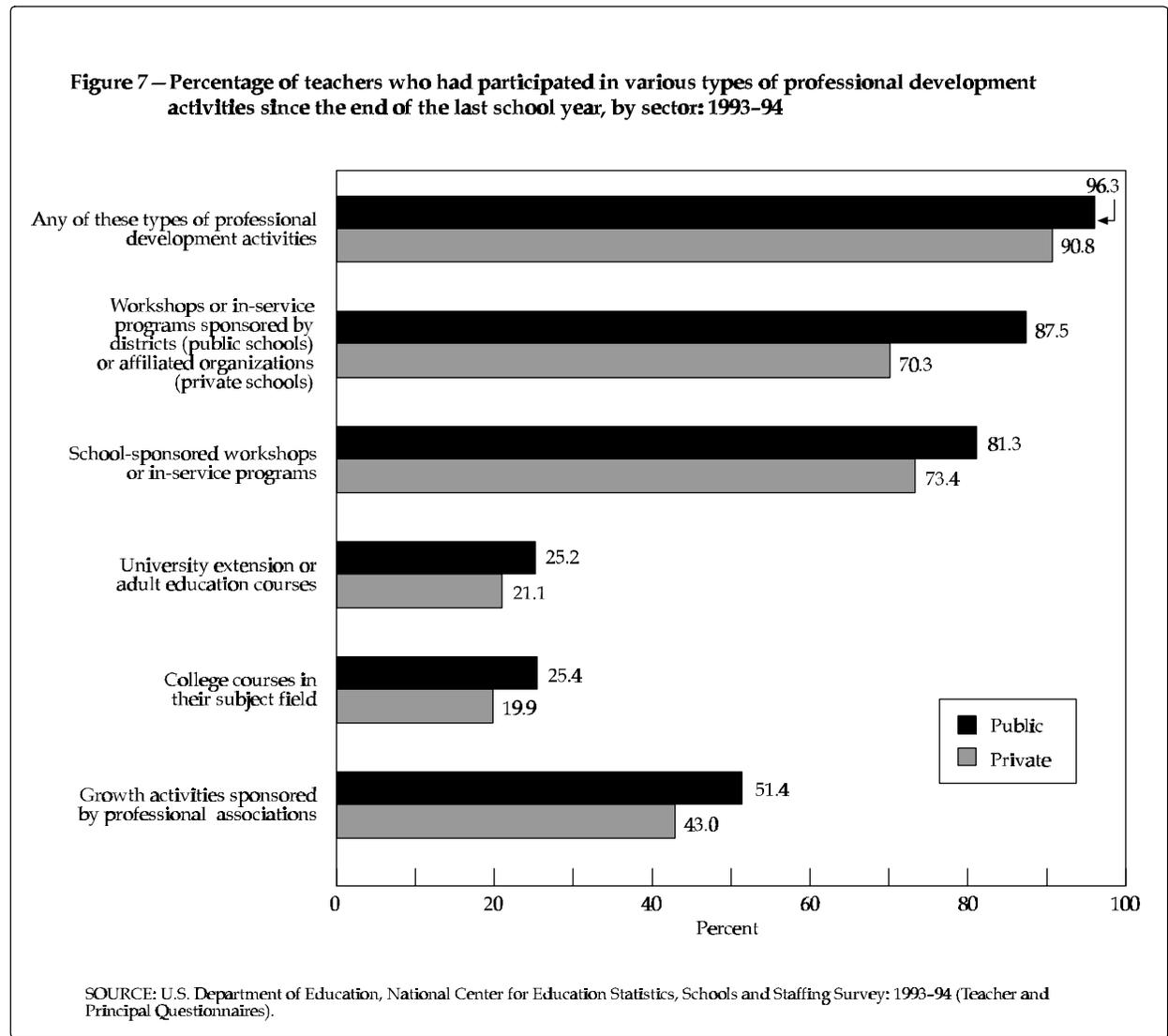
allow researchers to examine how participation rates vary by teacher, school, and district characteristics, and by state. When considering rates of participation, it is important to keep in mind that the data provide no information on the intensity of participation—that is, the frequency or duration of the activities. A teacher indicating that he had participated in a school-sponsored workshop since the end of the last school year, for example, might have participated in one workshop or many, and one might have lasted two hours while another might have lasted two weeks.

### ***Participation Rates***

In 1993–94, 96 percent of public school teachers reported having participated in one or more of the types of professional activities they were asked about (figure 7). Participation rates in district- and school-sponsored workshops and in-service training were high: in 1993–94, 88 percent of public school teachers reported that they had participated in district-sponsored programs since the end of the last school year, and 81 percent reported having participated in school-sponsored programs. These high rates reflect the fact that these programs are typically conducted at times when teachers must be in school and that participation in these programs is often required.

The next most common type of professional development was professional growth activities sponsored by professional associations. In 1993–94, about half (51 percent) of all public school teachers reported that they had participated in such activities since the end of the last school year. These activities are more likely than school- and district-sponsored programs to be voluntary and to occur outside of school hours or the school year.

A substantially lower proportion of public school teachers had taken college courses in their field or adult education classes since the end of the previous school year (25 percent in each case). As indicated previously, teachers may take such courses for many reasons: to obtain certification in a new field, maintain their present certification, earn an advanced degree, qualify for a salary increase, pursue an academic or personal interest, or keep current in their field. Because such courses typically require a much larger commitment of time (and sometimes teachers' own money) than the other types of professional activities discussed here and require that this time be spent outside the school day, most teachers do not engage in this type of course taking every year.



Sometimes teachers take courses to retrain in new areas where teacher shortages exist (sometimes at district expense) and then switch assignment fields. In the public sector, bilingual/ESL and special education teachers were more likely than teachers in other fields to report having taken field-related college courses since the end of the last school year (table 7). These two fields happen to be among the fields in which vacancies are the most difficult to fill (Henke et al. 1996).

**Table 7—Percentage of teachers who had participated in various types of professional development activities since the end of the last school year, by sector and main assignment field: 1993–94**

	Workshop/ in-service training sponsored by school district or affiliated organization	Workshop/ in-service training sponsored by school	University extension/ adult education course	College course in their subject	Professional growth activities sponsored by professional associations
<b>Total</b>	85.3	80.3	24.7	24.7	50.3
<b>Public</b>	87.5	81.3	25.2	25.4	51.4
Main assignment field					
K–general elementary	91.2	85.4	24.8	25.4	49.3
Math or science	85.5	77.7	25.2	23.0	50.9
English or language arts	88.2	83.7	24.5	24.5	50.8
Social studies	85.7	80.1	23.0	23.1	48.3
Special education	86.2	80.8	26.3	30.4	49.9
Bilingual or ESL	91.3	85.5	28.8	35.0	51.8
Vocational education	84.1	77.7	30.1	25.1	56.4
Other	83.7	76.4	24.9	24.8	56.2
<b>Private</b>	70.3	73.4	21.1	19.9	43.0
Main assignment field					
K–general elementary	76.4	75.5	22.0	20.9	43.5
Math or science	67.0	67.4	21.2	19.3	43.5
English or language arts	74.0	79.9	18.6	18.6	43.5
Social studies	70.6	79.1	23.7	19.1	45.1
Special education	63.4	79.0	20.6	22.0	32.6
Bilingual or ESL	—	—	—	—	—
Vocational education	66.4	79.3	19.9	12.7	25.7
Other	62.6	68.7	20.2	19.4	44.1

—Too few cases for a reliable estimate.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

Participation in the types of professional development activities described here was consistently higher for public school teachers than private school teachers. However, the differences are not as large as one might expect given the fact that most states require certification and recertification of public school teachers, but only some impose the same requirements on private school teachers. Possible reasons include the fact that some private schools require teachers to earn certificates regardless of state requirements, and that a majority of private schools (63 percent in

1993–94) maintain salary schedules with steps based on education and experience (Henke et al. 1996). Furthermore, private school teachers have a number of incentives independent of state or school requirements to acquire and maintain certification, such as standing in the profession, marketability, and mobility.

Although these data indicate that private school teachers participate less than public school teachers in certain types of structured professional development, there are many other types of professional development activity (including some of the newer types described earlier) that are not reported here because such data have not been collected. For example, informal mentoring or teacher collaboration within a school or between teachers at different schools is thought to have a strong effect on teachers' professional skills and knowledge, but this type of professional development activity cannot be measured using the 1993–94 SASS data. Thus, the data do not allow any overall public-private comparisons about the total amount of attention accorded professional development in the two sectors.

### ***Variation by Teacher and School Characteristics***

While participation in diverse professional development activities was widespread during 1993–94, not all teachers participated at the same rate or in the same types of activities. Because participation in some types of professional development is completely at the teacher's discretion (such as taking a particular college course or participating in workshops sponsored by professional associations), one might expect participation in at least some types of professional development activities to vary with the characteristics of teachers (such as education, experience, level, and assignment field).

Participation in other types of professional development activities—such as workshops sponsored by schools and districts—is often required or strongly encouraged. Teacher participation in these types of professional development activities might therefore depend less on the characteristics of teachers and more on the characteristics of the schools and districts where they work. Thus, participation in these types of professional development activities might depend on the characteristics of schools (such as size, student body composition, region, and community type); principals (such as education and experience); and districts or affiliation group in the case of private schools (such as size).

Participation in professional development activities also depends on the availability of opportunities (such as programs sponsored by professional associations and nearby colleges with appropriate course offerings). Therefore, one might expect participation in these types of

professional development activities to vary with region or urbanicity or with teachers' assignment fields.

Because many of these teacher and school characteristics are interrelated, a multivariate analysis of each of the five types of professional development activities described above was conducted to identify the separate effects of various teacher and school characteristics. A logistic regression model was used to examine the factors related to whether teachers participated in each of five types of professional development activities: district-sponsored workshops; school-sponsored workshops; continuing education or adult education courses; college courses in their subject area; and professional growth activities sponsored by professional associations. Data from public and private school teachers were analyzed separately because of the differing structures of professional development in public and private schools.

The results of the logistic regression analyses are displayed in appendix B (table B-1), and the methodology is described in more detail in appendix C. To simplify the presentation of the results of the analysis, the odds ratios generated by the regression analyses were used to adjust the estimates of teacher participation rates to control for teacher and school characteristics (tables 8a and 8b). The differences discussed in the rest of this section refer to the adjusted differences. Because the adjusted values necessarily refer to pairs of variables and presenting all possible pairs would be cumbersome, some intermediate categories were combined or omitted. Instances where this masks relationships shown in the appendix table are footnoted.

### *Workshops and In-Service Training*

In the public sector, full-time and experienced teachers (with 10 or more years experience) were more likely than part-time and new teachers (in their first 3 years of teaching), respectively, to have participated in district- and school-sponsored workshops (table 8a).<sup>11</sup> However, the adjusted differences were relatively minor (5 percentage points or less), probably because participation in district- and school-sponsored workshops is frequently mandatory and scheduled during teachers' regular work days. Part-time teachers may not be required to attend as many workshops, and part-time and new teachers tend to participate less frequently in voluntary activities—part-time teachers perhaps because of their nonteaching-related commitments, and new teachers

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<sup>11</sup>The regression results (table B1) suggest that the relationship between experience and participation may be nonlinear when teacher experience is divided into more categories. Nevertheless, beginning teachers participate in district- and school-sponsored activities at a lower rate than any other group.

**Table 8a—Adjusted and unadjusted percentages of public school teachers who had participated in various types of professional development activities since the end of the last school year and differences by selected teacher and school characteristics: 1993–94**

	Workshop/ in-service training sponsored by school district or affiliated organization	Workshop/ in-service training sponsored by school	University extension/ adult education course	College course in their subject	Professional growth activities sponsored by professional associations
<b>Teacher characteristics</b>					
Elementary	89.8	83.3	25.0	26.0	51.4
Secondary	85.0	79.2	25.5	24.7	51.3
Unadjusted difference <sup>1</sup>	-4.8**	-4.1**	0.5	-1.3	-0.1
Adjusted difference <sup>2</sup>	-1.7**	-0.7	-0.2	-0.3	-4.5*
Part-time	84.4	73.8	25.5	26.1	58.2
Full-time	87.9	82.1	25.3	25.2	50.8
Unadjusted difference <sup>1</sup>	3.5**	8.3**	-0.2	-0.9	-7.4**
Adjusted difference <sup>2</sup>	2.1**	4.2**	1.8	1.4	-3.9**
New (0–3 years)	83.1	78.8	25.2	33.5	44.3
Experienced (at least 10 years)	88.2	81.4	23.9	20.8	52.8
Unadjusted difference <sup>1</sup>	5.1**	2.6**	-1.3	-12.7**	8.5**
Adjusted difference <sup>2</sup>	5.2**	3.8**	-1.6	-11.5**	6.7**
Bachelor's degree/lower Master's degree/higher	87.8 87.2	82.0 80.5	26.1 24.3	28.1 22.3	49.2 53.8
Unadjusted difference <sup>1</sup>	-0.6	-1.5	-1.8	-5.8**	4.6**
Adjusted difference <sup>2</sup>	-0.4	-0.4	-0.5	-2.4**	3.9**
<b>School characteristics</b>					
Low minority enrollment (0%)	85.6	73.0	25.1	26.3	49.5
High minority enrollment (>50%)	86.0	84.7	24.1	25.0	49.2
Unadjusted difference <sup>1</sup>	0.4	11.7**	-1.0	-1.3	-0.3
Adjusted difference <sup>2</sup>	2.0	8.0**	-1.6	-0.9	2.7
Small (<150)	87.3	79.3	30.5	32.0	51.0
Large (≥750)	84.9	81.4	24.2	24.2	50.2
Unadjusted difference <sup>1</sup>	-2.4	2.1	-6.3**	-7.8**	-0.8
Adjusted difference <sup>2</sup>	-1.8	1.2	-3.8*	-3.5*	2.6
Urban fringe	88.4	80.4	25.8	24.6	53.2
Central city	85.6	84.2	25.1	25.4	50.5
Unadjusted difference <sup>1</sup>	-2.8**	3.8**	-0.7	0.8	-2.7**
Adjusted difference <sup>2</sup>	-2.1**	1.8*	0.6	1.0	-0.2
Urban fringe	88.4	80.4	25.8	24.6	53.2
Rural	88.1	80.0	24.9	26.0	50.6
Unadjusted difference <sup>1</sup>	-0.3	-0.4	-0.9	1.4	-2.6**
Adjusted difference <sup>2</sup>	-0.8	-0.3	-0.2	1.0	-3.8**
Low poverty (0–5%)	87.1	78.9	26.2	25.8	54.8
High poverty (>40%)	87.1	83.5	24.3	25.8	49.0
Unadjusted difference <sup>1</sup>	0.0	4.6**	-1.9	0.0	-5.8**
Adjusted difference <sup>2</sup>	-0.9	-1.2	0.1	0.8	-3.1

\*P ≤ .05; \*\* P ≤ .01.

<sup>1</sup>Difference was between the two compared subgroups of teachers (e.g., secondary versus elementary).<sup>2</sup>Difference was adjusted by teacher and school characteristics (except for the corresponding characteristics being tested) and school characteristics. Teacher characteristics included teacher level, main assignment field, employment status, teaching experience, and highest degree earned. School characteristics included size, percentage of minority enrollment, percentage of free/reduced-price lunch recipients, region, community type, district size, principal's education, and principal's experience.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher and School Questionnaires).

**Table 8b—Adjusted and unadjusted percentages of private school teachers who had participated in various types of professional development activities since the end of the last school year and differences by selected teacher and school characteristics: 1993–94**

	Workshop/ in-service training sponsored by school district or affiliated organization	Workshop/ in-service training sponsored by school	University extension/ adult education course	College course in their subject	Professional growth activities sponsored by professional associations
<b>Teacher characteristics</b>					
Elementary	72.8	73.5	21.5	20.7	42.8
Secondary	67.0	73.4	20.6	18.8	43.3
Unadjusted difference <sup>1</sup>	-5.8**	-0.1	-0.9	-1.9	0.5
Adjusted difference <sup>2</sup>	-2.4	-1.4	-0.9	-1.3	-3.5
Part-time	59.2	62.2	17.3	16.6	37.2
Full-time	73.2	76.3	22.1	20.7	44.5
Unadjusted difference <sup>1</sup>	14.0**	14.1**	4.8**	4.1**	7.3**
Adjusted difference <sup>2</sup>	9.9**	10.1**	4.6**	3.8**	6.8**
New (0–3 years)	64.4	65.3	17.6	24.0	29.5
Experienced (at least 10 years)	79.5	77.2	21.8	17.1	49.6
Unadjusted difference <sup>1</sup>	15.1**	11.9**	4.2**	-6.9**	20.1**
Adjusted difference <sup>2</sup>	8.5**	9.4**	4.3**	-6.6**	17.4**
Bachelor's degree/lower	71.2	72.6	21.8	21.3	39.7
Master's degree/higher	68.7	75.1	19.8	17.3	49.3
Unadjusted difference <sup>1</sup>	-2.5	2.5	-2.0	-4.0**	9.6**
Adjusted difference <sup>2</sup>	-1.6	0.3	-2.3	-1.9	6.5**
<b>School characteristics</b>					
Low minority enrollment (0%)	63.6	58.0	20.8	17.0	29.4
High minority enrollment (>50%)	73.1	74.3	25.0	23.9	45.5
Unadjusted difference <sup>1</sup>	9.5**	16.3**	4.2	6.9**	16.1**
Adjusted difference <sup>2</sup>	2.3	6.9	0.3	2.7	10.0**
Small (<150)	63.7	62.7	19.2	18.9	34.2
Large (≥750)	72.1	80.7	22.2	19.0	49.0
Unadjusted difference <sup>1</sup>	8.4**	18.0**	3.0	0.1	14.8**
Adjusted difference <sup>2</sup>	4.9	10.8**	1.3	0.2	5.4
Urban fringe	70.4	75.5	20.3	19.4	44.5
Central city	71.8	74.9	22.1	20.2	44.9
Unadjusted difference <sup>1</sup>	1.4	-0.6	1.8	0.8	0.4
Adjusted difference <sup>2</sup>	1.6	-0.2	1.7	0.9	-0.4
Urban fringe	70.4	75.5	20.3	19.4	44.5
Rural	66.9	66.3	20.6	20.0	36.3
Unadjusted difference <sup>1</sup>	-3.5	9.2**	0.3	0.6	-8.2**
Adjusted difference <sup>2</sup>	-1.4	-3.8	2.3	1.2	-2.3
Nonsectarian	62.3	71.8	20.5	16.9	43.4
Catholic	77.7	81.5	24.9	24.6	48.9
Unadjusted difference <sup>1</sup>	15.4**	9.7**	4.4**	7.7**	5.5**
Adjusted difference <sup>2</sup>	12.7**	8.1**	3.2	7.1**	3.9*
Nonsectarian	62.3	71.8	20.5	16.9	43.4
Other religious	67.4	65.8	17.5	16.6	36.4
Unadjusted difference <sup>1</sup>	5.1**	-6.0**	-3.0*	-0.3	-7.0**
Adjusted difference <sup>2</sup>	3.4	-3.2	-3.2	-0.4	-5.8*

\*P ≤ .05; \*\* P ≤ .01.

<sup>1</sup>Difference was between the two compared subgroups of teachers (e.g., teachers in large schools versus teachers in small schools).<sup>2</sup>Difference was adjusted by teacher and school characteristics (except for the corresponding characteristics being tested). Teacher characteristics included teacher level, main assignment field, employment status, teaching experience, and highest degree earned. School characteristics included size, percentage of minority enrollment, region, community type, school affiliation, principal's education, and principal's experience.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher and School Questionnaires).

perhaps because they are fully occupied with the demands of their new profession (or course taking, as described below) and have little time to devote to voluntary workshops and programs.

As in the public sector, full-time and more experienced private school teachers were also more likely than part-time or new private school teachers to participate in workshops sponsored by their school or an organization with which their school was affiliated (table 8b). The adjusted differences were about 9 to 10 percentage points.

For the most part, public school teacher participation was not related to school characteristics. Although teachers in central city schools were slightly less likely than those in urban fringe/large town communities to participate in district-sponsored workshops or in-service programs, they were slightly more likely than urban fringe/large town teachers to attend school-sponsored programs (table 8a). Teachers in schools with high minority enrollments (more than 50 percent) were more likely than those in schools with no minority enrollment to participate in school-sponsored workshops or in-service training. This might be related to higher levels of categorical funding, some of which is often earmarked for teacher professional development, in high minority schools.

Unlike the public sector, teachers in large private schools were more likely than those in small private schools to participate in school-sponsored programs (table 8b). Finally, teachers in Catholic schools were more likely than those in nonsectarian schools to participate in workshops or in-service programs sponsored by their schools or organizations with which their schools were affiliated.

### *Professional Growth Opportunities Provided by Professional Associations<sup>12</sup>*

Many teachers turn to professional associations for help in keeping up-to-date in their fields: 51 percent of all public school teachers and 43 percent of all private school teachers had participated in professional growth activities sponsored by professional associations since the end of the last school year (figure 7).

In both sectors, participation was greater among teachers with more experience and more formal education than among those with less experience and less formal education (tables 8a and

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<sup>12</sup>As discussed above, the professional organizations that offer teacher professional development opportunities include subject-specific organizations (e.g., NCSS, NCTE, NCTM, and the National Science Teachers Association [NSTA]); more general education professional organizations (e.g., National Association for the Education of Young Children [NAEYC] and ASCD); and teacher unions (e.g., AFT, NEA, and their state and local affiliates).

8b). Teachers with 10 or more years of experience were more likely than teachers in their first 3 years of teaching to participate, as were teachers with master's degrees or higher compared with teachers with bachelor's degrees.

In the public sector, participation was also greater for elementary than secondary teachers and for part-time than full-time teachers. Among public school teachers, those in rural communities were slightly less likely than their colleagues in urban fringe communities or large towns to participate in activities sponsored by professional associations, perhaps because fewer professional association activities are available in remote areas.

In the private sector, participation did not vary by level and was greater among full-time than part-time teachers. Participation was also higher in Catholic than nonsectarian schools and in nonsectarian schools than other religious schools, perhaps because of differential use of salary schedules or incentives to participate in professional development.

### *Course Taking*

Teachers frequently enroll in college, university extension, or adult education courses. They may do so to earn continuing education credits toward advancement on the salary schedule or recertification, to earn advanced degrees or credentials (which also may permit them to advance on the salary schedule), to retrain to teach in another field, or to increase their expertise in the field in which they are currently teaching. In 1993–94, 25 percent of public school teachers had taken college courses in their subject fields since the end of the last school year and 25 percent had taken university extension or adult education courses (table 7). In the private sector, the percentages of teachers taking each type of course were also similar (20 and 21 percent, respectively), but in each case they were slightly lower than in the public sector.

In both sectors, new teachers (those with 3 years of experience or less) were more likely than teachers with 10 or more years of experience to have taken college courses in their subject field (tables 8a and 8b).<sup>13</sup> Among public school teachers, those with advanced degrees were less likely than those with a bachelor's degree or less to take courses in their field. These differences may reflect the relatively large numbers of new teachers working on master's degrees or taking courses needed to obtain full certification or qualify for salary increases.

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<sup>13</sup>The regression results (table B1) show that new teachers and teachers with 4–9 years experience are about equally likely to take college courses. The results also suggest that the relationships between age and experience and university extension or adult education course taking are nonlinear.

Since taking courses is more likely to be voluntary than is participation in district- or school-sponsored workshops, the school characteristics measured here are likely to be less important than teacher characteristics in explaining variation.<sup>14</sup> However, participation was higher among public school teachers in small schools with enrollments of less than 150 than it was among their colleagues in large schools with enrollments of 750 or more (table 8a). Smaller schools might offer fewer subject-specific staff development activities than larger schools, leading teachers to turn elsewhere for training in their fields. Teachers in Catholic schools were more likely than those in nonsectarian schools to take college courses in their subject field, but this may reflect a greater use of salary schedules in Catholic schools (table 8b).

### *Choosing Among Types of Professional Development Activities*

The above discussion focused on the different types of professional development activities and how participation varied by teacher and school characteristics. To summarize the discussion of participation, this section takes a different perspective and looks at the choices teachers make among types of professional development activities. Teachers have a limited amount of time (and limited personal resources, which they sometimes must use) to spend on professional development activity, so greater participation in one type may be accompanied by less participation in others.

Full-time public school teachers were more likely than their part-time colleagues to attend school- or district-sponsored workshops, but less likely to participate in professional growth activities sponsored by professional associations (table 8a). In other words, full-time public school teachers appear to rely more on their schools and part-time teachers more on professional associations for professional development, a pattern that may reflect the opportunities available to them.

Among both public and private school teachers, teachers with 10 or more years of experience were more likely than new teachers to participate in school- and district- (or affiliation-) sponsored programs and in professional growth activities sponsored by professional associations (tables 8a and 8b). New teachers, on the other hand, were more likely than the experienced teachers to enroll in college courses in their subject field. This suggests that new teachers may be focusing their professional development time on earning advanced degrees or credentials or, if they are not fully certified, taking the required courses they need to continue teaching or gain some mobility.

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<sup>14</sup>The value individual schools and districts place on professional development is likely to affect teachers' voluntary participation in professional development activities, but SASS does not include such measures.

### ***Variation by State***

Teacher participation in the different types of professional development activities varied considerably across states (tables 9 and 10), especially with respect to the types of professional development that do not typically involve mandatory participation on a regular basis. For example, teacher participation rates for taking college courses in their subjects ranged from a high of 56 percent in Alaska to a low of 15 percent in North Carolina, and participation rates in professional growth activities sponsored by professional associations ranged from 77 percent in New Hampshire to 36 percent in Georgia.

Although teacher and school characteristics are not uniformly distributed across states, the amount of variation among states is too large to be attributable solely to differences in the distribution of teacher and school characteristics. Coupled with the relatively limited amount of variation by teacher and school characteristics, these findings suggest that state policies may have a relatively large impact on the amount and types of professional development. For example, Kentucky teachers have high participation in district- and school-sponsored in-service training, which is consistent with the strong emphasis on teacher professional development associated with implementation of the Kentucky Education Reform Act of 1990 and the expanded number of days of professional development it provided for (CPRE 1997). State variation may reflect different opportunities available to teachers as well as government policies, however. For example, teachers have easier access to colleges and universities in some states than others, and professional and state education associations are more active in some states than others. Finally, as already discussed, certification and recertification policies vary from state to state and may have an important effect on the amount of participation in some types of professional development programs.

### **Conclusion**

Almost all teachers participate in some professional development activity in a given year. Although participation rates vary with teacher characteristics in some expected ways, the magnitude of the differences is relatively small. Participation rates do not depend just on teachers, but also on state, district, and school policies. With the SASS data, it is not possible to determine the

### 3. Format of Professional Development

**Table 9—Percentage of public school teachers who had participated in various professional development activities since the end of the last school year, by state: 1993–94**

	District-sponsored workshop/ in-service training	School-sponsored workshop/ in-service training	University extension/adult education course	College course in their subject	Professional growth activities sponsored by professional associations
Total	87.5	81.3	25.2	25.4	51.4
Alabama	87.5	85.9	25.4	17.7	54.8
Alaska	95.1	86.0	57.6	55.7	50.6
Arizona	88.5	78.1	34.5	34.5	49.6
Arkansas	93.7	89.2	15.6	19.4	49.1
California	89.6	87.5	37.6	24.5	58.1
Colorado	85.4	81.6	42.7	42.4	47.8
Connecticut	94.6	90.2	24.2	18.4	66.7
Delaware	93.7	83.2	25.9	27.8	57.1
District of Columbia	85.3	86.4	35.4	42.4	55.2
Florida	88.7	88.0	18.3	19.5	43.5
Georgia	74.8	78.6	14.2	21.9	36.2
Hawaii	83.7	83.9	42.1	43.4	42.7
Idaho	92.4	78.6	46.2	51.7	49.8
Illinois	85.5	80.3	26.5	24.6	48.4
Indiana	76.2	80.2	17.7	18.8	54.7
Iowa	94.2	84.2	35.4	37.4	53.1
Kansas	96.9	85.8	32.4	40.6	52.2
Kentucky	95.5	94.1	15.5	20.7	57.1
Louisiana	83.6	85.7	15.2	25.6	50.6
Maine	89.7	83.7	32.3	27.9	57.3
Maryland	79.6	78.0	17.9	23.1	41.2
Massachusetts	78.5	74.9	25.6	24.7	55.4
Michigan	88.2	79.5	19.5	19.4	55.2
Minnesota	93.3	86.4	35.2	36.2	58.0
Mississippi	90.3	85.8	13.2	15.2	42.7
Missouri	89.6	80.7	22.4	26.7	63.7
Montana	90.7	79.4	42.2	41.2	56.5
Nebraska	90.7	83.1	24.0	37.9	58.7
Nevada	81.6	72.6	37.3	39.4	48.4
New Hampshire	92.8	85.4	28.0	32.2	76.5
New Jersey	89.4	76.3	25.1	18.4	57.6
New Mexico	84.1	80.8	26.8	24.3	42.6
New York	78.3	66.1	17.3	23.0	44.2
North Carolina	86.3	90.3	21.4	15.2	52.4
North Dakota	89.1	77.5	55.9	47.8	50.4
Ohio	87.0	72.8	30.4	30.5	49.5
Oklahoma	93.9	90.4	21.1	19.6	60.1
Oregon	87.5	80.3	37.2	37.6	54.5
Pennsylvania	87.4	65.8	20.9	20.5	43.8
Rhode Island	82.9	74.5	17.1	23.6	44.1
South Carolina	90.7	86.7	22.5	41.3	40.4
South Dakota	94.1	81.9	40.9	44.1	50.9
Tennessee	87.2	82.6	17.1	21.8	52.6
Texas	93.4	87.9	15.2	16.2	51.3
Utah	84.9	78.0	32.0	27.5	38.9
Vermont	92.2	86.5	34.8	47.7	67.3
Virginia	84.4	86.4	28.9	31.8	54.4
Washington	90.8	84.7	46.6	41.5	55.9
West Virginia	88.8	83.0	33.1	31.1	51.9
Wisconsin	91.7	77.1	34.1	35.6	55.8
Wyoming	92.3	78.4	58.6	43.3	52.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table 10—States with the highest and lowest public school teacher participation rates in various types of professional development activities since the end of the last school year: 1993–94**

Workshop/in-service training program sponsored by school district	Workshop/in-service training program sponsored by school	University extension/adult education course	College course in their subject	Professional growth activities sponsored by professional associations					
<b>States with highest participation rates</b>									
Kansas	96.9	Kentucky	94.1	Wyoming	58.6	Alaska	55.7	New Hampshire	76.5
Kentucky	95.5	Oklahoma	90.4	Alaska	57.6	Idaho	51.7	Vermont	67.3
Alaska	95.1	North Carolina	90.3	North Dakota	55.9	North Dakota	47.8	Connecticut	66.7
Connecticut	94.6	Connecticut	90.2	Washington	46.6	Vermont	47.7	Missouri	63.7
Iowa	94.2	Arkansas	89.2	Idaho	46.2	South Dakota	44.1	Oklahoma	60.1
South Dakota	94.1	Florida	88.0	Colorado	42.7	Hawaii	43.4	Nebraska	58.7
Oklahoma	93.9	Texas	87.9	Montana	42.2	Wyoming	43.3	California	58.1
Delaware	93.7	California	87.5	Hawaii	42.1	Colorado	42.4	Minnesota	58.0
Arkansas	93.7	South Carolina	86.7	South Dakota	40.9	District of Columbia	42.4	New Jersey	57.6
Texas	93.4	Vermont	86.5	California	37.6	Washington	41.5	Maine	57.3
<b>States with lowest participation rates</b>									
New Mexico	84.1	Maryland	78.0	Indiana	17.7	Florida	19.5	Rhode Island	44.1
Hawaii	83.7	North Dakota	77.5	New York	17.3	Arkansas	19.4	Pennsylvania	43.8
Louisiana	83.6	Wisconsin	77.1	Rhode Island	17.1	Michigan	19.4	Florida	43.5
Rhode Island	82.9	New Jersey	76.3	Tennessee	17.1	Indiana	18.8	Hawaii	42.7
Nevada	81.6	Massachusetts	74.9	Arkansas	15.6	Connecticut	18.4	Mississippi	42.7
Maryland	79.6	Rhode Island	74.5	Kentucky	15.5	New Jersey	18.4	New Mexico	42.6
Massachusetts	78.5	Ohio	72.8	Louisiana	15.2	Alabama	17.7	Maryland	41.2
New York	78.3	Nevada	72.6	Texas	15.2	Texas	16.2	South Carolina	40.4
Indiana	76.2	New York	66.1	Georgia	14.2	Mississippi	15.2	Utah	38.9
Georgia	74.8	Pennsylvania	65.8	Mississippi	13.2	North Carolina	15.2	Georgia	36.2

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

extent to which participation reflects teachers' commitment to improving teaching practice, their responses to salary or other incentives, or their cooperation with district mandates.

While many believe that professional development should involve teachers on a consistent basis through interaction with their peers, the traditional formats for professional development that have been described in this section will not necessarily become obsolete. Time may not bring a decrease in these activities per se, but a shift in their structure, content, and duration. Participation in half-day workshops on prepackaged topics may decline, for example, while participation in workshops that are designed to further specific school goals and that are followed up with additional activities, discussion, and feedback might increase. It will be a data collection challenge to distinguish between the two types of workshops; to determine how many teachers participate in some of the newer types of staff development activities, such as collegial study groups or teacher collaboratives; and to identify what teachers do when they work together.

## **4. Content and Duration of Professional Development Activities**

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Much of the criticism leveled at the half-day workshop and other traditional types of professional development is that they fail in both content and duration to address new conceptions of teaching and learning and thus do not modify teachers' practices in any meaningful way. When done well, programs to improve teaching address content areas central to teachers' needs and are of sufficient duration to allow time for teachers to absorb new ideas and test them in their classrooms; get feedback from their peers, exemplary teachers, and others about how they are managing; and then practice some more (Little 1987, 1993).

This section starts with a discussion of the demands placed on today's classroom teachers by school reform efforts and the implications of these demands for the content and conditions of their professional development experiences. It then uses SASS data to describe teachers' participation in professional development in selected content areas and examines the duration of these professional development activities.

### **New Demands Placed on Teachers and Implications for Professional Development**

Today's work environment requires schools to prepare the vast majority of students to reach skill levels once needed only by those applying to selective colleges and universities. More than 10 years ago, the Carnegie Forum on Education and the Economy (1986) argued that the kind and quality of education that was previously reserved for a small elite is now required for all students if the nation is to remain competitive in the global economy. To meet this challenge, teachers must acquire a greater in-depth knowledge of the subject matter in their assignment field and teaching methods appropriate to that field than ever before (NCTAF 1996).

Teachers are being asked to change how they interact with students. The professional consensus about what constitutes exemplary practice has shifted from a model of "teaching as telling" to "teaching as coaching," with students actively involved in constructing knowledge. Most teachers have not been trained for this type of teaching, which has become known as "teaching for

understanding” (Cohen, McLaughlin, and Talbert 1993). Teaching in these new ways also requires a depth of understanding of the subject matter that not all teachers have. Accompanying new ways of teaching are new ways of assessing students’ progress, which teachers must also learn to use.

Teachers are also being asked to use new technologies that are often unfamiliar. In 1994, there was one computer available for instructional use for every nine students, and 35 percent of public schools had access to the Internet in the United States. In addition, 41 percent of teachers had a television in their classroom (and virtually all had one in their school) (U.S. Congress, Office of Technology Assessment 1995). Teachers are expected to use these and other technologies when they teach, but many received their teacher education before this technology was available for the classroom. The need for professional development in the use of technology is even greater today than it was at the time of the SASS survey, as the percentage of schools having access to the Internet has more than doubled since 1994. In 1997, 78 percent of public schools had access to the Internet, up from 65 percent in 1996, 50 percent in 1995, and 35 percent in 1994. Teachers will be expected to use this technology not only as a classroom tool, but also for other activities such as record keeping, communicating with parents, distance learning, professional development, and curriculum development (NCES 1998).

In addition, teachers increasingly are being asked to take on expanded roles and responsibilities outside the classroom, especially in schools where site-based management is being implemented (Mohrman and Wohlstetter 1994). Recommended principles of effective professional development call for increased integration of professional development activities with school improvement goals and more collegial interaction among teachers.

Finally, teachers are being asked to manage classrooms that rapidly are becoming more diverse culturally and linguistically. In 1993–94, 5 percent of all public school students were limited English proficient (LEP) (Henke et al. 1996); 46 percent of all public schools had at least some LEP students; and in five states, 75 percent or more of the schools had such students (U.S. Department of Education, NCES 1997a).<sup>15</sup> Overall, 42 percent of public school teachers had LEP students, although for 75 percent of teachers, LEP students made up less than 10 percent of their classes (Henke et al. 1997). Also in 1993–94, 32 percent of the nation’s students, but only 12 percent of the teachers, belonged to minority racial–ethnic groups (Henke et al. 1996). Thus, today’s teachers must understand how to reach students from many different backgrounds and from backgrounds different from their own.

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<sup>15</sup>The five states were Arizona, California, Hawaii, New Mexico, and Texas.

To meet the demands just outlined, teachers must continually update their knowledge and skills in the subject matter they teach and in teaching methods, including such reform-oriented strategies as inquiry-based instruction, use of manipulatives, cooperative learning, strategies for dealing with student diversity, and both standard and alternative forms of student assessment (Mullens et al. 1996). In addition, they must be prepared to use computers and other advanced technology in the classroom (Means 1994).

### **Participation Rates by Content Area**

In the 1993–94 SASS, teachers were asked if, since the end of the last school year, they had participated in any in-service or professional development programs that focused on the following topics: uses of educational technology for instruction (e.g., use of computers, satellite learning); methods of teaching in their subject field; in-depth study in their subject field; student assessment (e.g., methods of testing, evaluation, performance assessment); and cooperative learning in the classroom. If the answer was “yes,” teachers were then asked whether the program had lasted 8 hours or less, 9–32 hours, or more than 32 hours.

It is important to keep in mind that the participation rates described here cover only the period from the end of the last school year until teachers were surveyed during the 1993–94 school year. Consequently, they give no indication of the total amount of attention teachers have devoted to professional development on a particular topic in recent years or throughout their careers. Furthermore, there is no standard against which to compare single-year participation rates. For example, while it may be widely accepted that almost all teachers need training in using educational technology for instruction, it would be difficult to translate that belief into an expected or acceptable rate for a single school year. Nevertheless, as the importance of certain types of training are recognized and professional development programs are developed and implemented, one would expect participation rates to increase over time (although not indefinitely). In the next administration of SASS, it will be possible to monitor these types of changes.

In 1993–94, 63 percent of all teachers reported that they had participated in an in-service or professional development program on methods of teaching in their subject field since the end of the last school year (table 11). About half of all teachers had participated in programs on student assessment (50 percent) and cooperative learning (49 percent), and only slightly fewer (47 percent) had participated in programs on the use of educational technology for instruction. The least frequently undertaken programs focused on in-depth study in their subject field (29 percent).

**Table 11—Percentage of teachers who had participated in an in-service or professional development program that focused on various topics since the end of the last school year, by main assignment field: 1993–94**

	Uses of educational technology for instruction	Methods of teaching in their field	In-depth study in their subject	Student assessment	Cooperative learning in the classroom
<b>Total</b>	47.2	62.8	29.3	49.5	49.2
<b>Public</b>	49.4	64.0	30.0	51.4	50.9
Main assignment field					
K–general elementary	50.0	74.5	30.9	59.0	53.7
Math or science	58.8	57.1	26.2	48.6	52.2
English or language arts	47.8	64.0	30.6	54.0	51.5
Social studies	48.9	54.1	25.5	49.2	51.5
Special education	43.8	64.5	32.4	49.9	49.0
Bilingual or ESL	47.9	79.4	43.9	56.9	59.0
Vocational education	58.8	49.6	31.3	43.2	49.5
Other	42.3	55.6	29.2	41.5	44.8
<b>Private</b>	32.5	54.8	24.2	36.4	38.0
Main assignment field					
K–general elementary	28.5	63.4	22.7	39.7	42.3
Math or science	44.5	48.0	21.4	32.5	37.0
English or language arts	33.0	51.6	24.2	38.5	37.7
Social studies	31.4	52.9	25.1	40.2	36.1
Special education	34.8	61.3	30.1	45.4	38.5
Bilingual or ESL	—	—	—	—	—
Vocational education	38.9	26.8	11.7	35.3	32.3
Other	29.8	47.5	27.9	30.5	32.4

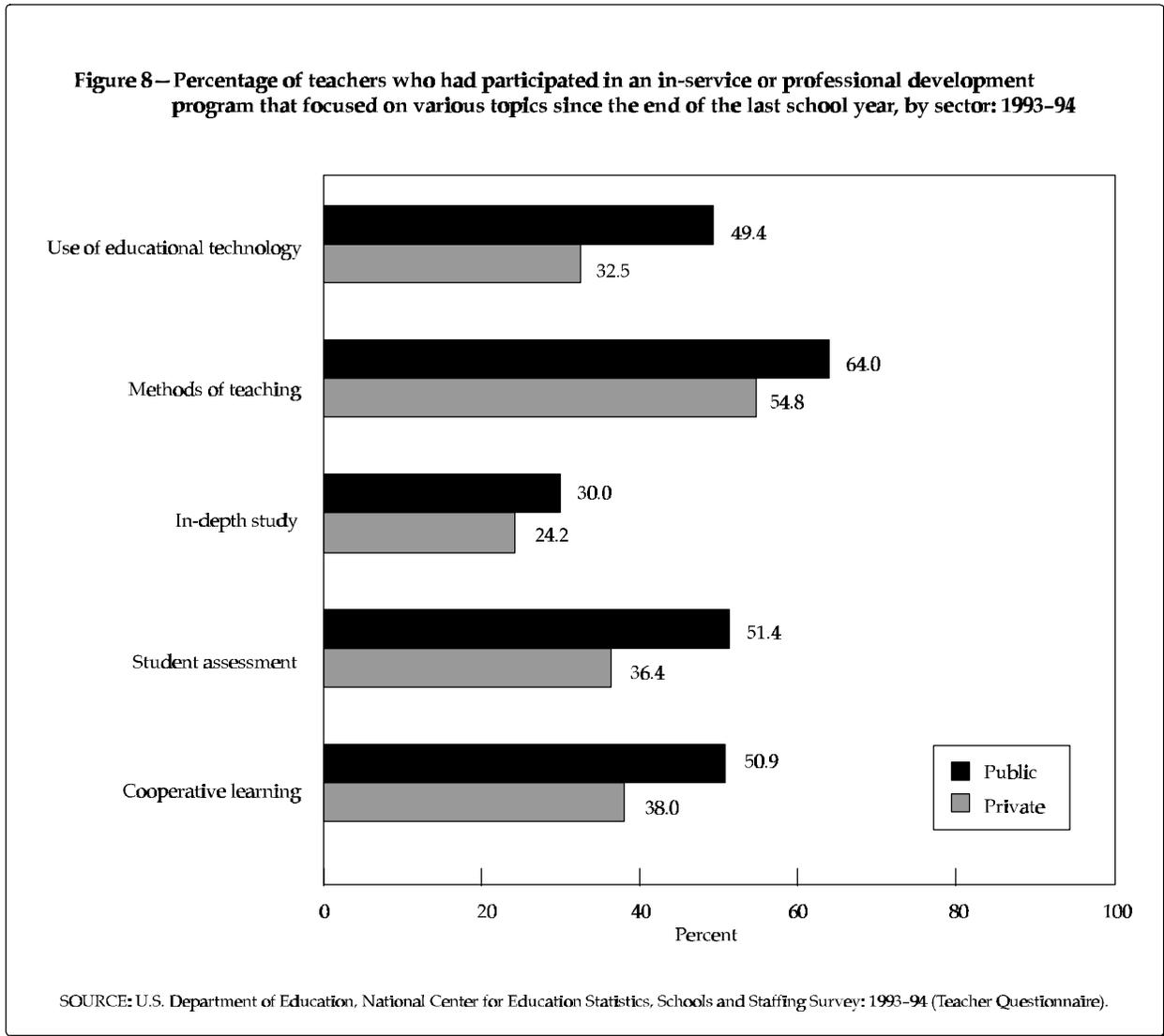
—Too few cases for a reliable estimate.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

Public school teachers were more likely than private school teachers to participate in professional development programs on each of these topics (figure 8).

### ***Factors Affecting Participation Rates***

As with the different formats for professional development activities (workshops, courses, and so on), not all teachers participated in professional development programs on these topics at



the same rate. Nor is this surprising. Rates of participation in professional development on particular topics reflect such factors as the need for help (as perceived by teachers themselves in the case of voluntary participation, and by those who choose the topics in the case of mandatory participation); the availability of resources; the priority given to professional development in specific content areas; the priority that schools and districts give to professional development generally; the extent to which training is voluntary or mandatory; and teachers' motivation to participate voluntarily.

For example, teachers in schools that have just adopted a new mathematics curriculum might need help implementing new instructional methods, while teachers in schools that have not

changed their curriculum would not have this particular need. Similarly, teachers in schools that have just purchased new computers and software probably would have a greater need for training in the use of technology than would teachers in schools without computers. Teachers in communities where student populations are more diverse are more likely than their colleagues in other communities to feel the need for training in working with students from backgrounds different from their own.

Some of the characteristics of schools and teachers that would be expected to affect participation can be measured with SASS data. For example, one would expect more experienced teachers would need more training in using technology for instruction or new forms of assessment than would their less experienced colleagues who had just completed their preservice professional education. However, measures of other important characteristics, such as those related to school and district fiscal resources, are not available in the SASS data.

Because many teacher and school characteristics are interrelated, a multivariate analysis of each of the five topic areas described above was conducted to identify the separate effects of various teacher and school characteristics. A logistic regression model was used to examine the teacher, school, and district factors related to whether teachers participated in professional development in each of five content areas: use of educational technology for instruction; methods of teaching in teachers' subject fields; in-depth study in their fields; student assessment; and cooperative learning in the classroom.

As in the rest of this report, data on public and private school teachers were analyzed separately because of the differing structures of professional development in public and private schools. The teacher and school characteristics controlled for in this analysis of professional development by content area were the same as those controlled for in the analysis of participation in the types of activities already described. The results of the logistic regression analyses can be found in appendix B (table B2). As was done previously, the odds ratios generated by the regression analyses were used to adjust the estimates of the participation rates for teachers in order to control for teacher and school characteristics (tables 12a and 12b). The differences discussed in the rest of this section refer to the adjusted differences. As before, some intermediate categories were combined or omitted, but footnotes point out instances where relationships shown in the appendix table are masked.

The rest of this section describes participation in each of the five content areas on which SASS collected data. This does not purport to be a comprehensive examination of the content of

**Table 12a—Adjusted and unadjusted percentages of public school teachers who had participated in an in-service or professional development program that focused on various topics since the end of the last school year and differences by selected teacher and school characteristics: 1993–94**

	Uses of educational technology for instruction	Methods of teaching in their field	In-depth study in their subject	Student assessment	Cooperative learning in the classroom
<b>Teacher characteristics</b>					
Elementary	48.0	71.4	31.7	55.4	51.6
Secondary	50.8	56.0	28.1	47.1	50.1
Unadjusted difference <sup>1</sup>	2.8**	-15.4**	-3.6**	-8.3**	-1.5*
Adjusted difference <sup>2</sup>	0.3	-8.4**	-4.2**	-1.7	1.1
Part-time	43.2	59.8	30.7	45.0	43.9
Full-time	50.0	64.4	29.9	52.0	51.5
Unadjusted difference <sup>1</sup>	6.8**	4.6**	-0.8	7.0**	7.6**
Adjusted difference <sup>2</sup>	2.5	0.3	-0.5	1.9	2.2
New (0–3 years)	43.2	66.0	28.9	52.9	50.7
Experienced (at least 10 years)	50.0	62.3	29.7	50.8	50.6
Unadjusted difference <sup>1</sup>	6.8**	-3.7**	0.8	-2.1*	-0.1
Adjusted difference <sup>2</sup>	6.3**	-2.7*	0.5	-1.8	1.5
Bachelor's degree/lower	48.3	65.2	29.0	51.4	51.7
Master's degree/higher	50.5	62.6	31.1	51.4	50.0
Unadjusted difference <sup>1</sup>	2.2**	-2.6	2.1	0.0	-1.7
Adjusted difference <sup>2</sup>	2.3**	-0.4	2.8**	1.6	-1.3
<b>School characteristics</b>					
Low minority enrollment (0%)	45.3	53.7	23.2	44.2	42.0
High minority enrollment (>50%)	48.3	68.8	33.5	54.8	56.8
Unadjusted difference <sup>1</sup>	3.0	15.1**	10.3**	10.6**	14.8**
Adjusted difference <sup>2</sup>	0.6	6.7**	6.0**	7.7**	10.4**
Small (<150)	45.1	54.9	27.3	47.0	42.4
Large (≥750)	51.3	61.6	30.0	48.9	51.8
Unadjusted difference <sup>1</sup>	6.2	6.7*	2.7	1.9	9.4**
Adjusted difference <sup>2</sup>	1.3	5.7*	-0.5	-1.1	4.3
Urban fringe	50.8	64.6	29.9	52.5	49.4
Central city	50.6	68.2	34.1	53.4	54.7
Unadjusted difference <sup>1</sup>	-0.2	3.6	4.2	0.9	5.3
Adjusted difference <sup>2</sup>	0.8	1.6	3.2**	0.3	3.0*
Urban fringe	50.8	64.6	29.9	52.5	49.4
Rural	47.4	60.6	27.2	49.2	49.4
Unadjusted difference <sup>1</sup>	-3.4**	-4.0**	-2.7**	-3.3**	0.0
Adjusted difference <sup>2</sup>	-2.3	-3.0**	-1.7	-3.4**	-0.3
Low poverty (0–5%)	56.4	61.8	30.3	53.0	49.1
High poverty (>40%)	46.3	67.4	31.5	53.2	54.1
Unadjusted difference <sup>1</sup>	-10.1**	5.6	1.2	0.2	5.0
Adjusted difference <sup>2</sup>	-11.3**	-2.8	-2.5	-4.8**	-1.7

\*P ≤ .05; \*\* P ≤ .01.

<sup>1</sup>Difference was between the two compared subgroups of teachers (e.g., secondary versus elementary).<sup>2</sup>Difference was adjusted by teacher and school characteristics (except for the corresponding characteristics being tested).

Teacher characteristics included teacher level, main assignment field, employment status, teaching experience, and highest degree earned. School characteristics included size, percentage of minority enrollment, percentage of free/reduced-price lunch recipients, region, community type, district size, principal's education, and principal's experience.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher and School Questionnaires).

**Table 12b—Adjusted and unadjusted percentages of private school teachers who had participated in an in-service or professional development program that focused on various topics since the end of the last school year and differences by selected teacher and school characteristics: 1993–94**

	Uses of educational technology for instruction	Methods of teaching in their field	In-depth study in their subject	Student assessment	Cooperative learning in the classroom
<b>Teacher characteristics</b>					
Elementary	29.5	60.3	23.9	37.4	40.3
Secondary	36.5	47.3	24.6	35.1	34.8
Unadjusted difference <sup>1</sup>	7.0*	-13.0**	0.7	-2.3	-5.5
Adjusted difference <sup>2</sup>	-0.5	-10.0**	-1.5	-1.4	-5.9**
Part-time	24.8	43.0	23.3	26.6	26.5
Full-time	34.3	57.8	24.4	38.8	40.8
Unadjusted difference <sup>1</sup>	9.5**	14.8**	1.1	12.2**	14.3**
Adjusted difference <sup>2</sup>	9.0**	10.6**	2.0	8.6**	11.8**
New (0–3 years)	23.8	52.5	21.0	33.8	32.7
Experienced (at least 10 years)	36.3	54.8	25.9	38.5	40.2
Unadjusted difference <sup>1</sup>	12.5**	2.3	4.9*	4.7*	7.5**
Adjusted difference <sup>2</sup>	10.7**	1.0	3.6	3.4	6.8**
Bachelor's degree/lower	30.6	55.7	22.7	36.1	37.8
Master's degree/higher	36.1	53.1	26.9	37.0	38.3
Unadjusted difference <sup>1</sup>	5.5*	-2.6	4.2*	0.9	0.5
Adjusted difference <sup>2</sup>	0.8	0.1	2.6*	0.1	0.6
<b>School characteristics</b>					
Low minority enrollment (0%)	22.4	45.8	20.5	29.2	31.6
High minority enrollment (>50%)	32.3	58.0	25.2	41.5	44.7
Unadjusted difference <sup>1</sup>	9.9**	12.2**	4.7	12.3**	13.1**
Adjusted difference <sup>2</sup>	5.5	3.8	0.4	7.5	5.3
Small (<150)	24.3	48.6	19.6	30.7	31.6
Large (≥750)	41.2	54.3	25.0	38.1	39.8
Unadjusted difference <sup>1</sup>	16.9**	5.7	5.4	7.4	8.2**
Adjusted difference <sup>2</sup>	7.2**	8.4**	3.2	6.3*	3.7
Urban fringe	33.9	55.7	24.8	35.5	37.7
Inner city	34.1	57.2	25.5	38.8	40.7
Unadjusted difference <sup>1</sup>	0.2	1.5	0.7	3.3	3.0
Adjusted difference <sup>2</sup>	0.5	1.3	0.8	3.4	3.1
Urban fringe	33.9	55.7	24.8	35.5	37.7
Rural	26.4	47.7	19.9	33.0	32.6
Unadjusted difference <sup>1</sup>	-7.5**	-8.0**	-4.9**	-2.5	-5.1**
Adjusted difference <sup>2</sup>	-3.0	-4.7*	-1.7	1.5	-1.9
Nonsectarian	37.9	51.9	27.9	38.3	35.7
Catholic	36.6	59.6	25.5	40.9	45.5
Unadjusted difference <sup>1</sup>	-1.3	7.7**	-2.4	2.6	9.8**
Adjusted difference <sup>2</sup>	-2.6	6.2**	-2.4	1.3	8.4**
Nonsectarian	37.9	51.9	27.9	38.3	35.7
Other religious	24.7	51.4	20.4	30.4	31.3
Unadjusted difference <sup>1</sup>	-13.2**	-0.5	-7.5*	-7.9**	-4.4*
Adjusted difference <sup>2</sup>	-10.3**	-0.4	-6.2**	-6.7**	-3.9

\*P ≤ .05; \*\* P ≤ .01.

<sup>1</sup>Difference was between the two compared subgroups of teachers (e.g., teachers in large schools versus teachers in small schools).<sup>2</sup>Difference was adjusted by teacher and school characteristics (except for the corresponding characteristics being tested). Teacher characteristics included teacher level, main assignment field, employment status, teaching experience, and highest degree earned. School characteristics included size, percentage of minority enrollment, region, community type, school affiliation, principal's education, and principal's experience.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher and School Questionnaires).

teacher professional development, because teachers could have participated in professional development on many other topics in 1993–94. However, participation in professional development in these particular topics provides an indication of the extent to which teachers are developing skills that appear to be demanded by the new directions school reform is taking.

### ***Use of Educational Technology for Instruction***

The federal government is strongly supporting professional development in the use of technology for instruction. The Goals 2000: Educate America Act of 1994 requires states to address the use of technology in their state plans and authorizes grants to states to increase the use of educational technologies for student learning and staff development.<sup>16</sup> Several other programs to support technology-related teacher training are being funded by the Department of Education, the National Science Foundation, and the Department of Commerce.

States also have encouraged training in the use of new technologies such as computers, networks, integrated learning systems, interactive videos, videotapes, modems, CD-ROMs, and satellite dishes. A national study of state education agencies in 1993 found that 43 states provided technical assistance to districts or schools in the use of these technologies, and 40 states provided training in their use (Levine 1996).

In at least one area—advanced telecommunications—the use of technology in the schools is increasing rapidly. In 1996, 65 percent of all public schools had Internet access, up from 35 percent in 1994, and an additional 30 percent planned to have it by 2000 (Heaviside, Riggins, and Farris 1997). Thirteen percent of public schools reported that training for teachers was mandated (by the school, district, or a certification agency), and another 31 percent provided incentives to encourage teachers to obtain training in the use of advanced telecommunications.

A 1995 study by the Office of Technology Assessment (OTA) on the use of computers in schools found that most teachers felt inadequately trained to use technology effectively in teaching. Although teachers were using computers for basic tasks such as word processing much more often than in the past, they were having difficulty integrating technology into the curriculum (U.S. Congress, OTA 1995). Thus, one might expect districts and schools to make training in the use of technology for instruction a priority and teachers to be highly motivated to seek such training.

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<sup>16</sup>It is premature for the effects of this legislation to be evident in the SASS:1993–94 data analyzed for this report.

As indicated above, 47 percent of all teachers in 1993–94 had participated in training in the use of educational technology in instruction since the end of the last school year (table 11). In both public and private schools, more experienced teachers (those with at least 10 years of experience) were more likely than new teachers (those in their first 3 years of teaching) to have participated in an in-service or professional development program on the use of educational technology in instruction (tables 12a and 12b).<sup>17</sup> More experienced teachers are likely to be older than new teachers and, therefore, are less likely to have learned computer skills while in college.

In addition to experience, public school teachers' participation was associated with their level of formal education, and private school teachers' participation was associated with their employment status. Public school teachers with advanced degrees were slightly more likely than their colleagues without advanced degrees to have participated in training on the use of technology in instruction. Among private school teachers, full-time teachers were more likely than part-time teachers to have undertaken formal professional development on the use of technology for instruction.

Among public school teachers, participation was lower in schools with a large number of low-income students, but none of the other school characteristics presented in table 12a were related to teachers' participation.<sup>18</sup> Among private school teachers, the participation rate was lower in small schools than in large schools and in other (i.e., non-Catholic) religious schools than in nonsectarian schools. In both public and private schools, these differences may reflect variations in the availability of resources for advanced technology and training in its use.

In most states, participation rates ranged between about 40 and 60 percent (figure 9 and table 13).<sup>19</sup> In some of those states where the participation rates were considerably higher, there has been recent specific action to expand this type of training. In Kentucky, for example, the state has made a significant investment to prepare teachers and administrators to use the Kentucky Educational Technology System (KETS) and has received federal funds from several programs to help support this type of professional development. In Alaska, the state has addressed the challenge of educating children in remote rural areas by developing interactive telecommunication formats (CPRE 1997).

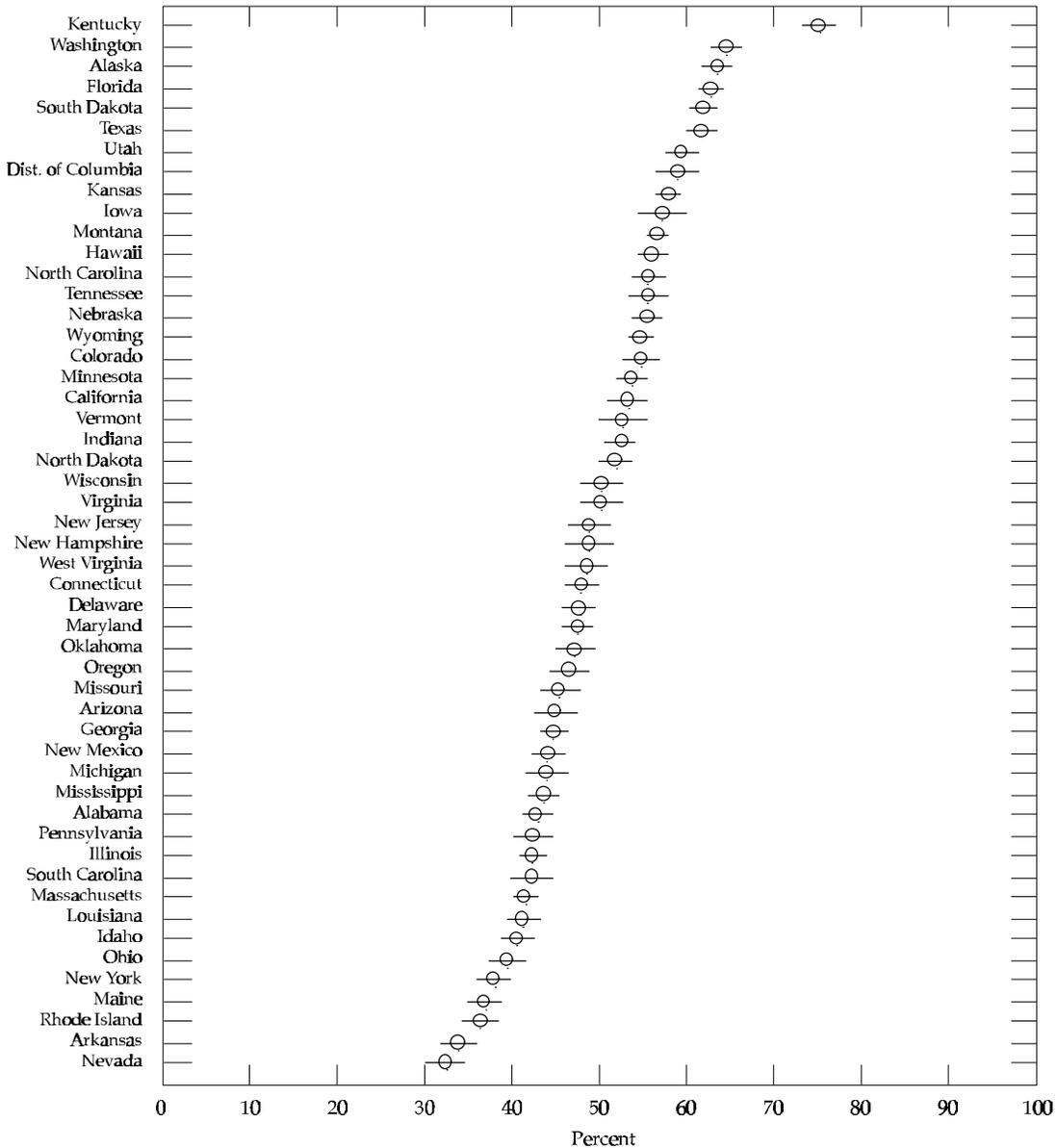
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<sup>17</sup>Table B2 presents regression results showing that new teachers were less likely than those at all other experience levels to have participated in this type of professional development.

<sup>18</sup>Table B-2 presents regression results indicating that teachers in schools with 6 to 20 percent and 21 to 40 percent low-income students were less likely than teachers in schools with 5 percent or less low-income students to have participated in professional development programs on using educational technology.

<sup>19</sup>The regression results in table B-2 show that teachers in the South were more likely than those in other regions to have participated in training in the uses of educational technology for instruction.

**Figure 9—Percentage of public school teachers who had participated in an in-service or professional development program that focused on uses of educational technology for instruction since the end of the last school year, by state: 1993-94**



NOTE: The circles denote the mean percentages for the states. The horizontal lines through the circles denote the 95 percent confidence intervals for the means.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993-94 (Teacher Questionnaire).

#### 4. Content and Duration of Professional Development Activities

**Table 13—Percentage of teachers who had participated in an in-service or professional development program that focused on various topics since the end of the last school year, by state: 1993–94**

	Uses of educational technology for instruction	Methods of teaching in their field	In-depth study in their subject	Student assessment	Cooperative learning in the classroom
Total	49.4	64.0	30.0	51.4	50.9
Alabama	42.6	70.0	33.1	51.4	50.9
Alaska	63.3	64.0	36.4	49.5	42.3
Arizona	44.8	55.5	27.0	51.9	41.2
Arkansas	33.7	67.5	27.7	46.6	48.0
California	53.0	77.2	39.1	68.3	53.3
Colorado	54.5	58.3	32.4	57.3	39.2
Connecticut	47.7	71.7	39.3	62.1	52.2
Delaware	47.4	64.3	29.8	57.6	47.0
District of Columbia	58.8	67.6	37.8	52.2	67.9
Florida	62.6	67.2	30.7	46.2	53.6
Georgia	44.6	59.8	25.1	36.4	48.5
Hawaii	55.8	68.0	39.8	53.3	62.1
Idaho	40.4	60.6	28.4	39.8	43.0
Illinois	42.1	53.2	23.2	56.6	42.8
Indiana	52.2	55.6	22.5	38.5	45.8
Iowa	57.0	57.2	27.8	55.6	42.3
Kansas	57.7	62.7	29.0	53.6	48.1
Kentucky	75.0	75.3	36.9	87.3	73.1
Louisiana	41.0	68.1	29.1	46.8	51.0
Maine	36.6	57.5	28.7	47.9	50.5
Maryland	47.2	64.4	23.2	53.5	58.6
Massachusetts	41.3	61.2	30.7	43.7	53.7
Michigan	43.7	61.4	25.4	51.2	47.9
Minnesota	53.5	63.4	32.4	49.9	43.8
Mississippi	43.4	65.9	30.5	68.1	64.5
Missouri	45.2	55.9	23.9	42.5	43.8
Montana	56.4	60.4	28.3	43.7	45.5
Nebraska	55.3	55.6	23.6	47.0	41.4
Nevada	32.1	65.7	33.0	39.4	44.1
New Hampshire	48.6	71.5	46.2	52.0	57.9
New Jersey	48.6	65.9	27.0	49.3	49.9
New Mexico	43.9	55.4	24.4	44.3	52.3
New York	37.7	56.4	24.3	41.9	44.8
North Carolina	55.4	70.6	31.6	58.3	56.7
North Dakota	51.6	57.3	28.8	35.5	38.8
Ohio	39.2	59.8	28.9	44.7	48.4
Oklahoma	47.0	65.2	28.5	53.8	58.6
Oregon	46.4	62.9	29.6	54.7	38.3
Pennsylvania	42.2	56.0	24.3	49.1	50.5
Rhode Island	36.2	57.5	22.0	46.8	49.2
South Carolina	42.0	61.5	26.0	45.2	53.9
South Dakota	61.6	55.5	26.6	44.3	47.3
Tennessee	55.3	66.3	24.7	49.3	49.1
Texas	61.5	75.0	39.5	56.7	66.3
Utah	59.1	66.4	34.9	42.1	50.7
Vermont	52.4	61.2	33.7	49.0	36.4
Virginia	50.0	62.4	28.6	47.0	53.0
Washington	64.3	61.8	35.8	49.3	45.7
West Virginia	48.3	66.0	28.9	53.9	57.1
Wisconsin	50.0	57.6	29.3	45.6	35.8
Wyoming	54.5	52.2	29.7	45.6	42.2

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

### ***Methods of Teaching in Their Field***

In the 1980s, education researchers began studying “pedagogical content knowledge” and its relationship to the quality of instruction (Grossman 1989; Gudmundsdottir and Shulman 1987). These researchers found that expert teachers, in addition to their knowledge of the subject matter itself, have distinct knowledge about teaching in each subject, including the kinds of misunderstandings students often develop at each stage of the learning process and the kinds of teaching techniques that help students address those misunderstandings.

Some of the school reform efforts that began in the 1980s require teachers to reconsider their approaches to teaching. In each of the core academic subjects, and others as well, new state curriculum frameworks, textbooks, and testing procedures have pressed teachers on many fronts (Little 1993). Surveys conducted in 1980 and 1993 showed that almost half of the states (24 in all) changed their high school curricular policies during this period, taking actions such as developing curricular frameworks, specifying learning outcomes, and developing course specifications (Levine 1996). The SASS data should reflect assistance provided to teachers to meet these demands, and they do.

In 1993–94, almost two-thirds (63 percent) of all teachers had participated in professional development programs on methods of teaching in their field since the end of the previous school year, more than in any of the other content areas of professional development discussed here (table 11). However, because of the general way in which the question was asked in SASS, there is no way to determine the extent to which the methods teachers heard about in these programs were related to new approaches to teaching being advocated.

Elementary school teachers in both sectors were more likely than secondary school teachers to participate in programs on methods of teaching in their subject fields (tables 12a and 12b). New public school teachers were slightly more likely than their colleagues with 10 or more years of experience to participate in these types of programs.<sup>20</sup> Among private school teachers, experience was not a factor, but employment status was, with full-time teachers considerably more likely than part-time teachers to participate.

In the public sector, teachers in schools with high-minority enrollments were more likely than those in schools with low-minority enrollments to participate in professional development programs on methods of teaching in their field. It is possible that teachers in schools with

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<sup>20</sup>However, they were less likely than teachers with 4–9 years of experience to do so, according to the regression results in table B2.

high-minority enrollments might perceive a greater need for such assistance. However, figure 10 suggests an alternative or additional explanation. It shows that the participation rates in California and Texas, two large states with relatively high minority enrollments,<sup>21</sup> are among those of the top five states. These two states have a large enough number of teachers to affect the national average. Thus, it seems possible that state differences rather than minority enrollment may account for the differential rates. California, for example, has been particularly active since the mid-1980s in developing curriculum frameworks to guide instructional activities at the local level (CPRE 1997), and these frameworks are likely to lead to professional development in this area. Overall, however, participation in professional development on subject-specific teaching methods varied little by state.

Among both public and private school teachers, the size of their schools and type of community in which they were located were related to their professional development activities on subject-specific teaching methods. Teachers in small schools and schools in rural areas were less likely than their colleagues in large schools and schools in urban fringe communities, respectively, to engage in a professional development program on methods of teaching in their subject area. Finally, among private school teachers, those in Catholic schools were more likely than those in nonsectarian schools to participate in these programs.

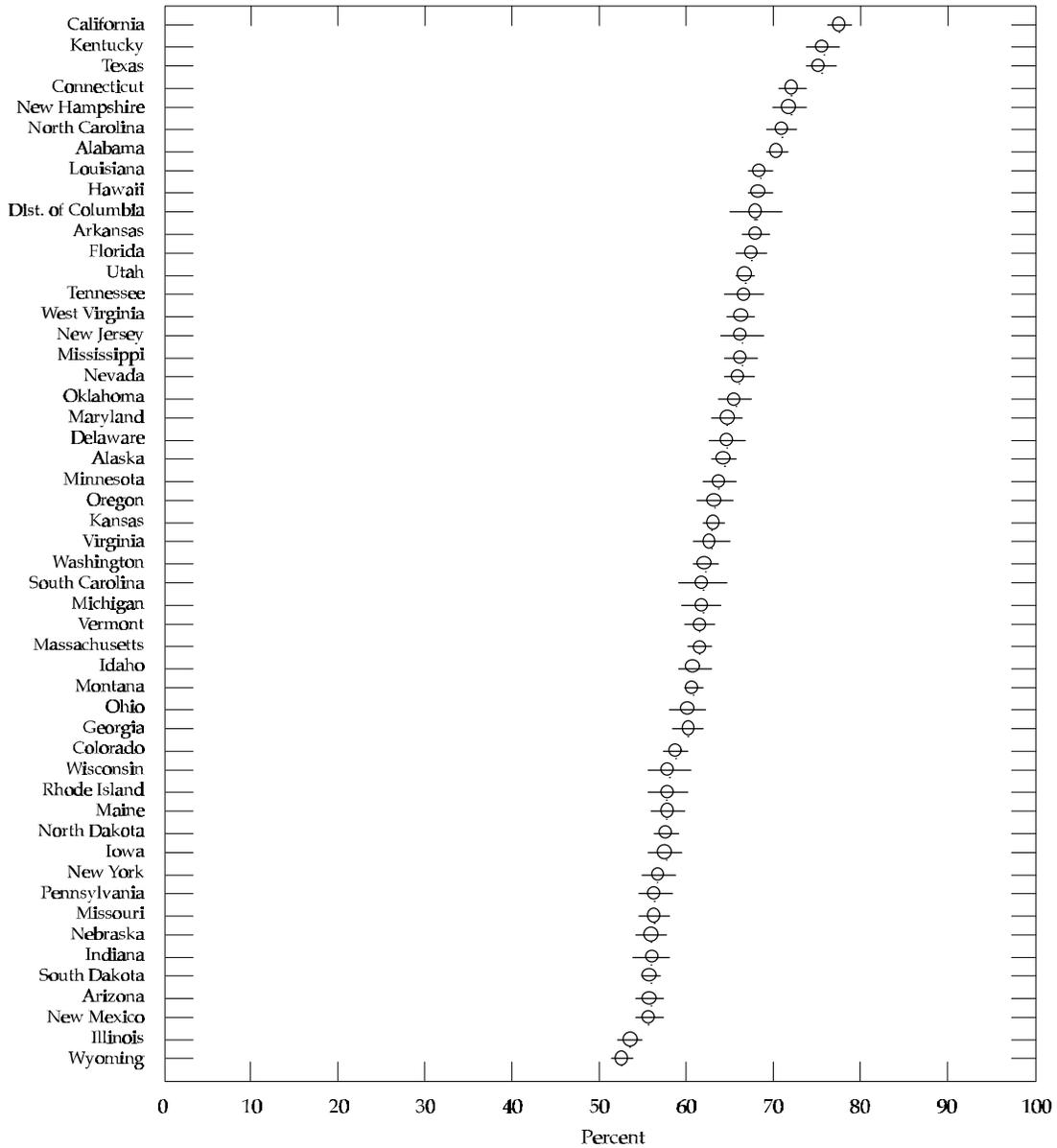
### ***In-Depth Study in Subject Area***

In addition to their subject-specific pedagogical expertise, contemporary educators and education researchers emphasize that teachers must have a thorough grounding in the subjects they teach. Those who know their subjects well, it is argued, are better able to respond to students' questions and comments: because they know the terrain well, they can be effective guides for their students (NCTAF 1996). Professional development of this sort is often voluntary, taking the form of college or adult education courses, and therefore may be more subject to individual teachers' motivation (for which we have no measure) than to the teacher and school characteristics measured by SASS. In the public sector, elementary school teachers were slightly more likely than secondary school teachers to undertake this type of professional development, and in both sectors, teachers with advanced degrees were slightly more likely than teachers with less formal education to do so (tables 12a and 12b).

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<sup>21</sup>Overall, 33 percent of the nation's 41.6 million public school students were nonwhite; in California (with 4.8 million students), 54 percent were nonwhite; and in Texas (with 3.3 million students), 49 percent were nonwhite (Henke et al. 1996).

**Figure 10—Percentage of public school teachers who had participated in an in-service or professional development program that focused on methods of teaching in their subject field since the end of the last school year, by state: 1993-94**



NOTE: The circles denote the mean percentages for the states. The horizontal lines through the circles denote the 95 percent confidence intervals for the means.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993-94 (Teacher Questionnaire).

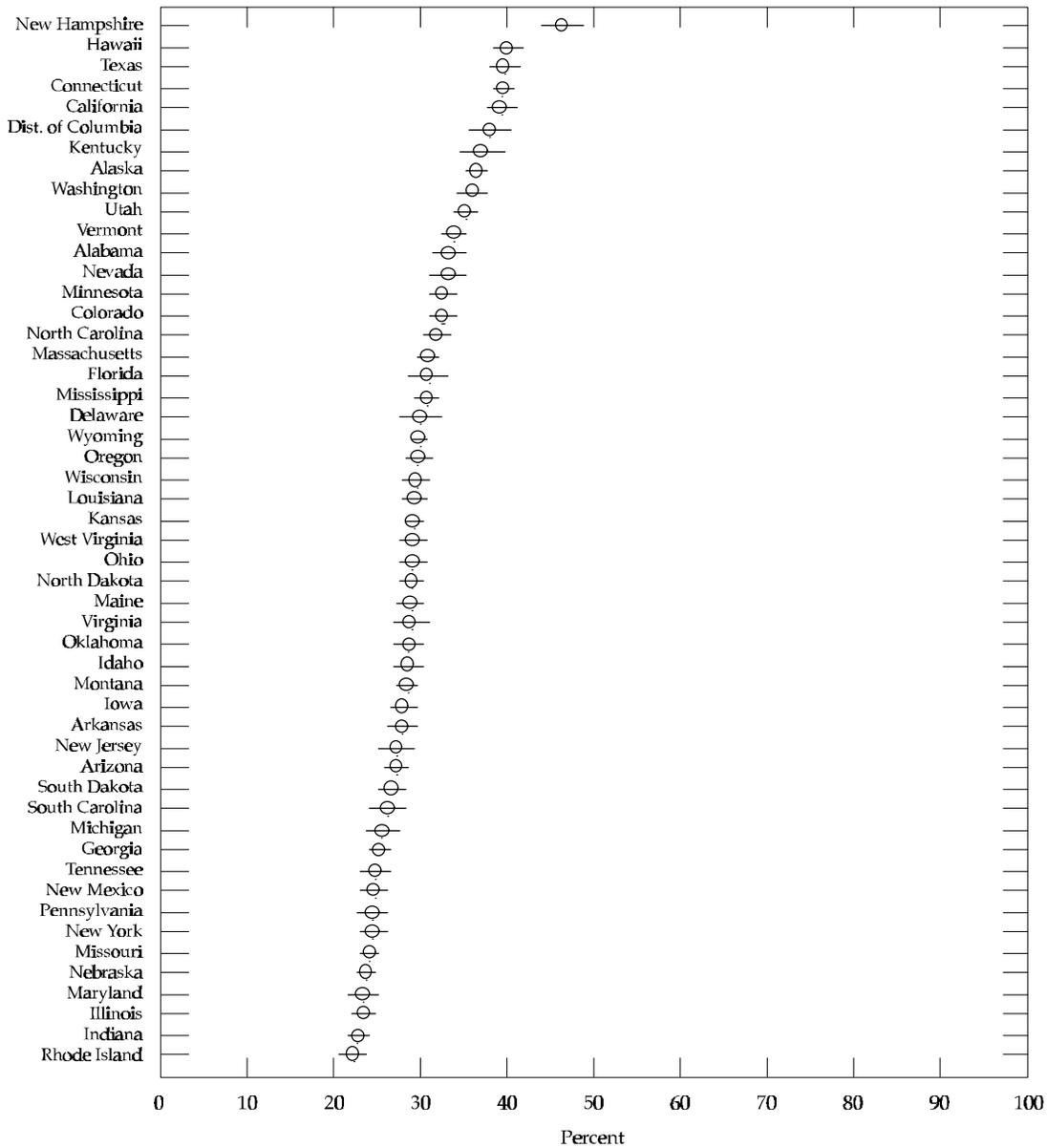
In public schools, teachers in central cities and high-minority enrollment schools were more likely than their colleagues in urban fringe communities and schools with no minority enrollment to undertake in-depth study in their subject area. The reasons for the relationship between minority enrollment and participation in professional development programs on subject matter may be similar to those suggested above regarding professional development on subject-specific teaching methods, as California and Texas again appeared to be among the states with the highest participation rates (figure 11). As with professional development in subject-specific teaching methods, there was little variation by state. In private schools, teachers in nonsectarian schools were more likely to participate in in-depth study in their areas than were teachers in “other” religious schools.

### ***Student Assessment***

New methods of student assessment are among the innovations that have been widely advocated as appropriate to contemporary school reform goals. New approaches to student assessment put less emphasis on multiple-choice and short-answer tests to evaluate student progress, and more emphasis on methods that involve including extended-response questions on tests and preparing portfolios of students’ work in order to evaluate their development of higher order skills. Beyond innovations in student assessment, some researchers have found that many teachers misuse or use ineffectively traditional forms of assessment (Brookhart 1993; Stiggins and Conklin 1992). Some believe that inadequate preservice education in this important aspect of teaching is responsible, while others find that teachers feel profound conflicts between the science and ethics of student assessment. Whatever the cause, these researchers argue that teachers need high-quality professional development in both traditional and innovative forms of assessment.

In 1993–94, one-half of all teachers had participated in professional development programs on student assessment since the end of the last school year (table 11). In the public sector, teachers’ participation was not related to the teacher characteristics examined, but was related to several characteristics of their schools and students (table 12a). Public school teachers in urban fringe schools where there was high minority enrollment, urban-fringe schools, and high-poverty schools were more likely than their colleagues in schools where there was no minority enrollment, rural schools, and low-poverty schools, respectively, to participate in professional development programs on student assessment.

**Figure 11 – Percentage of public school teachers who had participated in an in-service or professional development program that focused on in-depth study in their field since the end of the last school year, by state: 1993-94**



NOTE: The circles denote the mean percentages for the states. The horizontal lines through the circles denote the 95 percent confidence intervals for the means.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993-94 (Teacher Questionnaire).

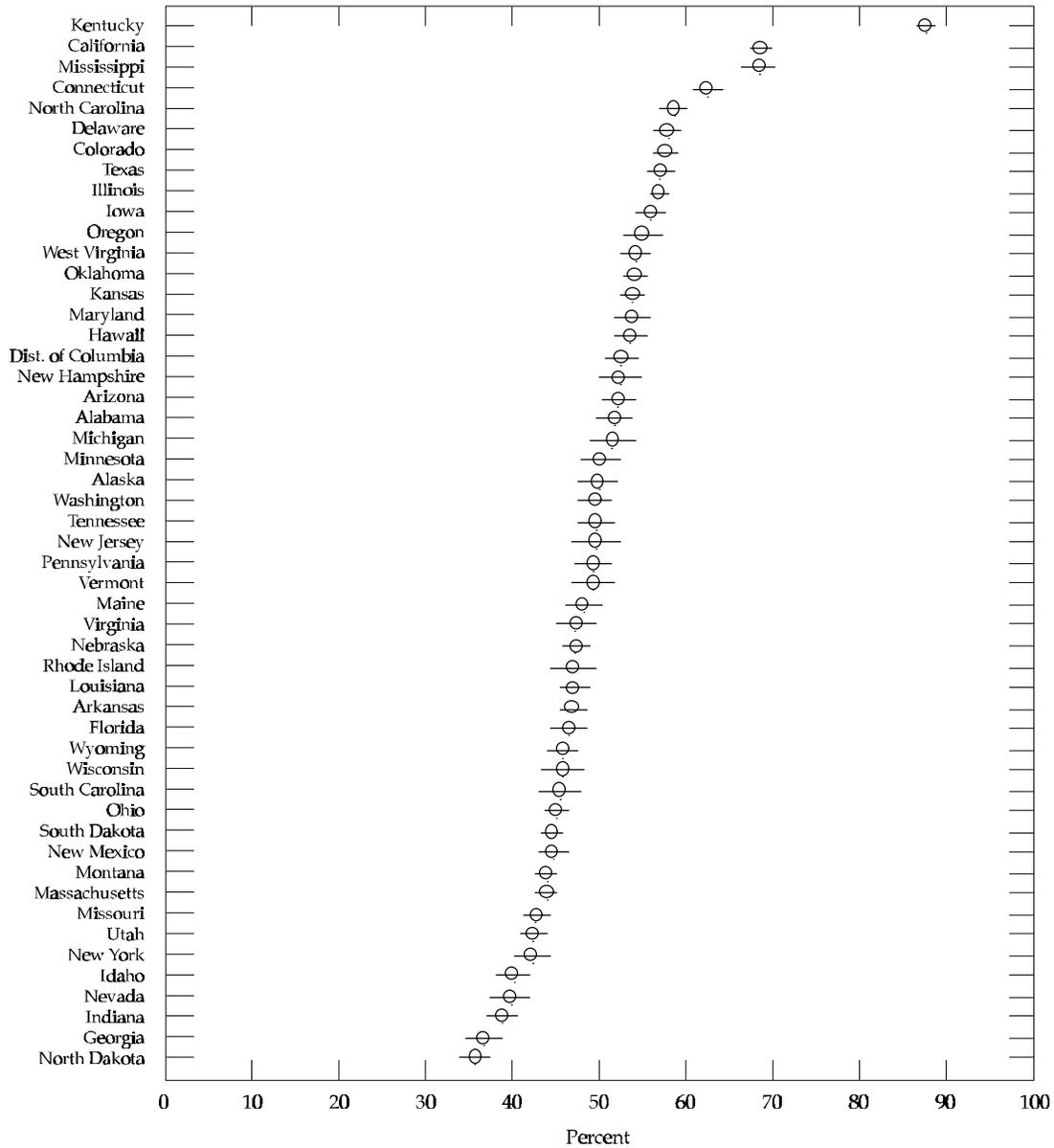
In 1993, many states were developing alternative assessment procedures: 35 states had developed or were developing alternative state assessments in writing, 29 were doing so in mathematics, 25 in reading, and 23 in science (Levine 1996). The SASS data indicate that the rates of participation in professional development programs on student assessment were particularly high in four states: Kentucky (87 percent), California (68 percent), Mississippi (68 percent), and Connecticut (62 percent) (figure 12). In three of these states—Kentucky, California, and Mississippi—the state education agencies were developing or implementing new student assessment initiatives, and these may account for at least some teachers' participation in professional development on assessment in these states (CPRE 1997).

### ***Cooperative Learning***

Cooperative learning, which is frequently advocated as a way of helping students learn higher order thinking skills, involves students working together in groups to solve a problem or produce a product. By engaging in cooperative learning, students are expected to help each other learn rather than compete with each other for grades or work in isolation (Covington 1992). Research suggests that cooperative learning activities can support motivation to learn, particularly among low-achieving students, and can improve social relations among children of different racial, ethnic, or cultural backgrounds (Cohen 1994; Johnson and Johnson 1994; Slavin 1996). In addition, these learning activities may help students build the social skills necessary to work effectively on a team—skills that employers find valuable (Murnane and Levy 1996).

As with professional development programs on assessment, in the public sector, none of the teacher characteristics examined was related to participation in professional development on cooperative learning once other teacher and school characteristics were taken into account (table 12a). However, public school teachers in central cities were more likely than their colleagues in urban fringe communities or large towns to learn about cooperative learning through formal professional development programs. In the private sector, elementary, full-time, and experienced teachers were more likely than secondary, part-time, and new teachers, respectively, to learn about cooperative learning through professional development programs (table 12b). In addition, teachers in Catholic schools were more likely than teachers in nonsectarian private schools to attend programs on cooperative learning.

**Figure 12—Percentage of public school teachers who had participated in an in-service or professional development program that focused on student assessment since the end of the last school year, by state: 1993–94**



NOTE: The circles denote the mean percentages for the states. The horizontal lines through the circles denote the 95 percent confidence intervals for the means.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

Teachers in four states and the District of Columbia were especially likely to participate in professional development on cooperative learning (figure 13). These states are Kentucky (73 percent), Texas (66 percent), Mississippi (65 percent), and Hawaii (62 percent). Sixty-eight percent of teachers in the District of Columbia participated. In Kentucky, Mississippi, and Texas, the activity appears to be related to recent large-scale state-level initiatives to improve schools generally or professional development specifically (CPRE 1997).

### **Duration of Programs**

Teachers who participated in professional development programs on each of the topics just discussed were asked how long the program had lasted: 8 hours or less; 9–32 hours; or more than 32 hours. Participation in professional development programs lasting more than 1 day was relatively rare, and programs lasting more than 32 hours, very rare (figure 14 and table 14). Thus, at least in 1993–94, most professional development activities followed the traditional format of a program that lasted one day or less. It should be pointed out, however, that the data do not indicate how many programs an individual teacher participated in, so the cumulative hours spent on a topic over the course of a year might be greater than those indicated here. In addition, some of these short-term programs may have had follow-up activities that are not captured in this report.

### **Conclusion**

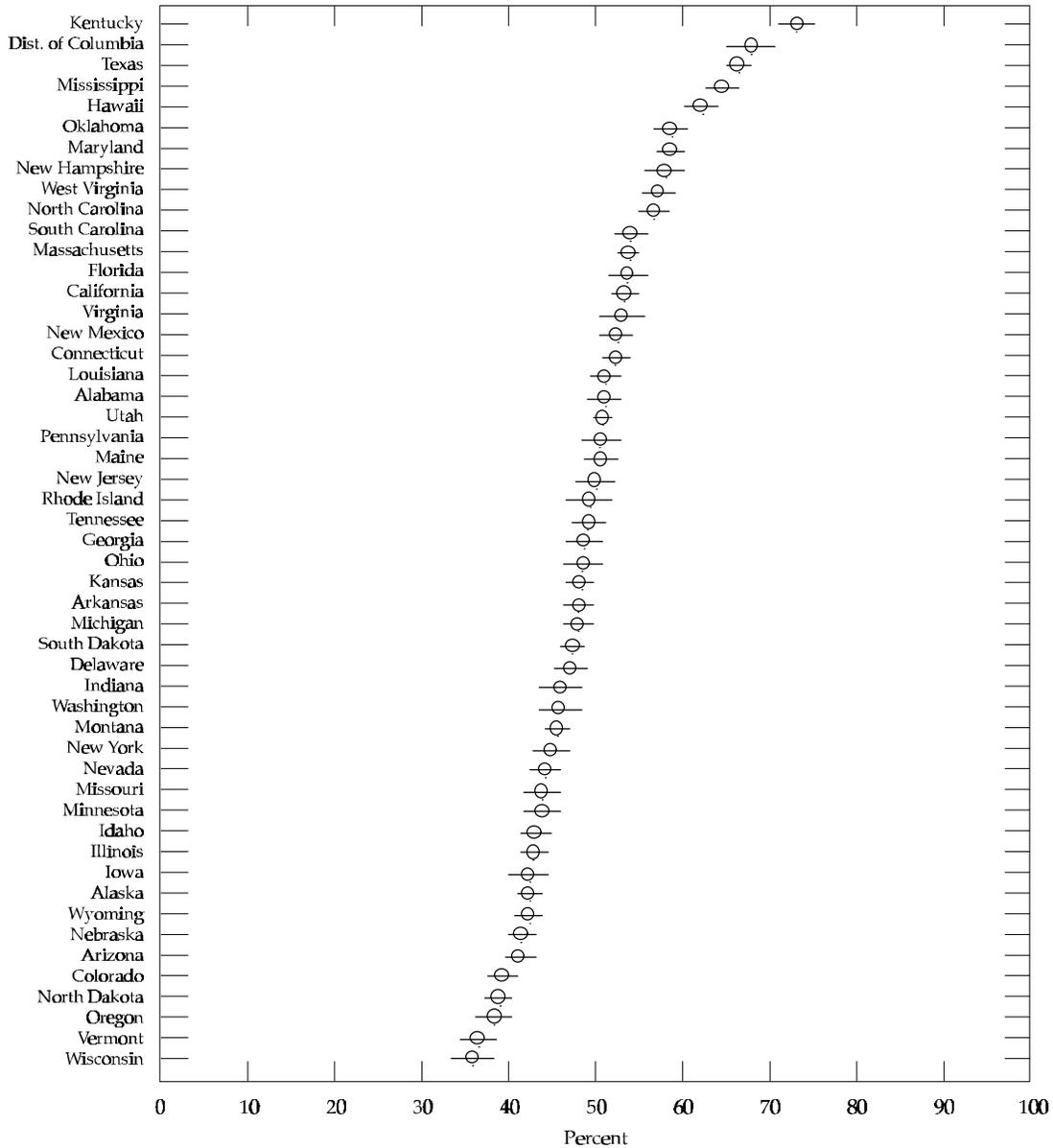
Approximately one-half of all teachers had participated in at least one professional development program since the end of the last school year on three topics associated with recent reform efforts: uses of educational technology for instruction, student assessment, and cooperative learning in the classroom. In addition, almost two-thirds had participated in professional development programs on methods of teaching in their fields. Teachers' assessments of the impact of the professional development programs in which they had participated since the end of the last school year are discussed in section 6 of this report.

The extent to which these programs have some of the characteristics of high-quality professional development as described by the U.S. Department of Education and others is unknown. The SASS data indicate that most programs still last a day or less, which is not consistent with calls to create professional development programs that last longer. However, the kinds of follow-up activities (if any) that are associated with these short programs are unknown. A final point to keep in mind is that the range of activities considered as professional development has expanded in recent years to include not only participation in formal programs, but also less formal activities

such as networking with other teachers, using the Internet, conducting research, and participating in mentoring programs. Thus, the data reported here may understate the amount of effort that teachers are devoting to developing their knowledge and teaching skills in these topical areas.

4. Content and Duration of Professional Development Activities

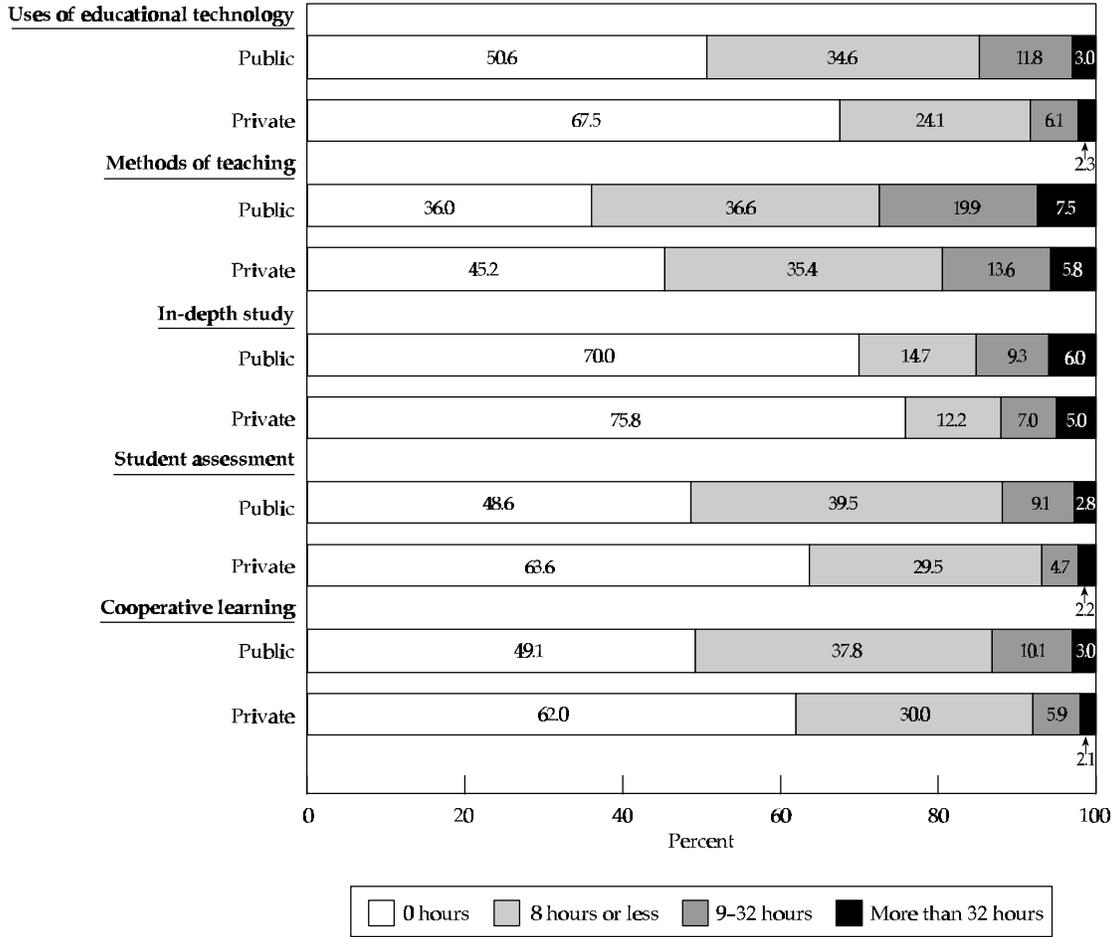
**Figure 13 – Percentage of public school teachers who had participated in an in-service or professional development program that focused on cooperative learning in the classroom since the end of the last school year, by state: 1993-94**



NOTE: The circles denote the mean percentages for the states. The horizontal lines through the circles denote the 95 percent confidence intervals for the means.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993-94 (Teacher Questionnaire).

**Figure 14— Percentage distribution of teachers according to the amount of time spent in various types of in-service or professional development programs, by topic and sector; 1993-94**



SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993-94 (Teacher Questionnaire).

#### 4. Content and Duration of Professional Development Activities

**Table 14a—Percentage distribution of public school teachers according to the number of hours spent in in-service or professional development programs on certain topics since the end of the last school year, by state: 1993–94**

	Use of technology				Methods of teaching				In-depth study			
	0	8	9–32	> 32	0	8	9–32	> 32	0	8	9–32	> 32
	hours	hours	hours	hours	hours	hours	hours	hours	hours	hours	hours	hours
Total	50.6	34.6	11.8	3.0	36.0	36.6	19.9	7.5	70.0	14.7	9.3	6.0
Alabama	57.4	31.0	9.4	2.1	30.0	46.2	17.5	6.3	66.9	18.4	8.9	5.8
Alaska	36.7	42.4	16.7	4.2	36.0	31.1	22.8	10.1	63.6	16.4	11.2	8.8
Arizona	55.2	31.7	10.9	2.2	44.5	32.1	15.4	8.0	73.0	13.5	8.1	5.5
Arkansas	66.3	24.1	8.2	1.3	32.5	37.2	23.4	7.0	72.3	14.4	8.9	4.4
California	47.0	37.7	11.1	4.2	22.8	36.6	25.7	14.9	60.9	14.9	13.2	11.0
Colorado	45.5	34.4	16.6	3.4	41.7	28.7	22.7	6.9	67.6	14.1	11.5	6.9
Connecticut	52.3	32.4	13.3	1.9	28.3	44.8	22.3	4.6	60.7	21.9	11.1	6.2
Delaware	52.6	37.2	7.9	2.3	35.7	40.8	18.8	4.7	70.2	16.5	8.6	4.7
District of Columbia	41.2	31.0	20.9	6.9	32.4	39.7	17.6	10.3	62.2	13.8	12.6	11.4
Florida	37.4	42.5	15.1	5.1	32.8	38.9	21.4	6.9	69.3	18.5	8.2	3.9
Georgia	55.4	26.3	14.2	4.1	40.2	33.6	16.5	9.7	74.9	13.7	6.7	4.6
Hawaii	44.2	32.6	15.9	7.4	32.0	27.3	24.9	15.8	60.2	15.9	14.5	9.5
Idaho	59.6	25.3	12.2	3.0	39.4	25.7	26.4	8.5	71.6	10.4	12.0	6.1
Illinois	57.9	32.5	7.0	2.6	46.8	37.3	11.6	4.3	76.8	13.2	6.2	3.7
Indiana	47.8	39.3	9.9	3.0	44.4	39.9	12.0	3.7	77.5	12.0	4.9	5.6
Iowa	43.0	41.7	11.8	3.5	42.8	32.5	18.7	5.9	72.2	12.3	9.8	5.8
Kansas	42.3	42.2	12.1	3.3	37.3	44.7	13.9	4.0	71.0	15.0	9.8	4.1
Kentucky	25.0	46.6	26.1	2.3	24.7	34.7	34.5	6.1	63.1	20.2	13.8	2.9
Louisiana	59.0	29.9	9.7	1.4	31.9	43.2	19.3	5.6	70.9	17.1	8.3	3.7
Maine	63.4	22.9	9.7	4.0	42.5	25.6	19.2	12.6	71.3	8.4	10.4	9.9
Maryland	52.8	32.5	12.2	2.5	35.6	38.3	21.2	5.0	76.8	11.6	9.1	2.4
Massachusetts	58.7	26.6	11.4	3.3	38.8	32.6	18.5	10.0	69.3	13.3	9.5	7.9
Michigan	56.3	34.1	6.9	2.8	38.6	36.0	18.8	6.5	74.6	13.9	5.9	5.6
Minnesota	46.5	38.6	11.8	3.2	36.6	32.4	23.2	7.8	67.6	14.5	10.4	7.4
Mississippi	56.6	32.8	8.4	2.3	34.1	44.3	16.8	4.7	69.5	19.1	7.8	3.6
Missouri	54.8	35.3	8.1	1.8	44.1	38.2	13.2	4.6	76.1	13.0	6.9	4.0
Montana	43.6	38.1	14.1	4.3	39.6	28.9	23.8	7.7	71.7	10.6	11.0	6.7
Nebraska	44.7	40.9	12.2	2.3	44.4	37.9	11.6	6.1	76.4	12.3	7.2	4.1
Nevada	67.9	17.6	13.1	1.4	34.3	33.0	23.6	9.1	67.0	13.4	11.3	8.3
New Hampshire	51.4	34.6	12.4	1.6	28.5	31.5	27.4	12.7	53.8	20.9	15.5	9.8
New Jersey	51.4	37.2	8.8	2.5	34.1	45.9	15.8	4.3	73.0	14.7	7.1	5.3
New Mexico	56.1	33.9	7.7	2.3	44.6	38.2	12.7	4.5	75.6	13.8	6.7	3.9
New York	62.3	23.2	13.0	1.5	43.6	32.5	17.2	6.7	75.7	10.5	8.2	5.7
North Carolina	44.6	33.4	20.2	1.9	29.4	36.0	27.8	6.8	68.4	12.8	12.8	6.0
North Dakota	48.4	35.0	14.6	2.1	42.7	29.5	21.9	5.9	71.2	13.5	10.8	4.5
Ohio	60.8	31.5	6.2	1.6	40.2	36.2	17.2	6.4	71.1	15.3	9.1	4.5
Oklahoma	53.0	39.4	6.7	0.9	34.8	45.3	16.2	3.8	71.5	15.8	9.2	3.4
Oregon	53.6	31.6	11.4	3.3	37.1	34.7	22.4	5.7	70.4	12.9	11.8	4.9
Pennsylvania	57.8	32.5	7.4	2.3	44.0	35.6	13.8	6.6	75.7	12.9	7.1	4.4
Rhode Island	63.8	25.3	8.8	2.0	42.5	34.7	16.2	6.6	78.0	11.4	7.2	3.4
South Carolina	58.0	31.0	7.2	3.7	38.5	37.7	15.9	7.9	74.0	15.3	5.4	5.3
South Dakota	38.4	40.8	18.1	2.7	44.5	31.9	16.8	6.7	73.4	14.1	7.5	4.9
Tennessee	44.7	37.6	12.3	5.3	33.7	43.6	15.1	7.6	75.3	15.3	5.2	4.2
Texas	38.5	43.2	15.0	3.4	25.0	38.4	28.9	7.7	60.5	19.9	12.3	7.2
Utah	40.9	39.8	16.1	3.2	33.6	34.2	24.7	7.5	65.1	15.4	13.1	6.4
Vermont	47.6	34.6	11.0	6.8	38.8	26.2	21.5	13.5	66.3	9.8	11.9	12.0
Virginia	50.0	36.5	9.2	4.3	37.6	35.7	19.1	7.6	71.4	14.7	7.7	6.1
Washington	35.7	36.2	23.1	4.9	38.2	27.3	25.7	8.8	64.2	12.0	13.9	9.9
West Virginia	51.7	31.6	13.6	3.2	34.0	37.6	19.2	9.2	71.1	15.3	10.1	3.5
Wisconsin	50.0	33.9	12.7	3.4	42.4	29.5	17.4	10.8	70.7	11.9	9.2	8.2
Wyoming	45.5	34.3	15.8	4.4	47.8	27.0	19.0	6.2	70.3	13.9	9.5	6.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table 14b—Percentage distribution of public school teachers according to the number of hours spent in in-service or professional development programs on certain topics since the end of the last school year, by state: 1993–94**

	Student assessment				Cooperative learning			
	0 hours	8 hours	9–32 hours	> 32 hours	0 hours	8 hours	9–32 hours	> 32 hours
Total	48.6	39.5	9.1	2.8	49.1	37.8	10.1	3.0
Alabama	48.6	43.4	5.7	2.3	49.1	42.1	7.2	1.6
Alaska	50.5	38.0	8.7	2.9	57.7	31.6	8.1	2.6
Arizona	48.1	39.7	9.5	2.6	58.8	30.7	7.9	2.6
Arkansas	53.4	38.4	7.0	1.3	52.0	39.1	6.4	2.5
California	31.7	50.3	13.1	4.9	46.7	39.7	10.1	3.6
Colorado	42.7	38.6	14.8	3.8	60.8	28.8	9.2	1.3
Connecticut	37.9	51.2	8.6	2.2	47.8	42.1	7.7	2.4
Delaware	42.4	41.6	13.4	2.6	53.0	38.3	7.6	1.1
District of Columbia	47.8	37.4	12.6	2.2	32.1	42.8	15.6	9.6
Florida	53.8	32.8	10.8	2.5	46.4	34.6	15.9	3.1
Georgia	63.6	28.5	4.7	3.2	51.5	35.8	8.5	4.2
Hawaii	46.7	37.1	12.3	3.8	37.9	34.3	19.8	8.0
Idaho	60.2	25.2	11.4	3.2	57.0	25.2	14.5	3.2
Illinois	43.4	44.5	9.6	2.5	57.2	31.0	9.3	2.5
Indiana	61.5	32.0	4.1	2.5	54.2	38.8	5.4	1.6
Iowa	44.4	41.7	11.4	2.4	57.7	30.4	6.9	4.9
Kansas	46.4	41.6	9.4	2.6	51.9	41.4	6.0	0.7
Kentucky	12.7	49.4	35.4	2.5	26.9	54.2	17.4	1.5
Louisiana	53.2	37.5	6.6	2.6	49.0	40.4	7.7	3.0
Maine	52.1	32.7	9.4	5.7	49.5	36.1	9.5	4.9
Maryland	46.5	44.1	6.4	3.0	41.4	44.6	9.8	4.2
Massachusetts	56.3	32.5	7.9	3.3	46.3	38.9	11.1	3.7
Michigan	48.8	42.9	6.0	2.3	52.1	35.7	10.0	2.2
Minnesota	50.1	35.3	11.9	2.7	56.2	33.3	8.6	1.9
Mississippi	31.9	55.5	11.3	1.3	35.5	52.0	10.5	2.0
Missouri	57.5	35.6	4.9	2.0	56.2	36.3	6.2	1.4
Montana	56.3	31.3	10.0	2.3	54.5	32.0	11.4	2.2
Nebraska	53.0	36.4	8.1	2.4	58.6	29.3	8.1	3.9
Nevada	60.6	28.7	8.7	2.0	55.9	26.7	14.6	2.7
New Hampshire	48.0	36.2	11.8	4.1	42.1	40.0	14.1	3.8
New Jersey	50.7	39.5	8.5	1.3	50.1	38.2	9.2	2.4
New Mexico	55.7	35.9	6.2	2.2	47.7	41.8	8.0	2.6
New York	58.1	31.1	7.7	3.1	55.2	30.3	9.3	5.2
North Carolina	41.7	43.6	12.0	2.7	43.3	37.2	17.3	2.2
North Dakota	64.5	27.7	6.5	1.3	61.2	29.9	7.0	1.9
Ohio	55.3	35.0	6.8	2.9	51.6	35.9	9.7	2.8
Oklahoma	46.2	47.4	5.0	1.5	41.4	50.6	6.7	1.4
Oregon	45.3	42.1	8.1	4.4	61.7	26.3	10.3	1.8
Pennsylvania	50.9	38.8	7.8	2.4	49.5	37.5	9.9	3.1
Rhode Island	53.2	38.0	7.0	1.8	50.8	39.2	7.2	2.8
South Carolina	54.8	37.4	4.8	3.1	46.1	41.9	8.9	3.1
South Dakota	55.7	33.1	8.5	2.7	52.7	36.6	8.5	2.3
Tennessee	50.7	42.0	5.7	1.6	50.9	41.2	6.6	1.4
Texas	43.3	44.9	9.6	2.2	33.7	49.9	13.3	3.1
Utah	57.9	31.9	8.0	2.3	49.3	38.6	10.2	1.9
Vermont	51.0	27.7	13.5	7.7	63.6	23.9	9.0	3.5
Virginia	53.0	36.6	8.0	2.4	47.0	41.0	9.1	2.9
Washington	50.7	33.2	13.1	3.0	54.3	30.2	12.3	3.1
West Virginia	46.1	43.9	8.4	1.7	42.9	44.4	8.9	3.8
Wisconsin	54.4	34.3	7.3	4.0	64.2	25.1	7.8	2.9
Wyoming	54.4	34.4	7.9	3.3	57.8	29.8	9.5	2.9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).



## 5. Support for Professional Development

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Effective professional development is dependent to a large extent upon institutional and financial support of teachers' professional development efforts and a school culture that nurtures teacher learning. Recommended principles for effective professional development address the way schools are organized and managed, recognizing that teachers need substantial time and opportunities to work with other teachers both within and outside their own schools in order to develop their knowledge and skills. The 1993–94 SASS data contain useful information on the types of support for professional development that teachers receive and on aspects of the organization and management of schools that may affect teachers' professional development.

### **Institutional Support**

Institutional support to teacher development includes scheduling time during the school day and year for professional development and providing incentives and rewards that encourage teachers to participate. Examples of incentives and rewards include advances on salary schedules; reimbursement of tuition and fees for courses and programs; consideration of participation during evaluation and recertification processes; and paying the fees for obtaining certification by the National Board for Professional Teaching Standards. Districts and schools can also facilitate teachers' communication with colleagues outside their school by providing Internet connections, informing teachers of opportunities outside the district, and supporting membership in professional associations, among other activities.

### ***Time Available for Professional Development***

It is widely recognized that to realize the new vision of professional development, teachers need to have more time available to devote to their professional growth. Teachers already have very full work days, and typically must scramble for staff development time (Massell and Fuhrman 1994; Renyi 1996). Finding large blocks of time for concentrated work and collaboration with other teachers is a particular challenge. Consequently, professional development is frequently relegated to a few scattered days before school begins and during the school year.

Suggested options for making more time available have included extending teachers' contracts to cover more time when students are not in school, reallocating existing time during the teacher's day, and team teaching, for example (Renyi 1996). Some have urged a complete restructuring of how time is used in schools so that teachers have more time during the school year for planning and preparing to teach, observing and assisting colleagues, group work, and individual study (National Education Commission on Time and Learning [NECTL] 1994).

The average teacher was required to be at school 33 hours a week in 1993–94 (table 15). In addition, on average, teachers reported spending another 3 hours per week outside of school hours in activities with students (such as coaching, field trips, tutoring, and transporting students), and 9 hours per week on other school-related activities not directly involving students (such as lesson preparation, grading papers, parent conferences, and meetings). Whether teachers included voluntary professional development activities in the latter category is unknown.

**Table 15—Average number of hours per week full-time teachers were required to be at school and average amount of time spent outside regular school hours in school-related activities, by sector: 1993–94**

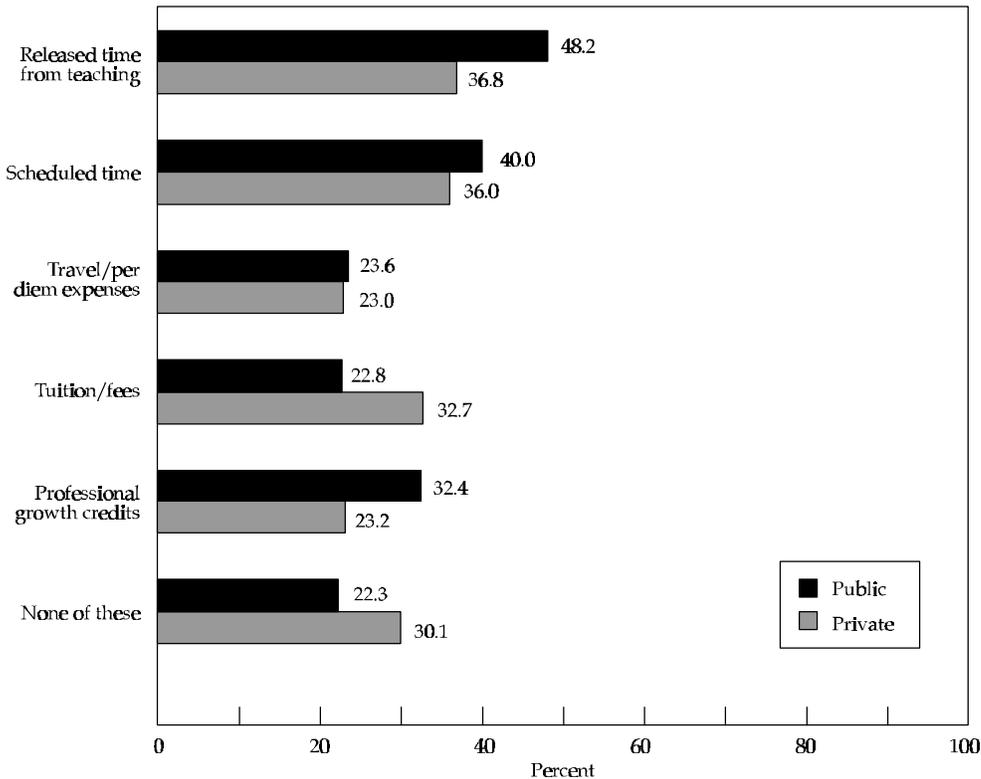
	Required to be at school	Spent in activities outside school hours	
		With students	Without students
Total	33.3	3.4	8.8
Sector			
Public	33.2	3.3	8.7
Private	34.3	3.7	9.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

### *Types of Support for Professional Development*

SASS asked teachers to identify the various types of support they had received during the current school year for in-service education or professional development in their main teaching field. What was reported is related both to whether they had participated in in-service education or professional development on topics related to their main teaching assignment field and to whether their district or school offered this type of support. Twenty-two percent of all public school teachers and 30 percent of all private school teachers reported having received no support when asked about release time from teaching, time built into their schedules, travel expenses, tuition or fees, and professional growth credits (figure 15 and table 16).

**Figure 15 – Percentage of teachers who reported receiving various types of support for in-service education or professional development in their main assignment field during the current school year: 1993–94**



SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

The most common types of support were release time from teaching and time for professional development built into teachers' schedules. Overall, 47 percent of teachers reported having received release time from teaching to participate in professional development activities, and 40 percent reported having had time built into their schedules. In both cases, public school teachers were more likely than private school teachers to receive these types of support. In the public sector, as district size increased, teachers were less likely to be supported with release time and more likely to have time for professional development built into their schedules. In the private sector, as school size increased, teachers were more likely to have received release time.

**Table 16—Percentage of teachers who reported receiving various types of support for in-service or professional development in their main teaching field during the current school year, by selected school and district characteristics: 1993–94**

	Release time from teaching	Time built into schedule	Travel expense	Tuition or fees	Professional growth credits	None of these
Total	47.0	39.5	23.5	24.0	31.2	23.3
<b>Public</b>	48.2	40.0	23.6	22.8	32.4	22.3
School size						
Less than 150	50.7	37.5	33.1	27.7	32.7	21.8
150–499	50.5	40.9	26.7	25.7	33.5	20.2
500–749	49.6	41.5	21.9	22.6	32.8	21.1
750 or more	44.6	38.4	22.1	20.3	31.1	25.3
District size						
Less than 1,000	52.5	36.5	35.5	29.4	32.5	21.3
1,000–4,999	49.0	37.8	29.1	26.1	29.9	23.0
5,000–9,999	48.1	40.1	24.0	22.8	32.4	22.7
10,000 or more	46.6	41.7	16.8	18.4	34.4	22.5
<b>Private</b>	38.6	36.0	23.0	32.7	23.2	30.1
School size						
Less than 150	32.5	35.4	24.0	27.0	18.0	36.8
150–499	39.5	35.8	20.6	33.0	23.7	29.6
500–749	41.6	36.9	24.0	35.0	26.6	25.7
750 or more	40.2	36.1	27.3	37.5	25.9	25.3
Affiliation						
Catholic	42.5	36.2	14.8	30.8	27.6	27.2
Other religious	32.3	34.3	28.0	31.4	22.3	33.7
Nonsectarian	41.9	38.4	29.2	38.1	16.9	29.5

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher, School, and Teacher Demand and Shortage Questionnaires).

As district size increased, public school teachers were less likely to have their travel expenses or tuition or fees reimbursed. This suggests that in smaller districts these types of support may be an alternative to subject-specific in-service programs that are district sponsored.<sup>22</sup>

Although almost all public school teachers had participated in some type of professional development since the end of the last school year (figure 7), only about one-third of all teachers reported having received professional growth credits for participation in professional

<sup>22</sup>Although the percentage of teachers who participated in any district-sponsored programs was about 88 percent regardless of district size (table 7), these workshops were not necessarily subject specific.

development programs (table 16). This may mean that the types of activities in which they participated were not the types that their districts, states, or both recognized for credit. It may also reflect the fact that most participation was in activities that lasted one day or less (figure 14 and table 14).

The percentages of teachers who received various types of support varied by state as well, reflecting variation in state involvement in professional development (table 17). For example, in Kentucky, where local districts were required to use 4 days of the school term for professional development and were permitted to request up to 5 additional days, 60 percent of the teachers reported having had time built into their schedules for subject-specific professional development. In Rhode Island, on the other hand, where teachers must bargain with their local districts for in-service days beyond the 180 instructional days dictated by state law, 29 percent of teachers reported having had time built into their schedules for subject-specific professional development. In total, 14 states and the District of Columbia mandated the amount of time that local districts were required to dedicate to professional development in 1996 (CPRE 1997).<sup>23</sup>

## School Culture

The principles for effective professional development referred to in the Introduction emphasize the importance of a collaborative environment where teachers and administrators develop common goals, share ideas, and work together to achieve their goals. The 1993–94 SASS included several questions that permit some judgments about the extent to which school cultures support teachers’ professional development. Teachers were asked whether they agreed or disagreed with statements regarding how often their principal talked with them about their instructional practices, the amount of cooperation among staff members, and the extent of coordination among teachers with regard to class content. In responding to these questions, teachers were given the option of strongly agreeing, somewhat agreeing, somewhat disagreeing, or strongly disagreeing.

Overall, 11 percent of all teachers strongly agreed that their principal talked with them frequently about their instructional practices; 37 percent strongly agreed that there was a great deal of cooperative effort among the staff members; and 39 percent strongly agreed that they made a

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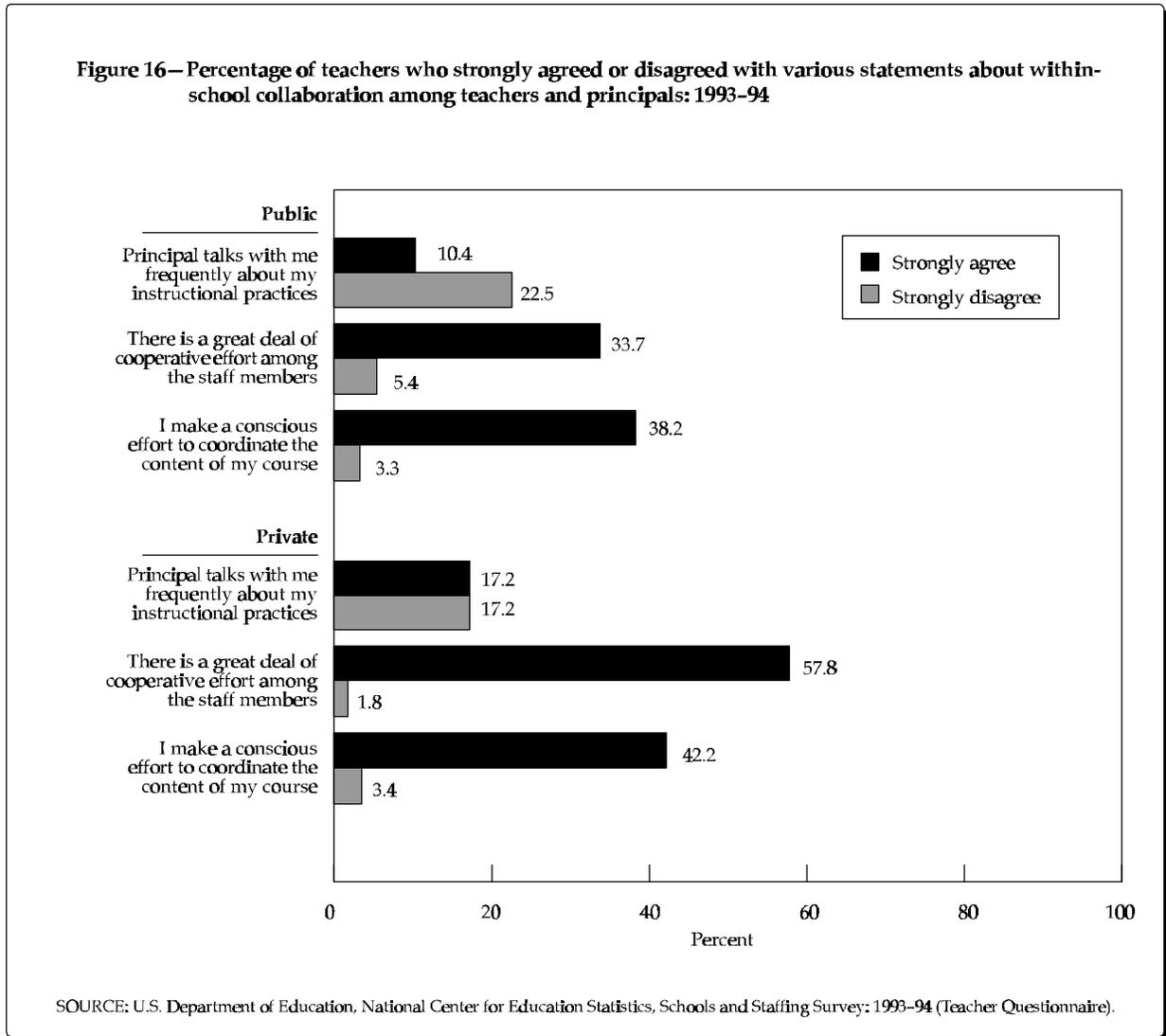
<sup>23</sup>These states included Arkansas, Connecticut, Delaware, Kentucky, Louisiana, Michigan, Mississippi, Montana, Nebraska, Oklahoma, South Carolina, Tennessee, Virginia, and West Virginia.

**Table 17—Percentage of public school teachers who reported receiving various types of support for in-service education or professional development in their main teaching field during the current school year, by state: 1993–94**

	Release time from teaching	Time built into schedule	Travel expense	Tuition or fees	Professional growth credits	None of these
Total	48.2	40.0	23.6	22.8	32.4	22.3
Alabama	36.4	36.9	16.0	11.2	58.5	20.1
Alaska	52.1	41.1	21.6	15.5	25.3	24.5
Arizona	48.0	31.7	16.9	19.6	34.5	24.5
Arkansas	51.2	50.1	32.5	20.4	37.9	16.5
California	59.4	49.7	22.1	24.7	28.6	15.6
Colorado	52.0	39.8	15.4	19.8	43.6	18.7
Connecticut	50.5	52.2	19.2	21.1	58.7	13.3
Delaware	31.7	30.8	15.6	21.2	52.5	22.9
District of Columbia	52.9	63.0	11.9	13.6	40.8	13.6
Florida	50.9	41.0	17.9	16.1	50.5	20.1
Georgia	40.3	34.9	23.7	21.1	40.8	24.3
Hawaii	50.0	33.5	10.4	22.0	37.6	22.2
Idaho	50.3	39.6	29.4	32.3	41.3	18.5
Illinois	52.7	35.7	27.2	26.9	20.6	23.0
Indiana	57.9	30.9	27.1	20.0	9.9	26.6
Iowa	52.9	43.5	35.2	27.0	25.1	19.6
Kansas	54.9	47.8	33.1	28.9	55.3	16.4
Kentucky	40.7	60.3	34.8	14.3	34.1	16.1
Louisiana	45.0	42.3	16.8	22.0	26.8	24.3
Maine	55.6	35.4	29.6	46.7	43.3	19.1
Maryland	40.5	41.1	10.0	14.4	16.2	27.0
Massachusetts	53.3	36.2	17.7	25.3	29.0	20.2
Michigan	54.7	34.6	23.0	23.2	12.7	28.2
Minnesota	56.0	38.6	27.7	24.4	46.5	17.3
Mississippi	36.0	54.7	26.4	15.0	35.5	19.9
Missouri	50.1	36.2	29.5	25.8	25.2	24.6
Montana	51.4	43.3	33.5	20.9	37.5	20.3
Nebraska	53.6	40.3	28.9	19.0	52.1	17.6
Nevada	46.0	32.2	12.0	14.6	43.4	26.1
New Hampshire	60.9	37.2	26.3	51.3	70.9	9.1
New Jersey	53.7	37.2	24.2	28.6	19.3	19.7
New Mexico	52.7	37.2	24.6	16.3	12.2	28.5
New York	43.2	30.1	16.5	14.7	21.8	32.4
North Carolina	44.5	45.4	32.7	26.9	61.7	15.7
North Dakota	44.2	34.2	30.0	24.4	39.1	22.5
Ohio	45.1	31.2	22.1	24.0	29.9	30.5
Oklahoma	38.3	51.4	23.7	15.8	53.6	18.7
Oregon	52.6	36.5	29.0	45.9	26.4	21.0
Pennsylvania	39.0	30.5	22.3	26.1	15.9	31.7
Rhode Island	60.7	28.8	8.5	11.8	11.4	29.5
South Carolina	38.3	45.0	25.9	23.4	21.5	26.5
South Dakota	54.3	36.9	39.5	24.3	20.7	21.7
Tennessee	30.2	40.6	17.7	12.9	29.4	31.2
Texas	49.9	50.7	27.7	24.1	36.3	17.9
Utah	39.9	29.9	17.7	26.3	33.3	26.7
Vermont	60.2	41.1	26.3	57.6	49.0	11.7
Virginia	36.6	41.1	20.0	26.1	52.5	20.9
Washington	54.6	36.9	29.4	30.5	34.8	17.5
West Virginia	31.1	38.3	21.1	18.1	34.5	25.7
Wisconsin	51.1	31.6	32.0	22.6	26.2	23.3
Wyoming	59.0	38.1	39.1	31.0	33.9	20.2

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

conscious effort to coordinate the content of their courses with other teachers (table 18).<sup>24</sup> To the extent that the responses to these questions can be used as indicators of a collaborative school culture, private school teachers were more likely than public school teachers to see their schools as collaborative places in which to work (figure 16 and table 18).



<sup>24</sup>At the other end of the scale, 22 percent of teachers strongly disagreed that their principal talked with them frequently about their instructional practices; 5 percent strongly disagreed that there was a great deal of cooperative effort among staff members; and 3 percent strongly disagreed that they made a conscious effort to coordinate the content of their courses with other teachers (1993-94 SASS [Teacher Questionnaire], not shown in table).

**Table 18—Percentage of teachers who strongly agreed with various statements about within-school collaboration among teachers and principals, by selected teacher and school characteristics: 1993–94**

	The principal talks with me frequently about my instructional practices	There is a great deal of cooperative effort among the staff members	I make a conscious effort to coordinate the content of my course with other teachers
Total	11.3	36.8	38.7
<b>Public</b>	10.4	33.7	38.2
Level			
Elementary	12.9	40.1	44.6
Secondary	7.7	26.7	31.2
Teaching experience			
0–3 years	12.9	34.4	32.5
4–9 years	10.8	32.0	36.6
10–19 years	10.2	33.2	40.4
20 or more years	9.5	34.8	39.0
School size			
Less than 150	13.9	41.5	35.1
150–499	12.7	39.0	41.6
500–749	11.4	37.0	41.0
750 or more	7.2	25.9	33.5
District size			
Less than 1,000	10.2	33.2	39.4
1,000–4,999	10.0	34.3	37.4
5,000–9,999	10.5	32.2	38.1
10,000 or more	10.8	33.5	38.5
<b>Private</b>	17.2	57.8	42.2
Level			
Elementary	20.3	61.6	47.7
Secondary	13.1	52.7	34.8
Teaching experience			
0–3 years	21.0	57.5	33.5
4–9 years	15.1	56.2	37.6
10–19 years	17.0	58.6	47.9
20 or more years	17.0	59.1	48.0
School size			
Less than 150	24.2	65.6	44.6
150–499	16.3	56.8	41.0
500–749	12.0	54.1	42.8
750 or more	10.9	46.2	39.4
Affiliation			
Catholic	16.4	53.1	38.6
Other religious	19.9	65.3	43.6
Nonsectarian	14.4	54.0	46.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher, School, and Teacher Demand and Shortage Questionnaires).

In both sectors, teachers were more likely to strongly agree that there was a great deal of cooperative effort among the staff members at the elementary level than at the secondary level and in small schools than in large ones.<sup>25</sup> Also, in both sectors, as school size increased, teachers were less likely to strongly agree that their principals talked with them frequently about their instructional practices.

## **Conclusion**

While SASS provides limited information on the resources devoted to professional development or on management processes in schools, it does provide some useful data on how much time teachers spend on school-related activities, the types of institutional support they receive for professional development, and their perceptions regarding the organizational culture in their schools. A number of reform-minded writers and commissions have asserted that as currently structured, teachers' workdays and weeks do not permit the time and collegial interaction necessary to foster their professional growth (Little 1993; NCTAF 1996; NECTL 1994). The SASS data indicate that, in fact, teachers already spend more than 40 hours per week on teaching and school-related activities, a finding that supports the concerns of reformers. Some types of tangible support provided for professional development varied with school and district size and also with state policy. Barely more than one-third (37 percent) of all teachers strongly agreed that there was a great deal of cooperative effort among staff members at their school.<sup>26</sup>

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<sup>25</sup>These two characteristics are, of course, interrelated.

<sup>26</sup>See Henke et al. (1997) for a more extensive discussion of teachers' work environments using SASS data.



## 6. Impact of Professional Development Activities

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Ideally, high-quality professional development will lead to changes in teaching practice and ultimately to improved student performance. In practice, it will always be difficult to link student outcomes to teacher professional development because of the many determinants of student achievement and the fact that there is no mechanism for examining how teachers are assigned to specific classes. However, the SASS data offer two measures of the impact of teachers' professional development activities. One is teachers' own opinions about the impact of programs and activities in which they have participated. The other is the relationship between teachers' participation in professional development and their reports of their use of various instructional practices.

### Teachers' Perceptions

As described previously, teachers were asked if they had participated in professional development programs on selected topics, including uses of educational technology for instruction, methods of teaching in their subject field, in-depth study in their subject field, student assessment, and cooperative learning. Teachers were then asked whether they strongly agreed, agreed, disagreed, strongly disagreed, or had no opinion on several statements about the impact of those programs. Teachers were reporting on their overall assessment of all professional activities they had participated in on any of these topics, not on each topic separately. Despite widespread criticisms of the state of professional development by researchers and policymakers, in 1993–94 teachers themselves held generally positive views about the impact of at least some of the professional development programs in which they had participated since the end of the last school year.

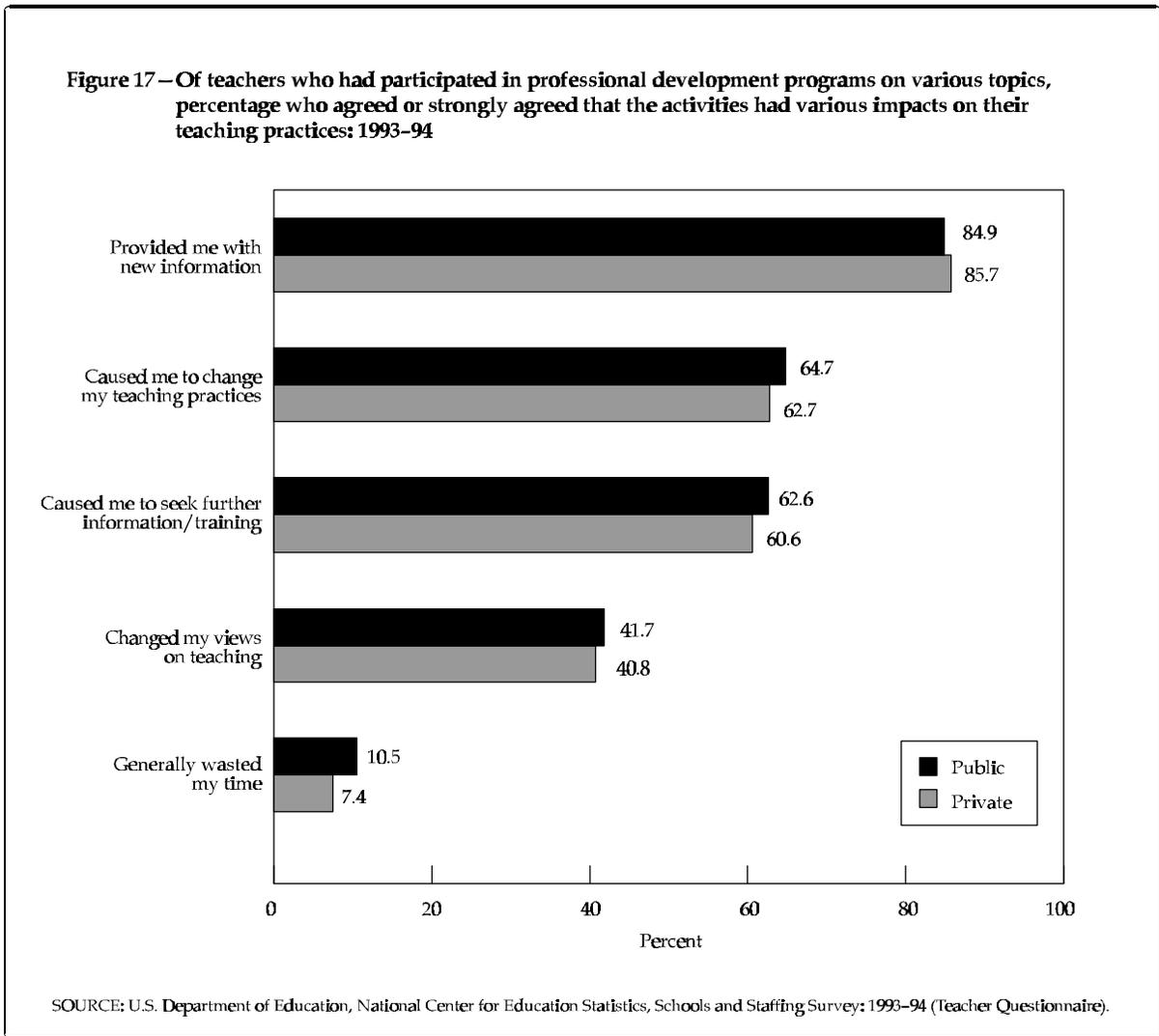
Overall, 85 percent of teachers who participated in professional development programs on one or more of the above mentioned topics reported that those programs provided them with new information (that is, they agreed or strongly agreed with the statement) (table 19). Sixty-two percent reported that the programs caused them to seek further information or training, and 65 percent reported that they caused them to change their teaching practices. Forty-two percent reported that the programs changed their views on teaching. There were no meaningful differences between public and private school teachers in their assessments (figure 17).

**Table 19—Percentage of teachers who had participated in certain types of professional development who agreed or strongly agreed that the activities had various impacts, by selected teacher and school characteristics: 1993–94**

	Provided with new information	Led to seek more information	Caused change in teaching practices	Changed view on teaching	Generally a waste of time
Total	85.0	62.3	64.5	41.6	10.1
<b>Public</b>	84.7	62.6	64.7	41.7	10.5
Main assignment field					
K–General elementary	86.4	66.0	70.9	44.9	8.3
Math or science	73.6	61.3	63.3	42.2	12.1
English, language arts	83.4	61.6	66.3	43.3	11.9
Social studies	83.7	60.2	61.4	39.5	15.6
Special education	84.6	65.3	62.3	38.0	9.0
Bilingual/ESL	83.4	67.0	59.7	42.4	10.9
Vocational education	86.3	60.6	58.8	39.8	11.3
Other	84.0	56.4	56.9	37.5	11.9
Teaching experience					
0–3 years	86.9	65.2	63.3	40.6	7.2
4–9 years	85.5	64.3	68.2	43.6	9.2
10–19 years	85.4	63.6	65.6	42.4	10.2
20 or more years	83.6	59.7	62.3	40.3	12.7
<b>Private</b>	85.7	60.6	62.7	40.8	7.4
Main assignment field					
K–General elementary	84.9	59.4	65.2	40.3	6.3
Math or science	87.8	64.5	62.6	44.5	7.1
English, language arts	83.1	57.4	66.2	34.4	8.0
Social studies	88.1	62.9	63.3	42.1	10.8
Special education	86.8	68.2	65.0	39.0	9.7
Bilingual/ESL	—	—	—	—	—
Vocational education	80.0	49.7	41.7	47.0	9.1
Other	86.1	59.6	57.1	41.5	7.8
Teaching experience					
0–3 years	86.0	59.2	60.6	41.3	6.8
4–9 years	86.0	60.0	61.0	39.7	8.3
10–19 years	85.4	61.7	64.8	39.1	6.8
20 or more years	85.3	60.9	63.5	44.1	7.7

—Too few cases for a reliable estimate.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).



Ten percent of the teachers thought that the programs had wasted their time. Public school teachers were more likely to have this opinion than private school teachers (11 percent versus 7 percent). In the public sector, as years of teaching experience increased, so did the percentage of teachers who thought that the programs had been a waste of their time.

Because of the emphasis on extended duration as a necessary component of effective professional development, it is important to examine whether teachers perceived longer professional development programs as more effective. Therefore, an index of participation was created by multiplying participation (no=0 or yes=1) by the length of the program (8 hours or less=1, 9-32

hours=2, and more than 32 hours=3) and summing across the five types. Thus, an index of 1 would indicate participation in one program for less than a day; an index of 2 would indicate two programs for 1 day or one program for 9–32 hours. Ordinary least squares regression was used to examine the relationship between the level of participation and teachers' assessments of the impact of such participation on their teaching (see appendix C for more details).

The level of teacher participation in professional development programs on the five topics and teachers' assessment about the effectiveness of the programs were positively associated (figure 18). Specifically, the higher the level of participation, the more likely the teachers were to agree or strongly agree that these programs provided them with new information, changed their views on teaching, caused them to change their teaching practices, and made them seek further information or training. This positive association remained significant after taking into account various teacher and school characteristics considered possibly to be related to teachers' assessment. Table B3 (in appendix B) shows the regression results.

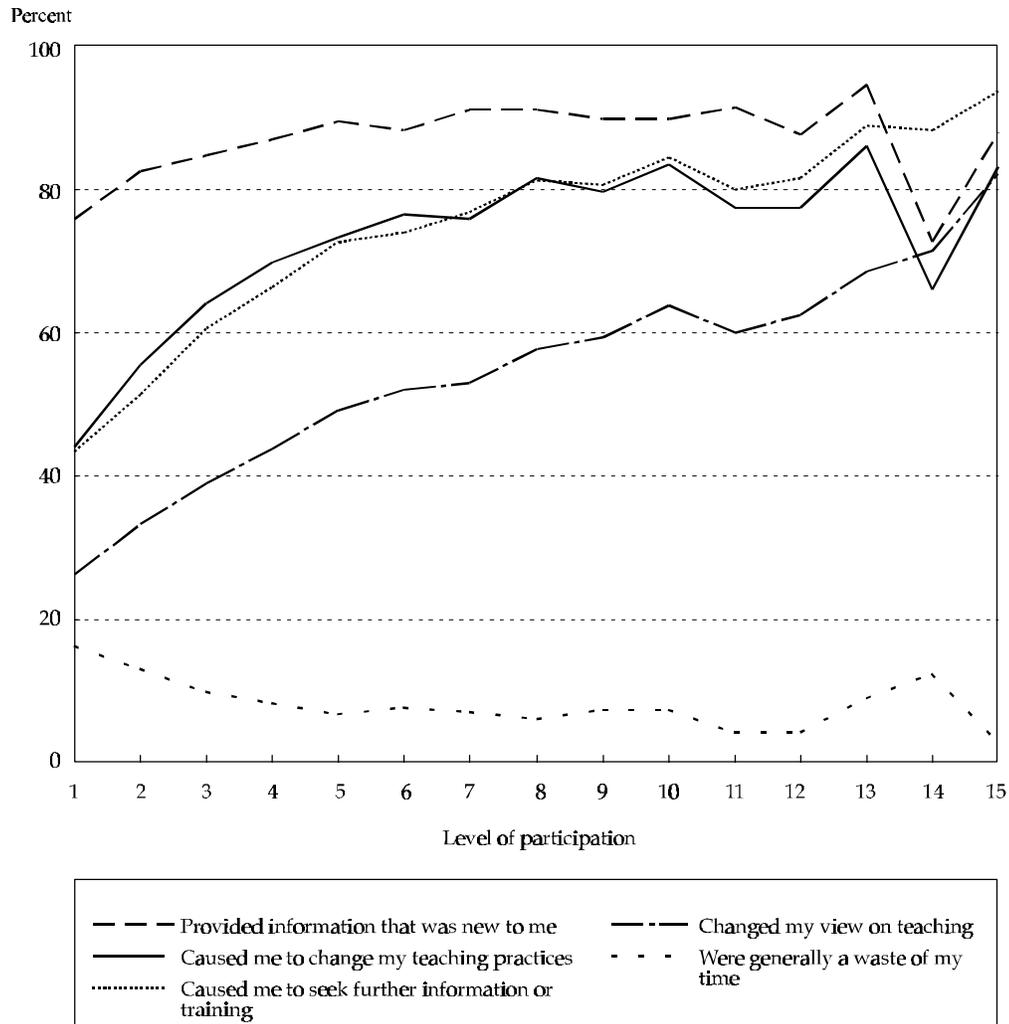
### **Impact on Instructional Practices**

Based on teachers' reports in the 1993–94 SASS and the Teacher Follow-up Survey (TFS) conducted the following year, participation in professional development programs appears to be linked to teachers' instructional practices (Henke et al. 1997).<sup>27</sup> In particular, participation in professional development was associated with the use of various types of instructional practices that are currently being advocated as effective, such as cooperative learning, portfolios for assessment, and the use of advanced technology in the classroom. Whether teachers participated in the professional development activities and were then motivated to adopt the recommended instructional practices, or whether they sought out professional development activities for help once they decided to implement the practices is unknown, but is not necessarily important. Either link is likely to be valuable to a teacher. It is always possible, of course, that there was no direct connection between the professional development activities and instructional practices, but that teachers who participated in professional development and adopted new teaching methods shared other common traits that prompted them to do both. Nevertheless, the links found between the two are intriguing and worth reviewing.

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<sup>27</sup>In the Teacher Follow-up Survey (conducted in 1994–95), teachers were asked about their use of various teaching methods during the past semester. In an analysis first presented in Henke et al. (1997), these data were linked to the professional development activities these teachers reported in 1993–94 that they had participated in since the end of the previous school year. The rest of the discussion of the impact of professional development on instructional practices is based on this previous analysis of the SASS data.

**Figure 18—The relationship between the level of participation and teachers' assessments of the impact of professional development programs on their teaching practices: 1993-94**



SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993-94 (Teacher Questionnaire).

### *Cooperative Learning*

The TFS asked teachers how often they used various grouping strategies for instructional purposes (whole group, small group, and individual instruction); how often they had students work on group projects (for a group or individual grade); and how often they conducted class discussions of work done by smaller groups. Both public and private school teachers who had participated in professional development programs on cooperative learning in the classroom since

the end of the previous school year were more likely than those who had not to use small group instruction at least once a week, assign group projects for individual or group grades, and conduct class discussions of work done in groups (table 20).

**Table 20—Percentage of teachers who reported that they instructed students in various grouping patterns and that students did various group activities at least once a week during the last semester, by selected teacher characteristics: 1994–95**

	Teacher activities			Student activities		
	Provided whole group instruction	Worked with small groups	Worked with individual students	Group project for individual grade	Group project for group grade	Class discussed work done in groups
Total	97.8	86.2	96.3	32.6	18.0	30.8
<b>Public</b>	97.9	86.9	96.6	33.6	18.6	31.3
Professional development:						
Cooperative learning						
Yes	98.2	90.7	97.5	37.4	21.8	36.7
No	97.6	83.0	95.6	29.7	15.2	25.7
<b>Private</b>	97.2	80.8	94.4	25.7	13.5	27.2
Professional development:						
Cooperative learning						
Yes	98.6	86.7	97.4	29.3	16.6	32.2
No	96.3	76.9	92.4	23.3	11.4	23.9

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire) and Teacher Follow-up Survey: 1994–95.

### *Assessment Practices*

Teachers were also asked whether they used portfolios in their classes, and if so, whether or not they included various types of work in them, ranging from traditional assessment tools, such as worksheets, tests, and homework, to tools suitable for evaluating complex learning tasks, such as long-term projects and audio or video work. About half (56 percent) of all teachers used portfolios (table 21). However, teachers who had attended a professional development program on student assessment were more likely than those who had not attended such a program to use portfolios. Again, this was true for both public school teachers (64 percent versus 50 percent) and private school teachers (58 percent versus 46 percent).

**Table 21—Percentage of teachers who used portfolios during the last semester and percentage who included various types of student work in those portfolios, by selected teacher characteristics: 1994–95**

	Percentage who used portfolios	Of teachers who used portfolios, percentage including types of student work in portfolios				
		Worksheets	Exploratory investigations	Inter-disciplinary problems	Homework	Tests and assessments
Total	56.4	56.5	29.5	22.7	35.1	61.9
<b>Public</b>	57.2	56.3	29.7	23.0	34.4	61.7
Professional development: Assessment						
Yes	64.3	54.7	31.2	26.2	34.0	64.5
No	49.9	58.4	27.7	18.8	35.0	58.0
<b>Private</b>	50.7	58.7	28.0	20.6	40.4	63.3
Professional development: Assessment						
Yes	58.2	59.4	30.2	23.4	38.6	65.3
No	46.3	58.2	26.4	18.5	41.7	61.8

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire) and Teacher Follow-up Survey: 1994–95.

### *Use of Educational Technology*

As discussed earlier, teachers are now being called upon to use unfamiliar technologies in the classroom. The TFS asked teachers about their use of various tools in the classroom for demonstrating concepts, including computers, videos, and other electronic media, and about tools that students used in class, such as calculators and computers for writing. Overall, 55 percent of all teachers used computers, videos, or other electronic media; 29 percent used computers for writing; and 24 percent used calculators (which would not be useful in all classes) (table 22). Among both public and private school teachers, those who had participated in professional development on the uses of educational technology for instruction were more likely than those who had not to use each of these tools.

### *Reading Instruction at the Elementary Level*

The link between teachers' professional development and their instructional practices suggested by the SASS and TFS data is supported by data from the 1994 National Assessment of

**Table 22—Percentage of teachers who reported that they demonstrated a concept using electronic media and that they planned in-class activities requiring students to use selected tools at least once a week during the last semester, by selected teacher characteristics: 1994–95**

	Teachers used Computer, video, or other electronic medium	Students used in class	
		Calculators	Computers for writing
Total	55.0	24.3	28.9
<b>Public</b>	56.3	24.5	29.1
Professional development: Education technology			
Yes	62.7	28.3	36.1
No	50.2	20.8	22.4
<b>Private</b>	45.1	23.1	27.2
Professional development: Education technology			
Yes	56.9	28.8	35.7
No	38.7	20.0	22.6

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire) and Teacher Follow-up Survey: 1994–95.

Educational Progress (NAEP) Reading Teacher Questionnaire (which includes both public and private school teachers). For example, the more staff development hours fourth-grade teachers had in reading, the more likely they were to require students to read from a variety of books (including novels, poetry, and nonfiction) and from materials from other subject areas at least once a month (table 23). Both of these practices are widely encouraged by experts in reading instruction.

Time in staff development in reading was also positively associated with a number of other student activities favored by reading experts, including talking with other students about readings, writing about readings, group activities about reading, discussing interpretations of readings, and explaining understandings of readings (table 24). Moreover, it was negatively associated with workbook exercises, which are generally considered a less productive use of students' time.

**Table 23—Percentage of fourth-graders whose reading teachers reported using various resources at least once a week, by teachers' staff development experience: 1994**

	Children's newspapers	Reading kits	Software for reading	Variety of books	Materials from other subject areas
Total	28.7	20.7	21.9	70.4	66.0
Staff development hours in reading					
Fewer than 6	27.1	15.6	19.6	58.8	57.8
6–35	28.1	25.2	24.1	74.4	71.7
More than 35	34.2	17.4	20.7	87.7	71.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1994 (Reading Teacher Questionnaire).

**Table 24—Percentage of fourth-graders whose reading teachers asked them to do certain activities at least once a week, by teachers' staff development experience: 1994**

	Talk with other students about readings	Write about readings	Group activity about readings	Discuss interpre- tations of readings	Explain under- standing of readings	Workbook exercises
Total	79.4	82.7	31.4	66.4	89.7	73.4
Staff development hours in reading						
Fewer than 6	71.9	76.9	23.2	60.2	86.5	83.9
6–35	82.5	85.9	34.4	67.9	92.4	71.5
More than 35	92.6	91.2	42.0	79.2	93.6	60.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1994 (Reading Teacher Questionnaire).

Finally, both time in staff development in reading and participation in courses or workshops on assessment in the last 5 years were positively associated with the use of paragraph writings, presentations, and reading portfolios to assess reading progress, and negatively associated with the use of multiple-choice tests (table 25).

**Table 25—Percentage of fourth-graders whose reading teachers used various assessment practices at least once a month, by teachers' staff development experience: 1994**

	Multiple-choice tests	Short-answer tests	Paragraph length writings	Presentations	Reading portfolios
Total	59.3	79.8	80.6	62.5	39.0
Staff development hours in reading					
Fewer than 6	66.6	77.8	72.0	51.1	25.2
6–35	59.6	83.3	86.4	67.9	42.7
More than 35	46.4	78.1	87.3	73.5	56.6
Courses/workshops on assessment in last 5 years					
Yes	57.0	81.8	85.9	71.9	49.9
No	67.7	80.8	75.1	49.2	21.2

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1994 (Reading Teacher Questionnaire).

## Conclusion

Teachers appeared to find the professional development activities in which they had participated since the end of the last school year valuable—at least those on the topics specifically asked about (the use of educational technology, methods of teaching in their field, in-depth study in their field, student assessment, and cooperative learning). Moreover, the greater the intensity of their participation, the more likely they were to think that their professional development experiences had an impact. Finally, there was an association between participation in various types of professional development and the use of certain instructional practices generally linked to contemporary teaching practices or new pedagogical approaches that are thought to be especially effective.

## 7. Conclusion

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As the reform movement that began in the early 1980s has progressed, the attention paid to the professional development of teachers has increased. Early efforts to improve schools by issuing new rules, creating new mandates, and investing more funds have not yielded the significant advances in student learning that were being sought. Moreover, as larger numbers of businesses have become subject to international economic competition and technology pervades more and more of our working lives, the education goals for all students have become more ambitious. Policymakers, educators, and others increasingly have come to understand that substantial gains in student learning are less likely to come from tinkering on the edges of the system than from effecting fundamental changes in teachers' knowledge and their working relationships with students and other teachers.

The spotlight is now on professional development as crucial to further gains in teacher effectiveness and student achievement, and there is growing agreement among experts that the conventional forms of professional development (mainly short lectures and workshops) are inadequate to the task. It is widely acknowledged that to be effective, professional development must become an essential and integral part of teachers' daily work, not something that teachers do a few times a year on staff development days. Consequently, major changes in the way professional development is conceived and delivered are being recommended, along with changes in school organization and management.

### Summary of Findings

Schools and Staffing Survey (SASS) data were used to describe various aspects of professional development activity in 1993–94, including who determined the content of professional development opportunities, the formats of professional development activities, participation rates in certain content areas, the types of institutional support that teachers received, and teachers' assessments of the impact of their professional development experiences on their teaching practice. Among the major findings were the following:

- Responsibility for determining the content of in-service professional development programs is shared by State Departments of Education, the school board, district

staff, principals, and teachers. However, from the principals' perspective, local actors—district staff, principals, and teachers—had the most influence.

- Since the end of the previous school year, almost all teachers had participated in some form of professional development. Participation in district- and school-sponsored workshops and in-service programs was particularly high, reflecting the mandatory nature of much of this type of professional development.
- Participation in formal induction programs by new public school teachers appears to be increasing. Just over half (56 percent) of public school teachers who were in their first 3 years of teaching reported having participated in such a program.
- Approximately one-half of all teachers had participated in professional development programs since the end of the last school year on at least one of three topics associated with recent reform efforts: uses of educational technology for instruction, student assessment, and cooperative learning in the classroom. In addition, almost two-thirds had participated in professional development programs on methods of teaching in their fields. Most of these programs lasted a day or less.
- About one-quarter of all teachers had received no tangible support from their schools or districts for professional development activities in their main assignment fields since the end of the last school year. That is, they had not been given release time from teaching, time built into their schedules, reimbursement for tuition or travel, or professional growth credits.
- Despite the widespread criticism of the current state of professional development by researchers and policymakers, teachers themselves held generally positive views about the impact of professional development on their teaching practices. Moreover, teachers' assessments about the effectiveness of the programs in which they participated were positively associated with their level of participation. In addition, the use of certain instructional practices appears to be linked to participation in specific types of professional development.

## **Changes in Professional Development Since 1993<sup>94</sup>**

The system of teacher professional development described in this report is changing. As school reform strategies have evolved since the early 1980s, teacher professional development has received increasing attention. Many recommendations for improving professional development have been put forth, and states are beginning to take a leadership role in implementing systematic reforms of teachers' professional practices.

In 1996, the National Commission on Teaching and America's Future issued a comprehensive set of recommendations intended to cover the entire continuum of teacher development (NCTAF 1996). With respect to in-service teacher education, the report calls for a redirection of

funds away from ineffective one-shot workshops to more productive types of professional development such as support for teachers' in-school study groups, peer coaching, and other problem-solving efforts. The Commission also called for greater investment in teacher networks, teacher academies, and school-university partnerships, and recommended that professional development time be consolidated and expanded into a block of time at the end of the school year. To fund these changes, the Commission proposed that \$2.75 billion in new state funds be allocated for professional development (that is, over and above what is already being spent). In 1993–94, there were 2.6 million public school teachers in the United States. Thus, this recommendation calls for *new* expenditures of more than \$1,000 per teacher per year.

In a follow-up study issued a year later, NCATF reported important progress in moving toward the recommended directions, despite the conclusion that there is still a long way to go (NCATF 1997). NCATF found that the federal and state governments and a wide range of professional associations and other organizations were paying serious attention to issues of teaching standards and teacher accountability and support for teacher learning and performance. Numerous federal and state initiatives are cited.

Despite the widespread enthusiasm for reform of professional development, policymakers seeking major change face some formidable challenges (Corcoran 1995b). The most significant is how to provide teachers with the time they need to plan their professional development, interact with their colleagues, and develop and implement new approaches. Little support has existed for reducing instructional time, and alternatives that would substantially increase the length of the teacher's day or contract year would be extremely costly (assuming proportionate increases in teachers' salaries). Other challenges cited include funding, competing demands for teachers' time and attention, teachers' attitudes toward professional development activities, incentives for teachers to participate, and public support.

The 1993–94 SASS data provide important baseline information on professional development as practiced in the mid-1990s. The next administration of SASS is scheduled for 1999–2000. By then, reforms now being planned and implemented should have started to make their influence felt by schools and teachers. To determine whether this has happened, however, it will be necessary to substantially revise and expand the number and types of questions asked about professional development.



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## **Appendix A. Standard Error Tables**

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**Table A1—Standard errors for: Percentage of public school principals who thought that various groups had a great deal of influence\* in determining the content of in-service programs, by state: 1993–94**

	State Department of Education	School district	School board	Principal	Teachers	Parents
Total	0.60	0.64	0.54	0.72	0.62	0.32
Alabama	3.43	3.83	3.17	3.30	3.22	1.39
Alaska	1.26	3.36	2.21	2.13	2.68	1.17
Arizona	2.69	4.31	3.07	2.87	3.69	1.17
Arkansas	4.03	4.13	3.20	3.41	3.29	1.40
California	2.60	3.67	2.66	2.71	3.23	2.18
Colorado	1.87	4.23	2.87	2.98	3.20	3.40
Connecticut	2.40	2.63	2.31	2.96	3.41	1.19
Delaware	4.63	3.37	3.64	3.53	3.48	—
District of Columbia	3.90	4.99	4.32	4.56	4.88	3.12
Florida	3.28	2.68	2.11	2.46	2.49	1.76
Georgia	2.79	2.57	2.84	3.37	3.22	—
Hawaii	4.60	4.58	1.64	2.71	3.29	2.58
Idaho	2.54	4.01	2.43	3.89	2.98	1.08
Illinois	2.08	2.91	1.46	2.46	2.49	1.76
Indiana	2.76	4.43	3.26	4.59	4.39	—
Iowa	3.51	4.20	3.04	2.92	3.73	1.44
Kansas	2.38	3.12	2.54	3.48	3.26	—
Kentucky	4.72	4.60	3.93	3.88	3.67	3.08
Louisiana	2.83	2.48	2.86	3.07	2.98	0.74
Maine	1.64	4.00	2.40	3.37	3.61	1.68
Maryland	2.97	3.12	3.44	3.40	3.00	1.73
Massachusetts	1.99	3.84	2.94	2.68	3.40	1.58
Michigan	1.40	4.42	4.37	3.11	3.32	1.62
Minnesota	3.14	3.60	2.40	3.23	2.89	1.80
Mississippi	3.44	2.33	3.60	3.60	3.62	2.12
Missouri	4.00	4.78	3.54	4.01	3.30	1.40
Montana	2.51	2.97	1.97	2.82	2.49	2.00
Nebraska	3.47	5.49	3.60	3.20	2.82	0.48
Nevada	2.82	3.27	2.80	3.37	3.02	—
New Hampshire	2.74	4.83	4.80	3.40	3.52	3.80
New Jersey	3.66	4.03	3.60	4.27	4.40	1.32
New Mexico	3.37	2.83	3.22	4.30	4.33	1.84
New York	3.32	3.68	3.18	4.20	4.67	0.29
North Carolina	3.32	3.27	3.02	3.01	3.20	1.80
North Dakota	2.34	3.82	2.67	3.67	3.60	0.96
Ohio	3.20	4.16	2.57	4.06	4.14	1.22
Oklahoma	3.00	2.89	2.29	3.40	3.38	1.68
Oregon	3.28	3.60	4.84	2.49	3.61	1.62
Pennsylvania	3.42	4.01	3.46	4.20	3.89	1.16
Rhode Island	4.00	3.50	4.42	4.61	4.87	0.00
South Carolina	4.01	3.00	2.59	2.84	3.98	1.81
South Dakota	2.51	3.30	1.97	2.54	2.81	0.54
Tennessee	4.13	3.87	4.40	3.66	3.69	2.42
Texas	3.54	3.49	3.13	2.80	2.68	1.99
Utah	2.39	2.66	2.41	2.62	2.58	1.21
Vermont	4.73	4.00	4.67	3.53	2.94	—
Virginia	3.10	3.33	4.27	3.73	4.13	1.60
Washington	2.41	3.38	2.00	3.29	2.83	0.80
West Virginia	4.57	3.29	3.73	3.49	3.84	1.80
Wisconsin	2.47	4.10	3.09	4.39	3.60	1.91
Wyoming	2.20	2.96	2.71	2.63	2.59	1.46

— Too few cases for a reliable estimate.

\*Teachers were asked how much actual influence they thought teachers at their school had in determining the content of in-service programs. They were categorized as having “a great deal of influence” if they responded 4 or 5 on a scale of 0–5.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Principal Questionnaire).

**Table A2—Standard errors for: Percentage of public school principals who thought that various groups had a great deal of influence\* in determining the content of in-service programs, by selected school characteristics: 1993–94**

	State Department of Education	School district	School board	Principal	Teachers	Parents
Total	0.60	0.64	0.52	0.56	0.62	0.28
<b>Region</b>						
Northeast	1.40	1.66	1.49	1.83	1.93	0.40
Midwest	0.87	1.16	0.97	1.18	1.16	0.44
South	1.14	0.98	0.94	0.87	0.74	0.60
West	1.18	1.93	1.31	1.34	1.60	0.99
<b>District size</b>						
Less than 1,000	1.32	1.33	1.00	1.20	1.68	0.80
1,000–4,999	0.71	1.22	0.89	1.18	1.16	0.39
5,000–9,999	1.70	1.80	1.63	1.82	1.89	1.00
10,000 or more	1.02	1.17	1.20	0.94	0.86	0.76
<b>School size</b>						
Less than 150	1.39	2.20	1.54	1.82	1.93	0.96
150–499	0.79	0.93	0.79	1.11	1.02	0.44
500–749	1.42	1.21	1.47	1.00	1.16	0.82
750 or more	0.98	1.40	1.13	1.08	1.32	0.73

\*Teachers were asked how much actual influence they thought teachers at their school had in determining the content of in-service programs. They were categorized as having “a great deal of influence” if they responded 4 or 5 on a scale of 0–5.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Principal, School, and Teacher Demand and Shortage Questionnaires).

**Table A3—Standard errors for: Percentage of private school principals who thought that various groups had a great deal of influence\* in determining the content of in-service programs, by private school affiliation: 1993–94**

	Governing/ Diocesan board	Principal/ school head	Teachers	Parents
Total	1.03	1.10	1.27	0.58
Affiliation				
Catholic	0.97	0.92	1.23	0.63
Other religious	1.72	1.99	2.30	1.18
Nonsectarian	1.64	1.49	3.02	0.93

\*Teachers were asked how much actual influence they thought teachers at their school had in determining the content of in-service programs. They were categorized as having “a great deal of influence” if they responded 4 or 5 on a scale of 0–5.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Principal and School Questionnaires).

**Table A4—Standard errors for: Percentage distribution of teachers according to the amount of influence\* they thought teachers in their school had in determining the content of in-service programs, by sector and selected teacher and school characteristics: 1993–94**

	Public			Private		
	A great deal	Some	Little or none	A great deal	Some	Little or none
Total	0.43	0.49	0.44	0.57	0.50	0.56
Main assignment field						
K–General elementary	0.74	0.81	0.66	1.09	0.86	0.80
Math or science	0.69	0.73	0.79	1.10	1.40	1.28
English, language arts	0.96	1.26	0.92	1.31	1.60	1.73
Social studies	1.11	1.12	0.91	3.06	2.47	2.33
Special education	0.97	1.12	0.91	2.96	3.09	2.92
Bilingual/ESL	2.60	2.62	2.38	—	—	—
Vocational education	0.88	0.91	0.76	4.87	5.11	4.33
Other	0.64	0.81	0.80	1.00	1.10	1.10
Level						
Elementary	0.60	0.71	0.61	0.79	0.67	0.70
Secondary	0.40	0.44	0.40	0.92	0.80	0.99
Teaching experience						
0–3 years	0.92	1.20	0.99	1.22	1.07	1.13
4–9 years	0.60	0.74	0.83	1.18	1.21	1.18
10–19 years	0.71	0.68	0.60	0.86	1.07	1.04
20 or more years	0.57	0.71	0.66	1.31	1.23	1.04
School size						
Less than 150	1.26	1.06	1.40	1.60	1.27	1.43
150–499	0.60	0.80	0.54	0.90	0.86	0.77
500–749	0.89	0.98	0.83	1.69	1.64	1.51
750 or more	0.60	0.56	0.67	1.83	1.28	1.51

\*Teachers were asked how much actual influence they thought teachers at their school had in determining the content of in-service programs. They were categorized as “a great deal” if they responded 4 or 5 on a scale of 0–5; “some” if they responded 2 or 3; and “little or none” if they responded 0 or 1.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher and School Questionnaires).

**Table A5—Standard errors for: Percentage of teachers who reported that they had participated in a formal teacher induction program during their first year of teaching, by sector and selected teacher, school, and district characteristics: 1993–94**

	Total	Public	Private
Total	0.34	0.37	0.60
Teaching experience			
0–3 years	0.96	1.20	1.06
4–9 years	0.77	0.80	1.12
10–19 years	0.49	0.54	0.76
20 or more years	0.46	0.51	1.00
School size			
Less than 150	0.59	0.83	1.06
150–499	0.40	0.58	0.87
500–749	0.73	0.77	1.80
750 or more	0.61	0.64	1.23
Region			
Northeast	0.83	0.96	1.03
Midwest	0.53	0.62	0.80
South	0.57	0.61	0.97
West	0.92	0.99	1.80
Community type			
Central city	0.76	0.92	0.92
Urban fringe/large town	0.53	0.61	0.78
Rural/small town	0.39	0.43	0.97
District size			
Less than 1,000	(*)	0.70	(*)
1,000–4,999	(*)	0.56	(*)
5,000–9,999	(*)	0.99	(*)
10,000 or more	(*)	0.68	(*)

\*Not applicable to private schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher, School, and Teacher Demand and Shortage Questionnaires).

**Table A6—Standard errors for: Percentage of teachers who reported that they were currently a master or mentor teacher in a formal teacher induction program, by selected teacher and school characteristics: 1993–94**

	Total	Public	Private
Total	0.23	0.26	0.43
Teaching experience			
0–3 years	0.20	0.29	0.41
4–9 years	0.47	0.53	0.77
10–19 years	0.43	0.48	0.91
20 or more years	0.38	0.41	0.91
Highest degree earned			
Bachelor’s degree or less	0.27	0.30	0.41
Master’s degree	0.37	0.39	0.81
Education specialist	1.13	1.24	2.53
Ph.D. or professional	2.37	2.93	3.31
School size			
Less than 150	0.60	0.61	0.93
150–499	0.40	0.38	0.60
500–749	0.54	0.60	1.11
750 or more	0.40	0.43	1.19
Percent minority enrolled in school			
0	0.73	0.80	1.71
1–10	0.32	0.40	0.57
11–30	0.50	0.57	0.88
31–50	0.68	0.71	1.16
More than 50	0.59	0.63	1.01
District size			
Less than 1,000	(*)	0.79	(*)
1,000–4,999	(*)	0.43	(*)
5,000–9,999	(*)	0.72	(*)
10,000 or more	(*)	0.40	(*)

\*Not applicable to private schools.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher, School, and Teacher Demand and Shortage Questionnaires).

**Table A7—Standard errors for: Percentage of teachers who had participated in various types of professional development activities since the end of the last school year, by sector and main assignment field: 1993–94**

	Workshop/ in-service training sponsored by school district or affiliated organization	Workshop/ in-service training sponsored by school	University extension/ adult education course	College course in their subject	Professional growth activities sponsored by professional associations
Total	0.22	0.27	0.20	0.24	0.32
<b>Public</b>	0.22	0.30	0.29	0.28	0.40
Main assignment field					
K–general elementary	0.39	0.60	0.56	0.61	0.69
Math or science	0.69	0.60	0.78	0.71	0.84
English or language arts	0.66	0.73	0.92	0.98	1.21
Social studies	0.74	0.80	0.83	0.89	1.17
Special education	0.67	0.80	0.97	0.81	1.00
Bilingual or ESL	0.83	1.27	2.29	2.48	2.57
Vocational education	0.66	0.60	0.93	0.83	0.91
Other	0.49	0.63	0.49	0.60	0.71
<b>Private</b>	0.60	0.50	0.47	0.42	0.60
Main assignment field					
K–general elementary	0.97	0.82	0.80	0.72	0.86
Math or science	1.28	1.31	1.13	0.94	1.31
English or language arts	1.46	1.28	1.48	1.21	1.77
Social studies	1.98	1.80	1.93	1.87	2.59
Special education	3.90	2.78	2.71	2.98	3.82
Bilingual or ESL	—	—	—	—	—
Vocational education	5.20	3.93	4.77	2.59	4.94
Other	1.08	0.91	0.87	0.90	1.17

—Too few cases for a reliable estimate.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table A9—Standard errors for: Percentage of public school teachers who had participated in various professional development activities since the end of the last school year, by state: 1993–94**

	District-sponsored workshop/ in-service training	School-sponsored workshop/ in-service training	University extension/adult education course	College course in their subject	Professional growth activities sponsored by profes- sional associations
Total	0.22	0.30	0.29	0.28	0.40
Alabama	1.06	1.16	1.47	1.37	1.54
Alaska	0.51	0.80	1.47	1.60	1.47
Arizona	1.12	1.17	1.74	1.90	1.87
Arkansas	0.72	1.09	1.23	1.56	2.04
California	0.90	1.16	1.20	1.63	2.12
Colorado	1.28	1.22	1.61	1.50	1.84
Connecticut	0.57	0.89	1.23	1.13	1.60
Delaware	0.73	1.56	1.68	1.94	2.00
District of Columbia	1.62	1.80	1.68	1.86	2.04
Florida	0.78	1.08	1.38	1.59	1.67
Georgia	1.41	1.42	1.16	1.20	1.88
Hawaii	1.23	1.73	1.83	1.72	1.70
Idaho	0.88	1.66	1.48	1.84	1.71
Illinois	0.89	1.16	1.26	1.16	2.06
Indiana	1.72	1.53	1.60	1.78	1.80
Iowa	0.94	1.50	1.74	1.98	2.00
Kansas	0.49	0.83	1.27	1.24	1.39
Kentucky	0.83	1.19	1.68	1.87	2.33
Louisiana	1.07	1.03	0.89	1.19	1.29
Maine	1.20	1.21	1.40	1.98	2.52
Maryland	1.03	1.89	1.39	1.59	1.66
Massachusetts	1.17	1.19	0.92	1.33	1.43
Michigan	1.33	1.84	1.82	1.57	2.30
Minnesota	0.99	1.31	1.74	1.83	2.41
Mississippi	1.40	1.01	1.00	1.19	1.84
Missouri	1.06	1.40	1.51	1.79	1.54
Montana	0.81	1.00	1.12	1.31	1.23
Nebraska	1.02	1.21	1.22	1.46	1.98
Nevada	1.77	1.98	1.71	1.60	2.24
New Hampshire	0.93	1.33	1.43	2.06	1.73
New Jersey	1.32	1.88	2.33	2.00	2.07
New Mexico	1.27	1.80	1.21	1.60	1.60
New York	1.99	2.60	1.28	1.62	2.04
North Carolina	1.20	1.19	1.22	1.17	1.61
North Dakota	0.94	1.17	1.48	1.19	1.32
Ohio	1.20	1.54	1.54	1.67	2.00
Oklahoma	0.84	0.94	1.17	1.20	1.59
Oregon	1.40	1.80	1.49	1.90	2.16
Pennsylvania	1.36	2.08	2.28	1.80	2.20
Rhode Island	1.88	2.32	1.70	1.80	2.22
South Carolina	1.22	1.33	1.48	1.98	2.00
South Dakota	0.64	1.00	1.50	1.33	1.41
Tennessee	1.28	1.38	1.67	1.59	2.13
Texas	0.80	1.01	1.16	1.37	1.81
Utah	1.01	0.91	1.19	1.63	1.47
Vermont	1.16	1.37	1.46	2.06	1.81
Virginia	1.54	1.30	2.09	2.27	2.40
Washington	0.94	1.10	1.72	2.17	2.02
West Virginia	0.97	1.64	1.77	1.70	1.69
Wisconsin	1.04	1.71	1.89	1.53	2.24
Wyoming	0.73	1.21	1.08	1.18	1.20

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table A10—Standard errors for: States with the highest and lowest public school teacher participation rates in various types of professional development activities since the end of the last school year: 1993–94**

Workshop/in-service training program sponsored by school district	Workshop/in-service training program sponsored by school	University extension/adult education course	College course in their subject	Professional growth activities sponsored by professional associations					
<b>States with highest participation rates</b>									
Kansas	0.49	Kentucky	1.19	Wyoming	1.08	Alaska	1.60	New Hampshire	1.73
Kentucky	0.83	Oklahoma	0.94	Alaska	1.47	Idaho	1.84	Vermont	1.81
Alaska	0.51	North Carolina	1.19	North Dakota	1.48	North Dakota	1.19	Connecticut	1.60
Connecticut	0.57	Connecticut	0.89	Washington	1.72	Vermont	2.06	Missouri	1.54
Iowa	0.94	Arkansas	1.09	Idaho	1.48	South Dakota	1.33	Oklahoma	1.59
South Dakota	0.64	Florida	1.08	Colorado	1.61	Hawaii	1.72	Nebraska	1.98
Oklahoma	0.84	Texas	1.01	Montana	1.12	Wyoming	1.18	California	2.12
Delaware	0.73	California	1.16	Hawaii	1.83	Colorado	1.50	Minnesota	2.41
Arkansas	0.72	South Carolina	1.33	South Dakota	1.50	District of Columbia	1.86	New Jersey	2.07
Texas	0.80	Vermont	1.37	California	1.20	Washington	2.17	Maine	2.52
<b>States with lowest participation rates</b>									
New Mexico	1.27	Maryland	1.89	Indiana	1.60	Florida	1.59	Rhode Island	2.22
Hawaii	1.23	North Dakota	1.17	New York	1.28	Arkansas	1.56	Pennsylvania	2.20
Louisiana	1.07	Wisconsin	1.71	Rhode Island	1.70	Michigan	1.57	Florida	1.67
Rhode Island	1.88	New Jersey	1.88	Tennessee	1.67	Indiana	1.78	Hawaii	1.70
Nevada	1.77	Massachusetts	1.19	Arkansas	1.23	Connecticut	1.13	Mississippi	1.84
Maryland	1.03	Rhode Island	2.32	Kentucky	1.68	New Jersey	2.00	New Mexico	1.60
Massachusetts	1.17	Ohio	1.54	Louisiana	0.89	Alabama	1.37	Maryland	1.66
New York	1.99	Nevada	1.98	Texas	1.16	Texas	1.37	South Carolina	2.00
Indiana	1.72	New York	2.60	Georgia	1.16	Mississippi	1.19	Utah	1.47
Georgia	1.41	Pennsylvania	2.08	Mississippi	1.00	North Carolina	1.17	Georgia	1.88

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table A11—Standard errors for: Percentage of teachers who had participated in an in-service or professional development program that focused on various topics since the end of the last school year, by main assignment field: 1993–94**

	Uses of educational technology for instruction	Methods of teaching in their field	In-depth study in their subject	Student assessment	Cooperative learning in the classroom
Total	0.36	0.32	0.26	0.30	0.31
<b>Public</b>	0.40	0.36	0.30	0.40	0.34
Main assignment field					
K–general elementary	0.74	0.69	0.58	0.80	0.71
Math or science	0.91	1.02	0.84	0.81	0.83
English or language arts	1.01	0.89	0.90	1.00	1.01
Social studies	1.17	1.10	0.80	0.93	1.16
Special education	1.09	0.88	0.96	0.96	1.02
Bilingual or ESL	3.48	1.59	2.24	2.27	2.53
Vocational education	0.92	0.80	0.78	1.06	1.00
Other	0.60	0.86	0.60	0.68	0.67
<b>Private</b>	0.44	0.50	0.39	0.53	0.52
Main assignment field					
K–general elementary	0.76	1.00	0.61	1.01	0.91
Math or science	1.32	1.24	1.00	1.07	1.24
English or language arts	1.54	1.80	1.49	1.74	1.32
Social studies	2.17	1.92	1.59	2.31	2.52
Special education	2.92	3.62	3.47	3.40	3.34
Bilingual or ESL	—	—	—	—	—
Vocational education	5.20	4.07	2.20	5.22	5.13
Other	0.96	1.00	1.02	1.02	1.03

—Too few cases for a reliable estimate.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table A13—Standard errors for: Percentage of teachers who had participated in an in-service or professional development program that focused on various topics since the end of the last school year, by state: 1993–94**

	Uses of educational technology for instruction	Methods of teaching in their field	In-depth study in their subject	Student assessment	Cooperative learning in the classroom
Total	0.40	0.36	0.30	0.40	0.34
Alabama	1.67	1.34	1.80	2.00	1.93
Alaska	1.66	1.43	1.19	2.40	1.31
Arizona	2.47	1.58	1.44	1.90	1.68
Arkansas	2.19	1.57	1.69	1.62	1.80
California	2.19	1.36	1.76	1.31	1.71
Colorado	2.00	1.40	1.58	1.43	1.79
Connecticut	1.90	1.52	1.27	1.77	1.59
Delaware	1.99	1.94	2.31	1.60	1.82
District of Columbia	2.38	3.01	2.43	1.92	2.73
Florida	1.41	1.71	2.20	1.99	2.23
Georgia	1.47	1.74	1.13	2.18	2.06
Hawaii	1.76	1.40	1.76	1.78	1.86
Idaho	2.01	1.86	1.72	1.92	1.81
Illinois	1.54	1.28	1.34	1.18	1.47
Indiana	1.81	2.09	1.22	1.68	2.40
Iowa	2.89	1.94	1.57	1.90	2.30
Kansas	1.46	1.31	1.06	1.40	1.54
Kentucky	2.00	1.80	2.58	1.17	2.10
Louisiana	1.93	1.29	1.46	1.72	1.84
Maine	1.93	2.01	1.60	2.12	1.99
Maryland	1.68	1.71	1.66	1.96	1.60
Massachusetts	1.42	1.28	1.23	1.20	1.32
Michigan	2.40	2.26	1.93	2.60	1.80
Minnesota	1.86	2.06	1.69	2.34	2.09
Mississippi	1.59	1.88	1.37	1.89	1.87
Missouri	2.21	1.82	1.13	1.69	1.98
Montana	1.20	1.02	1.13	1.20	1.30
Nebraska	1.84	1.80	1.13	1.46	1.51
Nevada	2.21	1.73	2.10	2.16	1.68
New Hampshire	2.74	1.92	2.50	2.37	2.17
New Jersey	2.36	2.42	2.20	2.77	2.34
New Mexico	1.94	1.59	1.60	1.78	1.88
New York	1.98	2.00	1.53	2.16	1.97
North Carolina	1.99	1.69	1.60	1.61	1.76
North Dakota	1.87	1.52	1.27	1.78	1.51
Ohio	2.19	2.09	1.61	1.40	2.20
Oklahoma	2.17	1.79	1.69	1.41	1.90
Oregon	2.27	2.17	1.59	2.28	2.13
Pennsylvania	2.31	1.89	1.74	2.08	2.30
Rhode Island	2.08	2.26	1.68	2.60	2.72
South Carolina	2.32	2.80	2.02	2.37	1.96
South Dakota	1.50	1.13	1.53	1.27	1.42
Tennessee	2.21	2.32	1.77	2.08	2.00
Texas	1.84	1.67	1.64	1.56	1.43
Utah	1.94	1.20	1.39	1.66	1.19
Vermont	2.72	1.77	1.50	2.34	2.10
Virginia	2.38	2.09	2.08	2.33	2.56
Washington	1.79	1.38	1.66	1.93	2.40
West Virginia	2.41	1.60	1.64	1.76	1.88
Wisconsin	2.47	2.40	1.60	2.39	2.44
Wyoming	1.47	1.28	0.91	1.71	1.69

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table A14a—Standard errors for: Percentage distribution of public school teachers according to the number of hours spent in in-service or professional development programs on certain topics since the end of the last school year, by state: 1993–94**

	Use of technology				Methods of teaching				In-depth study			
	0	8	9–32	> 32	0	8	9–32	> 32	0	8	9–32	> 32
	hours	hours	hours	hours	hours	hours	hours	hours	hours	hours	hours	hours
Total	0.40	0.39	0.27	0.13	0.36	0.38	0.26	0.21	0.30	0.20	0.23	0.18
Alabama	1.67	1.53	1.11	0.55	1.34	1.82	1.29	0.86	1.80	1.34	1.18	1.01
Alaska	1.66	1.62	1.06	0.66	1.43	1.18	0.94	0.92	1.19	1.02	0.91	0.72
Arizona	2.47	1.94	1.45	0.38	1.58	1.98	1.27	0.84	1.44	1.24	0.86	0.71
Arkansas	2.19	1.96	0.96	0.27	1.57	1.85	1.40	0.91	1.69	1.33	1.24	0.93
California	2.19	2.06	1.02	0.70	1.36	1.58	1.36	1.24	1.76	1.23	1.40	1.04
Colorado	1.95	1.85	0.99	0.66	1.40	1.66	1.58	0.95	1.58	1.18	1.17	0.98
Connecticut	1.90	1.47	1.11	0.47	1.52	1.89	1.48	0.59	1.27	1.24	0.85	0.65
Delaware	1.99	2.27	1.22	0.65	1.94	1.64	1.46	1.04	2.31	1.86	1.13	0.81
District of Columbia	2.38	1.86	2.79	1.38	3.01	2.64	1.67	1.28	2.43	1.85	1.30	1.50
Florida	1.41	1.96	1.42	1.02	1.71	1.33	1.25	0.66	2.15	1.85	1.05	0.52
Georgia	1.47	1.63	1.27	0.58	1.74	1.67	0.89	0.73	1.13	0.68	0.88	0.54
Hawaii	1.76	1.82	1.25	1.12	1.40	1.28	1.67	1.31	1.76	1.22	1.32	1.10
Idaho	2.01	1.47	1.15	0.59	1.86	1.63	1.64	1.11	1.72	1.06	0.98	0.83
Illinois	1.54	1.29	0.65	0.46	1.28	1.21	0.92	0.55	1.34	0.81	0.66	0.59
Indiana	1.81	1.81	1.33	0.66	2.09	2.25	1.58	0.65	1.22	1.09	0.69	0.79
Iowa	2.89	2.63	1.48	0.88	1.94	1.87	1.70	1.11	1.57	1.19	0.97	0.84
Kansas	1.46	1.30	1.11	0.53	1.31	1.28	0.85	0.57	1.06	0.97	0.93	0.56
Kentucky	2.05	2.40	2.37	0.60	1.85	2.31	2.45	1.50	2.58	2.20	1.56	0.80
Louisiana	1.93	1.69	1.03	0.31	1.29	1.54	1.09	0.81	1.46	1.05	0.95	0.64
Maine	1.93	1.60	0.91	0.77	2.01	1.97	1.27	1.41	1.60	1.12	0.95	0.90
Maryland	1.68	1.58	1.07	0.53	1.71	1.90	1.40	0.77	1.66	1.38	1.05	0.42
Massachusetts	1.42	1.06	0.97	0.42	1.28	1.30	1.11	0.82	1.23	1.28	0.75	0.54
Michigan	2.45	2.60	1.05	0.74	2.26	2.01	1.67	1.10	1.93	1.57	1.20	1.16
Minnesota	1.86	2.03	1.70	0.80	2.06	1.81	1.90	0.95	1.69	1.22	1.28	1.02
Mississippi	1.59	1.33	1.06	0.42	1.88	1.77	1.05	0.58	1.37	1.31	0.89	0.56
Missouri	2.21	1.87	1.19	0.55	1.82	1.77	1.21	0.79	1.13	0.90	1.08	0.53
Montana	1.20	1.15	0.95	0.40	1.02	1.11	1.23	0.65	1.13	0.88	0.63	0.55
Nebraska	1.84	2.06	1.23	0.40	1.75	1.55	1.30	0.66	1.13	0.84	0.81	0.62
Nevada	2.21	1.66	1.32	0.50	1.73	1.28	1.72	0.86	2.10	1.23	1.25	0.92
New Hampshire	2.74	2.08	1.42	0.45	1.92	2.06	1.63	1.29	2.50	1.93	1.86	1.22
New Jersey	2.36	2.35	1.63	0.82	2.42	2.97	1.91	0.93	2.15	1.76	1.28	1.01
New Mexico	1.94	1.53	0.98	0.45	1.59	1.34	1.00	0.60	1.60	1.36	1.00	0.49
New York	1.98	1.79	1.73	0.25	1.95	2.17	1.80	0.91	1.53	1.23	1.18	0.93
North Carolina	1.99	1.43	1.78	0.49	1.69	2.08	1.62	0.99	1.65	1.09	1.10	0.87
North Dakota	1.87	1.53	1.03	0.37	1.52	1.51	1.19	0.77	1.27	1.00	0.93	0.75
Ohio	2.19	1.88	1.17	0.38	2.09	1.95	1.62	0.74	1.61	1.31	1.38	0.82
Oklahoma	2.17	2.01	0.80	0.15	1.79	1.63	1.31	0.61	1.69	1.49	1.06	0.67
Oregon	2.27	1.85	1.01	0.83	2.17	1.78	1.27	0.78	1.59	1.19	1.04	0.77
Pennsylvania	2.31	1.91	1.50	0.64	1.89	1.80	1.51	0.92	1.74	1.62	0.85	0.89
Rhode Island	2.08	2.19	1.35	0.66	2.26	2.38	1.67	0.92	1.68	1.45	1.16	0.87
South Carolina	2.32	1.95	1.13	0.75	2.75	1.90	1.78	1.18	2.02	1.37	0.94	0.88
South Dakota	1.50	1.31	1.00	0.39	1.13	1.20	0.84	0.64	1.53	1.03	0.61	0.64
Tennessee	2.21	2.32	1.38	1.33	2.32	2.60	1.40	1.06	1.77	1.46	0.76	0.80
Texas	1.84	1.83	1.41	0.57	1.67	1.71	1.39	0.99	1.64	1.35	1.03	0.99
Utah	1.94	2.32	1.61	0.46	1.20	1.02	1.01	0.79	1.39	0.86	0.91	0.70
Vermont	2.72	2.49	1.28	1.27	1.77	1.89	1.33	1.38	1.50	1.17	1.10	1.31
Virginia	2.38	2.03	1.20	0.65	2.09	2.06	1.82	1.10	2.08	1.45	1.15	0.85
Washington	1.79	1.57	1.83	0.90	1.38	1.75	1.54	0.98	1.66	1.13	1.52	0.90
West Virginia	2.41	2.37	1.36	0.68	1.65	2.23	1.80	1.02	1.64	1.48	1.39	0.58
Wisconsin	2.47	2.28	1.56	0.74	2.40	1.90	1.62	1.52	1.60	1.19	0.99	1.09
Wyoming	1.47	1.26	0.65	0.66	1.28	0.93	0.99	0.62	0.91	0.72	0.80	0.48

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table A14b—Standard errors for: Percentage distribution of public school teachers according to the number of hours spent in in-service or professional development programs on certain topics since the end of the last school year, by state: 1993–94**

	Student assessment				Cooperative learning			
	0.00 hours	8.00 hours	9–32 hours	> 32 hours	0.00 hours	8.00 hours	9–32 hours	> 32 hours
Total	0.35	0.34	0.22	0.13	0.34	0.32	0.23	0.13
Alabama	2.05	1.93	0.85	0.53	1.93	1.80	1.01	0.50
Alaska	2.40	1.97	0.87	0.44	1.31	1.08	0.74	0.42
Arizona	1.90	1.97	1.11	0.60	1.68	1.54	0.79	0.50
Arkansas	1.62	1.59	1.01	0.35	1.75	1.57	1.01	0.71
California	1.31	1.96	1.10	0.81	1.71	1.78	1.21	0.62
Colorado	1.43	1.28	1.04	0.85	1.79	1.67	1.10	0.34
Connecticut	1.77	1.60	1.01	0.47	1.59	1.41	1.10	0.51
Delaware	1.65	1.51	1.30	0.65	1.82	1.93	1.10	0.29
District of Columbia	1.92	1.71	1.18	0.79	2.73	3.23	1.85	1.29
Florida	1.99	1.80	1.16	0.46	2.23	2.11	1.08	0.49
Georgia	2.18	1.77	0.60	0.72	2.06	1.55	1.10	0.86
Hawaii	1.78	1.74	1.28	0.66	1.86	2.23	1.78	1.11
Idaho	1.92	1.94	1.19	0.86	1.81	1.32	1.51	0.58
Illinois	1.18	1.12	0.76	0.46	1.47	1.23	1.00	0.54
Indiana	1.68	1.45	0.55	0.64	2.40	2.22	0.62	0.32
Iowa	1.90	1.95	1.55	0.57	2.30	2.31	0.99	0.97
Kansas	1.40	1.48	0.87	0.54	1.54	1.39	0.73	0.28
Kentucky	1.17	2.65	2.43	0.60	2.10	2.81	1.68	0.47
Louisiana	1.72	1.51	0.80	0.51	1.84	1.81	1.11	0.44
Maine	2.12	1.98	1.52	0.92	1.99	1.87	1.01	1.13
Maryland	1.96	2.05	1.20	0.65	1.55	1.84	1.28	0.75
Massachusetts	1.20	1.21	0.75	0.49	1.32	1.66	1.17	0.53
Michigan	2.60	2.66	0.89	0.73	1.85	1.67	1.17	0.63
Minnesota	2.34	2.22	1.32	0.56	2.09	2.36	1.01	0.53
Mississippi	1.89	1.58	1.07	0.27	1.87	2.17	0.93	0.50
Missouri	1.69	1.67	0.81	0.55	1.98	1.91	0.95	0.43
Montana	1.25	1.01	0.88	0.43	1.30	0.98	0.87	0.24
Nebraska	1.46	1.39	0.92	0.25	1.51	1.37	0.95	0.69
Nevada	2.16	1.55	1.07	0.45	1.68	1.59	1.49	0.45
New Hampshire	2.37	1.95	1.20	0.69	2.17	2.15	1.23	0.89
New Jersey	2.77	2.70	1.19	0.39	2.34	2.56	1.32	0.68
New Mexico	1.78	1.94	0.70	0.63	1.88	1.67	0.97	0.44
New York	2.16	1.91	1.47	0.66	1.97	1.42	1.00	0.96
North Carolina	1.61	1.39	1.14	0.53	1.76	1.80	1.48	0.51
North Dakota	1.78	1.43	0.91	0.45	1.51	1.39	0.69	0.45
Ohio	1.40	1.59	1.13	0.84	2.20	2.25	1.57	0.69
Oklahoma	1.41	1.35	0.59	0.29	1.90	1.77	0.90	0.36
Oregon	2.28	2.14	0.96	0.75	2.13	1.96	1.38	0.50
Pennsylvania	2.08	1.66	1.30	0.71	2.30	2.49	1.32	0.65
Rhode Island	2.65	2.42	1.23	0.60	2.72	2.22	1.28	0.85
South Carolina	2.37	1.91	1.00	0.78	1.96	1.74	1.15	0.63
South Dakota	1.27	1.06	0.79	0.45	1.42	1.32	0.83	0.32
Tennessee	2.08	2.05	0.90	0.58	2.00	2.18	1.04	0.47
Texas	1.56	1.65	0.97	0.49	1.43	1.87	1.10	0.55
Utah	1.66	1.33	0.72	0.44	1.19	1.14	0.99	0.31
Vermont	2.34	1.82	1.63	1.18	2.10	1.66	1.50	0.71
Virginia	2.33	1.87	1.17	0.62	2.56	2.61	1.47	0.65
Washington	1.93	1.97	1.50	0.69	2.45	1.78	1.42	0.68
West Virginia	1.76	2.01	1.14	0.41	1.88	1.99	1.13	0.78
Wisconsin	2.39	2.44	0.90	0.61	2.44	1.90	0.96	0.64
Wyoming	1.71	1.52	0.69	0.39	1.69	1.35	0.82	0.44

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table A15—Standard errors for: Average number of hours per week full-time teachers were required to be at school and average amount of time spent outside regular school hours in school-related activities, by sector: 1993–94**

	Required to be at school	Spent in activities outside school hours	
		With students	Without students
Total	0.07	0.04	0.04
Sector			
Public	0.08	0.04	0.05
Private	0.11	0.06	0.10

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table A16—Standard errors for: Percentage of teachers who reported receiving various types of support for in-service or professional development in their main teaching field during the current school year, by selected school and district characteristics: 1993–94**

	Release time from teaching	Time built into schedule	Travel expense	Tuition or fees	Professional growth credits	None of these
Total	0.32	0.34	0.28	0.20	0.30	0.28
<b>Public</b>	0.40	0.38	0.32	0.28	0.34	0.32
School size						
Less than 150	1.32	1.21	1.12	0.92	1.14	0.86
150–499	0.68	0.71	0.62	0.60	0.67	0.54
500–749	0.92	0.77	0.71	0.60	0.80	0.64
750 or more	0.64	0.60	0.57	0.58	0.61	0.48
District size						
Less than 1,000	1.26	0.76	0.83	0.90	0.80	0.72
1,000–4,999	0.77	0.73	0.68	0.74	0.59	0.69
5,000–9,999	0.91	1.11	1.03	0.79	1.11	0.77
10,000 or more	0.67	0.63	0.49	0.52	0.63	0.56
<b>Private</b>	0.53	0.48	0.50	0.54	0.57	0.51
School size						
Less than 150	1.13	1.03	1.46	1.16	0.98	1.18
150–499	0.84	0.80	0.78	0.79	0.81	0.83
500–749	1.84	1.42	1.60	1.69	1.57	1.92
750 or more	1.66	1.68	1.67	2.20	1.81	1.60
Affiliation						
Catholic	0.84	0.60	0.64	0.80	0.78	0.64
Other religious	0.90	0.94	1.02	1.11	1.00	1.08
Nonsectarian	1.16	1.01	1.32	1.26	1.20	1.10

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher, School, and Teacher Demand and Shortage Questionnaires).

**Table A17—Standard errors for: Percentage of teachers who reported receiving various types of support for in-service education or professional development in their main teaching field during the current school year, by state: 1993–94**

	Release time from teaching	Time built into schedule	Travel expense	Tuition or fees	Professional growth credits	None of these
Total	0.35	0.38	0.32	0.28	0.34	0.32
Alabama	1.88	1.84	1.24	0.93	1.61	1.22
Alaska	1.28	1.20	1.51	1.09	1.20	0.95
Arizona	2.22	1.33	1.23	1.78	1.71	1.68
Arkansas	2.26	1.77	1.66	1.74	2.21	1.26
California	1.59	1.85	1.29	1.85	1.93	1.32
Colorado	1.93	2.39	1.23	1.67	1.69	1.24
Connecticut	1.68	1.76	1.71	1.08	1.40	0.99
Delaware	1.86	2.32	1.07	2.11	1.79	1.99
District of Columbia	2.51	2.93	1.33	2.15	2.61	2.30
Florida	2.10	1.53	1.47	1.58	1.91	1.13
Georgia	1.92	1.94	1.36	1.33	1.72	1.68
Hawaii	1.64	1.82	1.71	1.50	1.86	1.64
Idaho	1.65	1.61	1.87	1.74	1.68	1.16
Illinois	1.42	1.33	1.19	1.37	1.44	1.10
Indiana	1.87	1.30	1.85	1.50	1.26	1.72
Iowa	2.14	1.94	2.12	2.10	1.49	1.57
Kansas	1.50	1.64	1.51	1.50	1.48	1.12
Kentucky	2.42	2.57	2.51	1.62	2.43	1.59
Louisiana	1.64	1.69	1.22	1.61	1.32	1.45
Maine	2.24	1.92	2.14	2.10	2.12	1.51
Maryland	1.68	1.91	1.07	1.23	1.32	1.74
Massachusetts	1.49	1.72	0.99	1.34	1.65	1.48
Michigan	2.33	2.11	1.89	2.16	1.84	2.22
Minnesota	1.90	2.21	1.71	1.70	1.92	1.25
Mississippi	2.00	2.03	1.79	1.05	1.86	1.38
Missouri	2.13	2.04	1.81	1.86	1.64	2.14
Montana	1.28	1.70	1.17	1.16	1.59	1.20
Nebraska	1.34	1.55	1.52	1.24	1.61	1.25
Nevada	2.44	2.05	1.30	1.27	1.36	1.50
New Hampshire	1.81	2.26	2.15	2.25	1.87	1.11
New Jersey	2.48	2.71	2.31	2.39	2.13	2.00
New Mexico	2.33	1.70	1.39	1.42	1.31	1.84
New York	2.10	1.99	2.23	1.76	1.94	1.82
North Carolina	1.77	1.90	1.64	1.49	1.57	1.54
North Dakota	1.81	1.44	1.86	1.78	1.40	1.59
Ohio	2.65	2.02	1.79	1.78	1.53	2.25
Oklahoma	1.85	1.92	1.20	1.02	1.26	1.32
Oregon	1.89	2.00	2.30	2.18	1.73	1.78
Pennsylvania	2.68	2.17	2.38	1.81	1.75	2.29
Rhode Island	2.37	2.02	1.47	1.68	1.57	2.24
South Carolina	1.56	2.06	1.81	1.75	2.02	1.49
South Dakota	1.47	1.54	1.52	1.15	1.00	1.23
Tennessee	1.53	1.78	1.64	1.17	2.44	1.96
Texas	1.83	1.57	1.66	1.81	1.93	1.14
Utah	1.56	1.47	1.14	1.60	1.13	1.19
Vermont	2.22	2.00	1.99	1.89	2.13	1.63
Virginia	2.01	2.17	1.83	2.51	1.89	1.77
Washington	1.99	2.14	1.91	2.21	1.73	1.71
West Virginia	1.82	2.13	1.77	1.72	1.66	1.97
Wisconsin	2.11	2.05	1.98	1.63	1.67	1.67
Wyoming	1.09	1.50	1.29	1.28	1.12	0.92

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table A18—Standard errors for: Percentage of teachers who strongly agreed with various statements about within-school collaboration among teachers and principals, by selected teacher and school characteristics: 1993–94**

	The principal talks with me frequently about my instructional practices	There is a great deal of cooperative effort among the staff members	I make a conscious effort to coordinate the content of my course with other teachers
Total	0.23	0.40	0.34
<b>Public</b>	0.26	0.40	0.38
Level			
Elementary	0.40	0.67	0.57
Secondary	0.22	0.41	0.37
Teaching experience			
0–3 years	0.62	0.99	0.96
4–9 years	0.48	0.92	0.92
10–19 years	0.43	0.60	0.60
20 or more years	0.41	0.61	0.61
School size			
Less than 150	0.86	1.21	1.24
150–499	0.48	0.76	0.71
500–749	0.56	0.78	0.84
750 or more	0.30	0.64	0.59
District size			
Less than 1,000	0.60	1.11	1.12
1,000–4,999	0.60	0.74	0.74
5,000–9,999	0.63	1.16	0.86
10,000 or more	0.38	0.66	0.61
<b>Private</b>	0.44	0.57	0.51
Level			
Elementary	0.53	0.81	0.72
Secondary	0.67	1.13	0.83
Teaching experience			
0–3 years	1.01	1.00	1.16
4–9 years	1.00	1.20	0.99
10–19 years	0.93	0.96	0.96
20 or more years	1.17	1.20	1.23
School size			
Less than 150	1.30	1.27	1.16
150–499	0.60	0.77	0.80
500–749	0.94	1.77	1.39
750 or more	1.14	1.50	1.80
Affiliation			
Catholic	0.61	0.78	0.69
Other religious	1.12	1.00	0.92
Nonsectarian	1.07	1.49	1.51

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher, School, and Teacher Demand and Shortage Questionnaires).

**Table A19—Standard errors for: Percentage of teachers who had participated in certain types of professional development who agreed or strongly agreed that the activities had various impacts, by selected teacher and school characteristics: 1993–94**

	Provided with new information	Led to seek more information	Caused change in teaching practices	Changed view on teaching	Generally a waste of time
Total	0.22	0.36	0.28	0.30	0.21
<b>Public</b>	0.20	0.40	0.32	0.34	0.24
Main assignment field					
K–General elementary	0.53	0.88	0.66	0.60	0.40
Math or science	0.53	0.76	0.60	0.89	0.53
English, language arts	0.84	1.08	1.06	1.00	0.67
Social studies	0.77	1.22	1.28	1.17	0.90
Special education	0.94	1.17	1.13	1.07	0.60
Bilingual/ESL	1.48	2.31	2.80	2.06	1.60
Vocational education	0.72	1.01	1.18	0.96	0.66
Other	0.54	0.76	0.73	0.68	0.40
Teaching experience					
0–3 years	0.66	1.27	0.98	1.27	0.59
4–9 years	0.54	0.73	0.77	0.73	0.50
10–19 years	0.40	0.67	0.53	0.60	0.32
20 or more years	0.42	0.50	0.50	0.60	0.43
<b>Private</b>	0.40	0.56	0.61	0.60	0.30
Main assignment field					
K–General elementary	0.76	0.91	1.07	1.04	0.47
Math or science	1.20	1.20	1.36	1.36	0.84
English, language arts	1.48	1.97	1.90	1.60	1.04
Social studies	1.73	2.56	2.94	2.49	2.11
Special education	2.16	2.79	3.23	3.16	1.83
Bilingual/ESL	—	—	—	—	—
Vocational education	5.91	6.39	5.80	6.46	3.70
Other	0.90	1.31	1.40	1.46	0.77
Teaching experience					
0–3 years	0.89	1.07	1.32	1.33	0.74
4–9 years	0.77	1.20	1.10	1.14	0.70
10–19 years	0.87	1.00	1.09	1.18	0.51
20 or more years	1.02	0.93	1.46	1.23	0.67

—Too few cases for a reliable estimate.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire).

**Table A20—Standard errors for: Percentage of teachers who reported that they instructed students in various grouping patterns and that students did various group activities at least once a week during the last semester, by selected teacher characteristics: 1994–95**

	Teacher activities			Student activities		
	Provided whole group instruction	Worked with small groups	Worked with individual students	Group project for individual grade	Group project for group grade	Class discussed work done in groups
Total	0.32	0.58	0.36	1.07	0.88	0.89
<b>Public</b>	0.35	0.64	0.38	1.23	0.98	1.00
Professional development: Cooperative learning						
Yes	0.47	0.84	0.47	1.54	1.45	1.42
No	0.41	1.22	0.56	1.75	1.22	1.45
<b>Private</b>	0.57	1.24	0.68	1.03	1.04	1.23
Professional development: Cooperative learning						
Yes	0.65	1.76	0.75	2.21	1.97	2.02
No	0.77	1.63	0.96	1.60	1.09	1.85

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher Questionnaire) and Teacher Follow-up Survey: 1994–95.

**Table A21—Standard errors for: Percentage of teachers who used portfolios during the last semester and percentage who included various types of student work in those portfolios, by selected teacher characteristics: 1994–95**

	Percentage who used portfolios	Of teachers who used portfolios, percentage including types of student work in portfolios				
		Worksheets	Exploratory investigations	Inter-disciplinary problems	Homework	Tests and assessments
Total	0.99	1.45	1.15	1.18	1.20	1.40
<b>Public</b>	1.09	1.58	1.26	1.34	1.36	1.55
Professional development: Assessment						
Yes	1.52	2.34	1.96	2.06	2.02	1.99
No	1.82	2.34	1.68	1.64	2.11	2.18
<b>Private</b>	1.59	2.18	1.83	1.84	2.50	2.14
Professional development: Assessment						
Yes	2.42	3.41	2.48	3.27	3.37	2.67
No	2.23	2.72	2.59	2.29	3.48	3.18

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher and Teacher Demand and Shortage Questionnaires) and Teacher Follow-up Survey: 1994–95.

**Table A22—Standard errors for: Percentage of teachers who reported that they demonstrated a concept using electronic media and that they planned in-class activities requiring students to use selected tools at least once a week during the last semester, by selected teacher characteristics: 1994–95**

	Teachers used	Students used in class	
	Computer, video, or other electronic medium	Calculators	Computers for writing
Total	0.92	0.93	0.90
<b>Public</b>	1.00	1.05	1.06
Professional development: Education technology			
Yes	1.48	1.62	1.27
No	1.39	1.20	1.35
<b>Private</b>	1.49	1.07	1.46
Professional development: Education technology			
Yes	2.62	2.40	2.81
No	1.65	1.27	1.77

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher and Teacher Demand and Shortage Questionnaires) and Teacher Follow-up Survey: 1994–95.

**Table A23—Standard errors for: Percentage of fourth-graders whose reading teachers reported using various resources at least once a week, by teachers' staff development experience: 1994**

	Children's newspapers	Reading kits	Software for reading	Variety of books	Materials from other subject areas
Total	2.61	2.25	1.94	2.06	2.09
Staff development hours in reading					
Fewer than 6	3.71	2.60	3.20	4.04	3.44
6–35	3.23	3.48	2.83	2.88	2.62
More than 35	4.99	3.96	4.80	2.80	4.43

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1994 (Reading Teacher Questionnaire).

**Table A24—Standard errors for: Percentage of fourth-graders whose reading teachers asked them to do certain activities at least once a week, by teachers' staff development experience: 1994**

	Talk with other students about readings	Write about readings	Group activity about readings	Discuss interpre- tations of readings	Explain under- standing of readings	Workbook exercises
Total	1.95	2.01	2.09	2.18	1.29	2.64
Staff development hours in reading						
Fewer than 6	3.54	2.80	3.09	3.39	2.38	3.03
6–35	2.29	2.40	3.30	3.30	1.43	3.40
More than 35	2.63	3.00	5.88	4.60	2.19	6.52

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1994 (Reading Teacher Questionnaire).

**Table A25—Standard errors for: Percentage of fourth-graders whose reading teachers used various assessment practices at least once a month, by teachers' staff development experience: 1994**

	Multiple-choice tests	Short-answer tests	Paragraph length writings	Presentations	Reading portfolios
Total	2.50	1.70	1.79	2.04	2.42
Staff development hours in reading					
Fewer than 6	3.74	2.43	2.89	3.57	3.02
6–35	3.29	2.21	2.41	3.02	3.32
More than 35	4.89	4.11	3.13	4.94	5.02
Courses/workshops on assessment in last 5 years					
Yes	2.49	2.39	1.91	2.32	3.20
No	4.78	2.54	3.04	3.49	2.80

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1994 (Reading Teacher Questionnaire).



## **Appendix B. Regression Results**

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**Table B1—Estimated effects of independent variables on change in odds ratios for teacher participation in various professional development activities: 1993–94**

Independent variable <sup>1</sup>	Workshop/in-service training sponsored by school district		Workshop/in-service training sponsored by school		University extension/adult education course		College course in your subject		Professional growth activity sponsored by professional associations	
	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
<b>Teacher characteristics</b>										
Teacher level (Ref=Elementary)										
Secondary	0.84**	0.89	0.95	0.93	0.99	0.95	0.98	0.92	0.84*	0.87
Employment status (Ref=Part-time)										
Full-time	1.23**	1.59**	1.32**	1.67**	1.12	1.35**	1.11	1.31**	0.86**	1.33**
Main assign. field (Ref=K–gen. elem.)										
Math/science	0.71**	0.72*	0.62**	0.61**	1.13	1.08	0.95	1.03	1.25*	0.98
English/lang. arts	0.87	1.01	0.91	1.26	1.09	0.87	1.04	0.99	1.19	0.95
Social studies	0.73*	0.89	0.71*	1.29	1.02	1.24	1.00	1.04	1.14	1.09
Special educ.	0.69**	0.89	0.74*	1.62	1.09	1.05	1.22*	1.43	1.07	0.71
Bilingual educ.	1.42	0.38	1.04	1.25	1.21	0.82	1.44	1.00	1.20	0.53
Vocational educ.	0.62**	0.76	0.62**	1.33	1.46**	0.94	1.09	0.65	1.54**	0.46
Other field	0.59**	0.64**	0.62**	0.75*	1.09	1.03	1.02	1.06	1.41*	1.07
Highest degree (Ref=BA/less)										
Master's degree	0.96	0.90	0.96	1.00	0.96	0.85	0.88**	0.92	1.14**	1.27**
Educ. Specialist	1.02	1.77**	1.18	1.20	1.22*	1.20	1.20	0.98	1.51**	1.85**
Ph.D./Professional	1.63	0.59*	1.66*	1.09	1.36	0.68	1.10	0.55	1.94**	1.02
Experience (Ref=0–3 years)										
4–9 years	1.46**	1.20	1.30**	1.32**	1.23*	1.36**	1.11	0.91	1.27**	1.58**
10–19 years	1.75**	1.56**	1.39**	1.68**	1.05	1.39**	0.71**	0.76**	1.40**	2.06**
20 years/more	1.40**	1.42**	1.19**	1.54**	0.78**	1.22	0.40**	0.50**	1.21**	2.14**
<b>Principal characteristics</b>										
Highest degree (Ref=BA/less)										
Master's degree	0.75	1.06	0.87	1.47**	0.74	1.16	0.98	1.17	1.02	1.36**
Ed. specialist/Ph.D./Prof.	0.70	1.13	0.87	1.56**	0.72	1.50**	0.96	1.24	0.98	1.62**
Experience (Ref=0–3 years)										
4–9 years	1.04	0.88	0.98	0.78*	1.05	1.18	1.07	0.96	1.04	0.89
10–19 years	1.05	1.08	1.06	0.84	1.08	1.16	1.08	0.93	1.02	0.95
20 years/more	1.03	0.80	1.01	0.57**	1.07	0.85	1.02	0.66**	1.09	0.90
<b>School and district characteristics</b>										
Region (Ref=South)										
Northeast	0.66**	0.76*	0.42**	0.71**	1.26**	1.19	1.19**	0.98	0.92	0.85*
Midwest	0.94	1.26**	0.67**	1.32**	1.68**	1.39**	1.64**	1.26*	1.07	1.21*
West	0.98	1.28	0.76**	1.02	2.87**	2.04**	1.84**	1.44**	1.15*	1.48**
Community (Ref=Urban fringe)										
Rural	0.92	0.93	0.98	0.82	0.98	1.16	1.05	1.08	0.86**	0.91
Central city	0.82**	1.08	1.14*	0.99	1.04	1.11	1.06	1.06	0.99	0.99

**Table B1—Estimated effects of independent variables on change in odds ratios for teacher participation in various professional development activities: 1993–94—Continued**

Independent variable <sup>1</sup>	Workshop/in-service training sponsored by school district		Workshop/in-service training sponsored by school		University extension/adult education course		College course in your subject		Professional growth activity sponsored by professional associations	
	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
Minority enrollment (Ref=0%)										
1–10%	1.37**	1.18	1.49**	1.54**	1.05	0.86	1.14	1.20	1.15	1.39**
11–30%	1.35*	1.04	1.45**	1.63**	0.98	0.84	1.04	1.04	1.09	1.51**
31–50%	1.17	1.26	1.53**	1.79**	1.09	0.77	0.96	0.79	1.23**	1.18
Over 50%	1.18	1.11	1.67**	1.41	0.92	1.02	0.96	1.20	1.11	1.50**
School size (Ref=Below 150)										
150–499	1.04	1.28*	1.00	1.47**	0.91	1.08	0.91	1.00	1.19	1.12
500–749	1.10	1.21	1.14	1.82**	0.93	1.03	0.84	1.07	1.20	1.54**
750 or more	0.86	1.30	1.10	1.76**	0.83*	1.10	0.85*	1.01	1.12	1.26
District size (Ref=Below 1,000)										
1,000–4,999	1.01	(†)	0.77**	(†)	1.04	(†)	1.05	(†)	0.78**	(†)
5,000–9,999	1.03	(†)	0.84	(†)	1.09	(†)	1.05	(†)	0.76**	(†)
10,000 or more	0.93	(†)	0.83	(†)	1.00	(†)	1.07	(†)	0.66**	(†)
Free/reduced-price lunch (Ref=0–5%)										
6–20%	0.99	(†)	0.97	(†)	0.97	(†)	0.98	(†)	1.02	(†)
21–40%	1.03	(†)	1.00	(†)	0.94	(†)	0.96	(†)	0.91	(†)
Over 40%	0.92	(†)	0.92	(†)	1.01	(†)	1.04	(†)	0.88	(†)
Affiliation (Ref=Nonsectarian)										
Catholic	(†)	1.87**	(†)	1.59**	(†)	1.20	(†)	1.57**	(†)	1.17*
Other religious	(†)	1.17	(†)	0.86	(†)	0.81	(†)	0.97	(†)	0.79*
Intercept	8.05**	0.86	4.55**	0.64**	0.28**	0.10**	0.34**	0.16**	0.90	0.16**
-2 log likelihood (-2LL)	65,203**	8,063**	60,257**	7,504**	57,977**	7,546**	65,311**	6,789**	65,590**	9,108**

<sup>1</sup>\*Significant at the 0.05 level; \*\*significant at the 0.01 level. Test for difference between each subgroup and the reference group was adjusted using the Bonferroni adjustment.

†Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher and School Questionnaires).

**Table B2—Estimated effects of independent variables on change in odds ratios for teacher participation in professional development programs on various topics: 1993–94**

Independent variable <sup>1</sup>	Uses of educational technology for instruction		Methods of teaching in your field		In-depth study in your subject field		Student assessment		Cooperative learning in the classroom	
	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
<b>Teacher characteristics</b>										
Teacher level (Ref=Elementary)										
Secondary	1.01	0.98	0.69**	0.67**	0.82**	0.92	0.93	0.94	1.05	0.78**
Employment status (Ref=Part-time)										
Full-time	1.11	1.56**	1.02	1.54**	0.99	1.13	1.08	1.48**	1.09	1.70**
Main assign. field (Ref=K-gen. elem.)										
Math/science	1.38**	1.92**	0.62**	0.71**	0.94	0.92	0.72**	0.74	0.89	0.96
English/lang. arts	0.88	1.15	0.81*	0.82	1.14	1.07	0.88	0.95	0.87	0.98
Social studies	0.91	1.09	0.57**	0.94	0.93	1.15	0.74**	1.06	0.87	0.98
Special educ.	0.77**	1.29	0.70**	1.30	1.11	1.45	0.71**	1.32	0.81**	1.08
Bilingual educ.	0.98	1.07	1.26	0.70	1.60**	1.10	0.88	0.40	1.09	0.60
Vocational educ.	1.37**	1.52	0.49*	0.31**	1.28*	0.47	0.59**	0.86	0.82*	0.85
Other field	0.73**	1.10	0.54*	0.68**	1.05	1.30	0.54**	0.71**	0.70**	0.84
Highest degree (Ref=BA/less)										
Master's degree	1.07	0.97	0.97	0.97	1.11*	1.09	1.04	0.97	0.92*	0.99
Educ. Specialist	1.38**	1.78**	1.31*	1.50	1.65**	1.76**	1.36**	1.49	1.31**	1.76**
Ph.D./Professional	1.75**	1.17	0.99	1.09	1.53*	1.45	1.26	0.93	0.90	0.75
Experience (Ref=0–3 years)										
4–9 years	1.35**	1.44**	1.13**	1.12	1.12	1.09	0.98	0.99	1.07	1.20
10–19 years	1.30**	1.63**	0.98	1.08	1.10	1.25	0.95	1.14	1.07	1.34**
20 years/more	1.28**	1.77**	0.80**	0.99	0.94	1.21	0.91	1.18	1.04	1.35**
<b>Principal characteristics</b>										
Highest degree (Ref=BA/less)										
Master's degree	1.22	1.30*	0.89	1.11	1.07	0.95	1.05	1.04	1.08	1.10
Ed. specialist/Ph.D./Prof.	1.16	1.40*	0.84	1.15	1.01	1.21	1.08	1.22	1.04	1.24
Experience (Ref=0–3 years)										
4–9 years	1.05	0.98	1.05	0.92	1.06	0.98	0.98	1.05	0.98	0.85
10–19 years	1.05	1.06	0.99	0.93	1.05	0.98	0.95	0.96	0.98	0.91
20 years/more	1.01	0.84	0.96	0.90	0.94	0.92	0.93	1.08	0.91	0.79
<b>School and district characteristics</b>										
Region (Ref=South)										
Northeast	0.58**	1.01	0.71**	1.00	0.81**	1.08	0.75**	1.20*	0.73**	1.04
Midwest	0.73**	1.26*	0.70**	1.13	0.82**	1.12	0.84**	1.18	0.64**	0.98
West	0.93	1.15	0.91	1.39**	1.13	1.40**	1.16**	1.26*	0.67**	1.10

**Table B2—Estimated effects of independent variables on change in odds ratios for teacher participation in professional development programs on various topics: 1993–94—Continued**

Independent variable <sup>1</sup>	Uses of educational technology for instruction		Methods of teaching in your field		In-depth study in your subject field		Student assessment		Cooperative learning in the classroom	
	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
Minority enrollment (Ref=0%)										
1–10%	1.10	1.19	1.24**	1.19	1.19	1.01	1.18	1.15	1.21	1.05
11–30%	1.09	1.25	1.18	1.28	1.22	1.04	1.21	1.20	1.19	0.96
31–50%	1.03	1.10	1.28**	1.30	1.33**	0.97	1.19	1.19	1.39**	1.24
Over 50%	1.02	1.29	1.34**	1.16	1.34**	1.02	1.36**	1.37	1.52**	1.24
Community (Ref=Urban fringe)										
Rural	0.91	0.87	0.87**	0.83*	0.92	0.91	0.87**	1.07	0.99	0.92
Central city	1.03	1.02	1.07	1.05	1.16**	1.04	1.01	1.16*	1.13*	1.14
School size (Ref=Below 150)										
150–499	1.09	1.18	1.20	1.37**	1.02	1.37**	1.09	1.29**	1.16	1.21
500–749	1.11	1.41	1.30*	1.33*	1.02	1.37**	1.03	1.40**	1.19	1.25
750 or more	1.06	1.42**	1.29*	1.43**	0.99	1.23	0.96	1.34*	1.19	1.20
District size (Ref=Below 1,000)										
1,000–4,999	0.86*	(†)	1.02	(†)	1.04	(†)	1.08	(†)	1.05	(†)
5,000–9,999	0.89	(†)	1.04	(†)	0.95	(†)	0.93	(†)	1.00	(†)
10,000 or more	0.94	(†)	1.01	(†)	1.00	(†)	0.92	(†)	0.95	(†)
Free/reduced-price lunch (Ref=0–5%)										
6–20%	0.79**	(†)	0.92	(†)	0.96	(†)	0.84**	(†)	0.94	(†)
21–40%	0.74**	(†)	0.94	(†)	0.89	(†)	0.86	(†)	0.91	(†)
Over 40%	0.64**	(†)	0.89	(†)	0.89	(†)	0.82**	(†)	0.93	(†)
Affiliation (Ref=Nonsectarian)										
Catholic	(†)	0.89	(†)	1.28**	(†)	0.88	(†)	1.05	(†)	1.41**
Other religious	(†)	0.62**	(†)	0.99	(†)	0.71**	(†)	0.74**	(†)	0.84
Intercept	0.92**	0.12**	2.97**	0.62**	0.35**	0.20**	1.40**	0.25**	0.87	0.26**
-2 log likelihood (-2LL)	-35,298**	8,432**	44,669**	-9,253**	52,590**	-7,610**	52,239**	-8,946**	65,790**	-8,988**

<sup>1</sup>\*Significant at the 0.05 level; \*\*significant at the 0.01 level. Test for difference between each subgroup and the reference group was adjusted using the Bonferroni adjustment.

†Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher and School Questionnaires).

**Table B3—Estimated effect of level of participation in professional development programs on various topics on teachers’ assessment of the impact of the programs on their teaching practices: 1993–94**

Independent variable <sup>1</sup>	Provided information that was new to me		Changed my view on teaching		Caused me to change my teaching practices		Caused me to seek further information or training	
	Public	Private	Public	Private	Public	Private	Public	Private
<b>Step 1</b>								
Level of participation	0.128**	0.138**	0.199**	0.195**	0.232**	0.226**	0.259**	0.245**
R <sup>2</sup>	0.016**	0.019**	0.040**	0.038**	0.054**	0.051**	0.067**	0.060**
<b>Step 2</b>								
Level of participation	0.131**	0.141**	0.199**	0.201**	0.228**	0.223**	0.255**	0.242**
<b>Teacher characteristics</b>								
Secondary	-0.029*	-0.034	-0.024*	0.009	-0.022*	0.008	-0.009	-0.024
Full-time	-0.021**	-0.026	-0.009	0.003	-0.002	0.006	-0.016**	-0.020
Math/science	0.005	-0.070**	0.014	0.038	-0.025	-0.015	-0.018	-0.053**
English/language arts	-0.007	0.012	0.002	-0.033	-0.018	0.013	-0.016	0.009
Social studies	0.003	0.038	0.000	0.012	-0.021	-0.014	-0.008	0.022
Special education	-0.007	0.026	-0.025	-0.009	-0.042**	0.004	-0.004	0.010
Bilingual education	-0.003	-0.017	-0.003	-0.008	-0.023*	-0.010	-0.004	0.002
Vocational education	0.027*	0.020	0.007	0.030	-0.031*	-0.035	-0.005	-0.009
Other field	0.000	-0.067*	-0.026	0.033	-0.078**	-0.058*	-0.047*	0.002
Master’s degree	-0.024	-0.016	-0.014	-0.024	0.008	-0.015	0.006	0.005
Education Specialist	-0.014	-0.029	-0.008	-0.018	0.005	-0.009	-0.023**	0.018
Ph.D./Professional	-0.023**	-0.050	-0.018	-0.058**	-0.007	-0.040	0.005	-0.023
Teaching experience	-0.044**	-0.032*	-0.042**	-0.008	-0.051**	-0.001	-0.062**	-0.021
<b>Principal characteristics</b>								
Master’s degree	0.005	-0.004	0.026	0.006	0.028	-0.010	-0.016	0.013
Ed. specialist/Ph.D./Prof.	0.013	-0.012	0.024	0.028	0.035	0.030	-0.005	0.015
Principal experience	-0.024**	-0.042*	0.000	-0.007	-0.008	-0.012	0.005	-0.028
<b>School and district characteristics</b>								
Northeast	0.012	-0.028	-0.035**	0.010	-0.030*	0.009	-0.047**	-0.036
Midwest	0.028**	0.014	0.055**	0.064**	0.046**	0.075**	0.041**	0.036
West	0.026*	0.034	0.026*	0.036	0.033**	0.065**	0.040**	0.033
Urban fringe/large town	0.014	-0.010	-0.021	-0.022	-0.021	-0.025	-0.002	-0.025
Rural/small town	-0.019	0.021	-0.024*	0.030	-0.017	0.006	-0.012	0.017
Minority enrollment (x 10%)	-0.035**	-0.028	0.015	-0.004	-0.003	-0.018	-0.008	-0.007
School size (x 100)	-0.009	-0.011	-0.017	0.015	-0.021*	0.005	-0.030*	0.010
District size (x 10,000)	-0.029**	(†)	-0.028*	(†)	-0.034*	(†)	-0.020**	(†)
Free/reduced-price lunch (x 10%)	-0.013	(†)	-0.002	(†)	0.001**	(†)	0.000	(†)
Catholic	(†)	-0.012	(†)	0.009	(†)	0.003	(†)	-0.024
Other religious	(†)	-0.032	(†)	0.019	(†)	-0.002	(†)	-0.046*
R <sup>2</sup>	0.027**	0.037**	0.048**	0.054**	0.069**	0.067**	0.078**	0.072**
Change of R <sup>2</sup>	0.011**	0.018**	0.008**	0.016**	0.015**	0.016**	0.011**	0.012**

<sup>1</sup>\*Significant at the 0.05 level; \*\*significant at the 0.01 level. Test for difference between each subgroup and the reference group was adjusted using the Bonferroni adjustment.

<sup>2</sup>Statistics shown in the table are standardized regression coefficients (β).

†Not applicable.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Schools and Staffing Survey: 1993–94 (Teacher and School Questionnaires).

## Appendix C. Technical Notes

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### The Schools and Staffing Survey

The data source for this study was the 1993–94 Schools and Staffing Survey (SASS:93–94)—a nationally representative survey that collected public- and private-sector data on the nation’s elementary and secondary teachers and their schools and districts. SASS:93–94 is particularly useful for analyzing the professional development of elementary and secondary school teachers, because it is the latest and most comprehensive nationally oriented data set available with information on teachers’ participation in professional development.<sup>28</sup> This survey represented the first time that information was collected in a large national survey on the types of professional development activities in which teachers participated, the focus of these activities, the amount of time teachers were engaged in various activities, and the ways in which schools or districts supported teachers’ participation in professional development. In addition, since SASS links school, principal, and district surveys with the teacher survey, it enables researchers to study how teachers’ participation in professional development varies across different types of schools and districts and how it varies according to the individual characteristics of teachers and principals.

### *Sample Design*

The 1993–94 survey was the third in a series of cross-sectional surveys, following ones in 1990–91 and 1987–88. It consisted of four sets of linked questionnaires, including surveys of schools, principals of selected schools, a subsample of teachers within each school, and public school districts. Stratified by state, sector, type, and association membership and grade level (for private schools); schools were sampled first. Each selected school received a school questionnaire and an administrator questionnaire. Within each school, a sample of teachers was selected and each one received a teacher questionnaire. Also, a Teacher Demand and Shortage questionnaire was sent to the local education agency (LEA) to collect information about school district’s

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<sup>28</sup>Several recent working papers published by NCES suggest improvements of questionnaire items and data collection. See U.S. Department of Education, National Center for Education Statistics, Kasprzyk, D., *Measures of Inservice Professional Development: Suggested Items for the 1998-1999 Schools and Staffing Survey*. Working Paper No. 96-25. U.S. Department of Education, National Center for Education Statistics, Rollefson, M., *Student Learning, Teaching Quality, and Professional Development: Theoretical Linkages, Current Measurement, and Recommendations for Future Data Collection*. Working Paper No. 96-28.

student enrollment, number of teachers, and hiring and retirement policies. A total of 13,271 schools and administrators, 68,284 teachers, and 5,459 LEAs participated in the 1993–94 survey.<sup>29</sup>

### ***Data Collection Timing and Response Rates***

Data collection for the 1993–94 SASS took place during the 1993–94 school year. The first mailing of questionnaires to teachers took place in January and February 1994 and the second in February and March. Telephone follow-up of mail nonrespondents took place between March and June.

The effective response rates (taking into account school response rates) were 84.7 percent for public school teachers and 72.9 percent for private school teachers. In the public school teacher survey, 91 percent of the items had a response rate of 90 percent or more; and in the private school teacher survey, 89 percent of the items had this level of response. None of the items used had a response rate of less than 75 percent. Values were imputed for questionnaire items that should have been answered but were not.

### **Study Sample**

Since this study was designed to investigate teachers' professional development at the elementary and secondary levels, we excluded teachers who taught only prekindergarten or post-secondary classes. This resulted in a study sample of 55,118 elementary and secondary school teachers, including 46,916 public school teachers and 8,202 private school teachers. In order to take into account the different probability of selection of schools and teachers, as well as adjust for nonresponse and coverage bias, weights of the sample units (e.g., school weights or teacher weights) were developed in SASS to produce the estimates that were unbiased and consistent with estimates of national or state totals. Because the analysis unit in this study was teachers, we applied SASS teacher design weights for all of our analyses. Thus, the results of the study can be generalized to 1993–94 elementary and secondary school teachers in the United States.

### **Measures**

The study emphasized five sets of outcome measures relevant to teachers' professional development and four sets of predictor measures describing characteristics of teachers, principals,

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<sup>29</sup>For a detailed description of the sample design, see Abramson et al. (1996).

schools, and districts (for public schools only). The specifics of how these measures were constructed, along with the SASS items from which they were drawn, are described below.

**Outcome measures.** Five sets of outcome measures describing teachers' professional development were investigated in the study. They included: 1) design of professional development (TT1020 and A835);<sup>30</sup> 2) delivery of professional development activities (T0545 to T0565, and T0700 and T0705); 3) content or topics of programs (T0590, T0600, T0610, T0620, T0630, and T1580) and duration of programs on various topics (T0595, T0605, T0615, T0625, and T0635); 4) professional development outcomes as perceived by teachers (T0640 to T0660); and 5) school context for teacher participation in professional development, including support provided to teachers (T0665 to T0690), and cooperative effort between teachers and principals (T1250, T1270, and T1290).

**Predictor measures.** These measures were used as classification variables in bivariate tabulations of the outcome measures described above or as predictor variables in multivariate analyses of the outcome measures. We focused on four sets of measures that described the following characteristics of teachers, principals, schools, and districts.

### **A. Teacher Characteristics**

**Teacher Level.** Teachers were classified as elementary or secondary on the basis of the grades they taught (T0710 to T0785) rather than on the schools in which they taught. An elementary school teacher was one who, when asked for the grades taught, checked:

- Only “ungraded” and was designated as an elementary teacher on the list of teachers provided by the school; or
- Sixth grade or lower, or “ungraded,” and no grade higher than sixth; or
- Sixth grade or lower and seventh grade or higher, and reported a primary assignment of prekindergarten, kindergarten, or general elementary; or
- Seventh and eighth grades only, and reported a primary assignment of prekindergarten, kindergarten, or general elementary; or
- Sixth grade or lower and seventh grade or higher, and reported a primary assignment of special education and was designated as an elementary teacher on the list of teachers provided by the school; or

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<sup>30</sup>Numbers in parentheses refer to the SASS Questionnaire items.

- Seventh and eighth grades only, and reported a primary assignment of special education and was designated as an elementary teacher on the list of teachers provided by the school.

A secondary school teacher was one who, when asked for the grades taught, checked:

- “Ungraded” and was designated as a secondary teacher on the list of teachers provided by the school; or
- Sixth grade or lower and seventh grade or higher, and reported a primary assignment other than prekindergarten, kindergarten, or general elementary; or
- Ninth grade or higher, or ninth grade or higher and “ungraded”; or
- Seventh and eighth grades only, and reported a primary assignment other than prekindergarten, kindergarten, general elementary, or special education; or
- Seventh and eighth grades only, and reported a primary assignment of special education and was designated as a secondary teacher on the list of teachers provided by the school; or
- Sixth grade or lower and seventh grade or higher, or seventh and eighth grades only, and was not categorized above as either elementary or secondary.

**Main Assignment field.** Teachers’ responses to items asking for their main and other assignment fields (T0315 and T0330, respectively) were aggregated into eight categories as follows:

- Kindergarten/general elementary—Kindergarten or general elementary;
- Mathematics or science—Computer science, mathematics, physical science, biology/life science, chemistry, geology/earth science/space science, physics, general or all other science;
- English/language arts—English/language arts or reading;
- Social studies—Social studies/social science (including history);
- Special education—Special education, general, emotionally disturbed, mentally retarded, speech/language impaired, deaf and hard-of-hearing, visually handicapped, orthopedically impaired, mildly handicapped, severely handicapped, specific learning disabilities, or other special education;
- Bilingual/ESL—Bilingual education or English as a second language;
- Vocational education—Accounting, agriculture, business, marketing, health occupations, home economics, industrial arts, technical, or other vocational/technical education; and
- Other—American Indian/Native American studies, art, basic skills and remedial education, dance, drama/theater, gifted, journalism, military science, music, philosophy, physical education, health, religion, French, German, Latin, Russian, Spanish, other foreign language, or all others.

**Teaching status.** Teaching status was classified into two categories—part time and full time—based on teachers’ responses to items asking them to report the activity in which they spend most of their time (T0020) at the school or the amount of time they work as a teacher (T0030). Part-time teachers were those who reported working less than full time as a teacher at their school.

**Teaching experience.** This measure was a sum of total number of years that teachers taught full time and part time in public and private schools (T0095 to T0110). The sum was further classified into four categories: 0–3 years, 4–9 years, 10–19 years, and 20 or more years.

**Highest degree earned.** This measure was drawn from teachers’ responses to items asking them about the type of education degree they had earned (T0170, T0235, T0270, T0285, and T0300). The measure was further classified into four categories: bachelor’s degree or less, master’s degree, educational specialist, and doctorate or first-professional degree.

## ***B. Principal Characteristics***

**Highest degree earned.** This measure, like the one above for teachers, was drawn from principals’ responses to items asking the type of education degree they had earned (A060, A125, A160, A175, and A190). The measure was again classified into four categories: bachelor’s degree or less, master’s degree, educational specialist, and doctorate or first-professional degree.

**Years of experience as a principal.** This measure was a sum of the total number of years that principals reported serving as a principal in their current school (A325) and in other schools (A330). It was further classified into four categories: 0–3 years, 4–9 years, 10–19 years, and 20 or more years.

## ***C. School Characteristics***

**Sector.** This measure identified public schools and private schools. A public school was defined as an institution that provides educational services for at least one of grades 1–12 (or comparable ungraded classes), has one or more teachers who provide instruction, is located in one or more buildings, receives public funds as primary support, has an assigned administrator, and is operated by an education agency. Schools in juvenile detention centers and schools located on military bases and operated by the Department of Defense were included.

A private school was defined as a school not in the public system that provides instruction for any of grades 1–12 where the instruction was not provided exclusively in a private home. In order to be included in SASS, a school was required to provide instruction to students in at least one of grades 1–12 and not out of a private home. If it could not be determined whether or not it operated in a private home, the school had to have at least 10 students or more than one teacher. Schools that taught only prekindergarten, kindergarten, or adult education were not included.

**Size.** Size categories were based on the number of students (in head count) who were enrolled in grades K–12 in the school on or about October 1, 1990 (S0255). Size was recoded into four categories: less than 150 students, 150–499 students, 500–749 students, and 750 students or more.

**Percent minority enrollment.** This measure was the proportion of a school’s total enrollment who were American Indian or Alaskan Native (S0405); Asian or Pacific Islander (S0410); Hispanic (S0415), regardless of race (Mexican, Puerto Rican, Cuban, Central or South American, or other culture or origin); and Black (0420) (not of Hispanic origin). Based on this proportion, the schools were further classified into five categories: 0 percent, 1–10 percent, 11–30 percent, 31–50 percent, and more than 50 percent.

**Percent free/reduced-price lunch recipients.** The proportion of students who received free or reduced-price lunch was computed for public schools that participated in the National School Lunch Program (S1680). Because relatively few private schools participate in the program, this variable was not computed for private schools. The proportion was recoded into four categories: 0–10 percent, 11–20 percent, 21–40 percent, and more than 40 percent.

**Region.** States were divided into four regions as follows:

- Northeast—Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, and Pennsylvania;
- Midwest—Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas;
- South—Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, and Texas; and
- West—Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada, Washington, Oregon, California, Alaska, and Hawaii.

**Community type.** Community type was derived from the seven-category “urbanicity” code (locale) developed by Johnson.<sup>31</sup> The locale code was based on the school’s mailing address matched to Bureau of the Census data files containing population density data, Standard Metropolitan Statistical Area (SMSA) codes, and a Census code defining urban and rural areas. This code, also used in the 1990–91 and 1993–94 editions of *Schools and Staffing in the United States: A Statistical Profile*, is believed to provide a more accurate description of the community than the respondent’s reported community type used in the 1987–88 edition of *Schools and Staffing in the United States*. For this study, the seven locale codes were aggregated into the following three community types:

- Central city—A large central city (a central city of an SMSA with population greater than or equal to 400,000 or a population density greater than or equal to 6,000 per square mile), or a mid-size central city (a central city of an SMSA, but not designated as a large central city);
- Urban fringe/large or large town—Urban fringe of a large or mid-size city (a place within an SMSA of a mid-size central city and defined as urban by the Bureau of the Census), or a large town (a place not within an SMSA, but with a population greater than or equal to 25,000 and defined as urban by the Bureau of the Census); and
- Rural/small town—Rural area (a place with a population of less than 2,500 and defined as rural by the Bureau of the Census) or a small town (a place not within an SMSA, with a population of less than 25,000, but greater than or equal to 2,500, and defined as urban by the Bureau of the Census).

**Private school affiliation.** This measure was drawn directly from the SASS School survey (AFFIL). It has three categories: Catholic, other religious, and nonsectarian.

#### ***D. District Characteristics***

A public school district (or LEA) was defined as a government agency administratively responsible for providing public elementary instruction, secondary instruction and educational support services, or both. The agency or administrative unit was required to operate under a public board of education. Districts that did not operate schools but that hired teachers were included. A district was considered out of scope if it did not employ elementary or secondary teachers of any kind, including special education and itinerant teachers.

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<sup>31</sup>F. Johnson, *Assigning Type of Locale Codes to the 1987–88 CCD Public School Universe*, Technical Report, Data Series: SP-CCD–87188-7.4, CS 89–194 (Washington, DC: U.S. Department of Education, National Center for Education Statistics, 1989); F. Johnson, “Comparisons of School Locale Setting: Self-Reported Versus Assigned” Working Paper No. 94-101 (Washington, DC: U.S. Department of Education, National Center for Education Statistics, 1994).

**District size.** Public school district size categories were based on the number of students (by head count) who were enrolled in the district on or about October 1, 1987 (as reported in Item #1 on the Teacher Demand and Shortage Questionnaire, D0255). The count was recoded into four categories: less than 1,000 students, 1,000–4,999 students, 5,000–9,999 students, and 10,000 students or more.

## Statistical Procedures

The major issues investigated in this study fell into five categories: 1) the influence of various groups in determining the content of in-service programs; 2) the participation rate of teachers in professional development activities; 3) the content and duration of these activities; 4) the school context; and 5) the outcomes of participation in professional development. To address these issues, bivariate analyses to examine the overall pattern of teachers' participation in professional development were conducted. Then multivariate analyses were conducted to explore how this participation varied by different kinds of teachers and teachers in different types of schools and districts.

**Bivariate analysis.** In this part of analysis, we examined overall patterns of teachers' participation in professional development, including their rates of participation in various types of professional development activities, their participation rate in programs that focused on various topics, the amount of time teachers were engaged in these activities, the school context for professional development, and how teachers assessed the effectiveness of the programs and their teaching practices. We also examined principals' perceptions of the influence of various groups on determining the content of in-service programs. Because of the differences between the professional development delivery mechanisms of public and private schools, we analyzed public and private teacher and school data on professional development separately.

In addition to examining the overall patterns of teacher participation in professional development, we also conducted a series of bivariate comparisons between different kinds of teachers (e.g., part-time versus full-time teachers) and teachers in different types of schools (e.g., those in small schools versus those in large schools). The comparisons were tested by the conventional Student's *t* statistic to ensure that the differences between the two groups of teachers were larger than that might be expected due to sampling variation. Tests for multiple comparisons were adjusted by the Bonferroni procedure, because when multiple statistical comparisons are made, it becomes increasingly likely that an indication of a population difference is erroneous. Generally, the Bonferroni procedure corrects the significance (or *alpha*) level for the total number of

comparisons made within a particular classification variable. For each classification variable, there are  $(K*(K-1)/2)$  possible comparisons (or non-redundant pairwise combinations), where  $K$  is the number of categories. For example, highest degree earned by teachers has four categories (bachelor's degree or less, master's degree, educational specialist, and doctorate or first-professional degree). Thus,  $K = 4$  and there are  $(4*3)/2 = 6$  possible comparisons among the categories. The Bonferroni procedure divides the *alpha* level for a single *t* test (e.g., .05) by the number of possible pairwise comparisons in order to produce a new *alpha* that is corrected for the fact that multiple contrasts are being made.

**Multivariate analysis.** Although the bivariate analysis was important, it did not reveal the degree to which each teacher, principal, school, or district characteristic was related to teachers' participation in professional development, because many of these characteristics are often interrelated. To obtain a better understanding of teachers' participation in professional development, multivariate analyses were conducted to determine the unique importance of each teacher, principal, school, and district characteristic associated with this participation, net of other associations. WESVAR-PC was used to conduct the multivariate analyses. WESVAR-PC is a program that computes estimates and replicate variance estimates for data collected using complex sampling and estimation procedures.

Among all of the outcome variables examined in the bivariate analysis, we selected the following to examine with multivariate analytic techniques: 1) participation of teachers in various types of professional development activities; 2) participation of teachers in professional development programs focusing on various topics; 3) teachers' assessment of how the level of participation in professional development affected teaching practices. Controlling for various teacher, principal, school, and district characteristics, multivariate analysis allowed us to examine in detail *who* participated in professional development activities, *who* participated in programs that focused on various topics, and *whether* the level of participation had a significant impact on teaching practices according to teachers' perceptions.<sup>32</sup>

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<sup>32</sup>The level of participation combined three elements: 1) teachers' participation in professional development programs on various topics; 2) the length of the program; and 3) the number of the programs in which teachers participated. This measure was constructed as follows: 1) we multiplied teachers' participation in programs on each of the five topics by the length of the program, and 2) we summed these products across the five topics. Bivariate results (see the attached table) suggested that the level of participation was positively associated with teachers' assessment of effectiveness of professional development programs. The higher the level of participation, the more likely were teachers to agree that these programs provided them with new information, changed their views on teaching, caused them to change their teaching practices, and made them seek further information or training; and the less likely were they to agree that these programs wasted their time.

The first two questions, which have dichotomous outcomes (participated versus not participated in a particular professional development activity; and participated versus not participated in a professional development program on a particular topic), require logistic regression models. These models included the teacher, principal, school, and district characteristics described above as predicted variables. The full logistic regression in each case may be symbolized by the following mathematical equation:

**Prob (Yes on Y)**

$$\log \left[ \frac{\text{Prob (Yes on Y)}}{\text{Prob (No on Y)}} \right] = B_0 + \sum B_i X_i + \sum B_j X_j + \sum B_k X_k + \sum B_l X_l + e$$

**Prob (No on Y)**

Where:

- Y is teacher participation (yes or no) in one of the five professional development activities or in programs on one of the five program topics;
- B<sub>0</sub> is the intercept;
- B<sub>i</sub> is the effect of various teacher characteristics, X<sub>i</sub>, on the log odds ratio of Y. X<sub>i</sub> represents a series of teacher-level characteristics: main assignment field, teaching status, years of experience, or highest degree earned;
- B<sub>j</sub> is the effect of principal characteristics, X<sub>j</sub>, on log odds ratio of Y. X<sub>j</sub> represents two principal characteristics: principal’s years of experience or highest degree earned;
- B<sub>k</sub> is the effect of school characteristics, X<sub>k</sub>, on log odds ratio of Y. X<sub>k</sub> represents a series of school characteristics: school size, percent minority enrollment, percent free/reduced-price lunch recipients, region, or community type; and
- B<sub>l</sub> is the effect of district characteristics, X<sub>l</sub>, on log odds ratio of Y. X<sub>l</sub> is district size.

The proportion of variance explained in each equation is indicated in appendix tables B1 and B2.

An ordinary least squares regression (OLS) was used to explore the effect of the level of participation on teachers’ assessment of the effectiveness of professional development programs. Besides the level of participation, the model also included teacher, principal, school, and district characteristics as controls. We entered these variables in two steps: beginning with the level of participation, and then using the characteristics of teachers, principals, schools, and districts as statistical controls. This procedure was meant to quantify the unique impact of the level of participation on the effectiveness of professional development programs in which teachers

participated, net of teacher, principal, school, and district characteristics. The full OLS regression model may be symbolized by the following mathematical equation:

$$Y = B_0 + B_1X_1 + \sum B_jX_j + e$$

Where:

- Y is teacher’s assessment of the impact of professional development programs on teaching practices;
- B0 is the intercept;
- B1 is the effect of the level of participation, X1, on Y; and
- Bj is the effect of a series of controls, Xj, on Y. Xj includes the characteristics of teachers, principals, schools, and districts listed above.

The proportion of variance explained in each equation is indicated in appendix tables B1 and B2.

*Adjusted Values* (tables 8a, b and 12a, b). The adjusted difference was computed by a mean-plugging procedure. The following examples illustrates the procedure. First, a logistic regression is run with a dummy outcome variable of whether teachers participated in workshops sponsored by school, Y, and four independent variables—teacher’s level (X<sub>1</sub>), employment status (X<sub>2</sub>), teaching experience (X<sub>3</sub>), and educational attainment (X<sub>4</sub>). B<sub>0</sub> is the intercept and B<sub>1</sub> to B<sub>4</sub> are the corresponding regression coefficients for independent variable X<sub>1</sub>, to X<sub>4</sub>. The logistic regression can be symbolized by the following mathematical equation:

$$\log \left[ \frac{Y}{1 - Y} \right] = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + e$$

Next, the means (M<sub>1</sub> to M<sub>4</sub>) are computed for these independent variables based on the teacher sample included in the study. To obtain the adjusted difference in participation rate between elementary and secondary school teachers (i.e. X<sub>1</sub>, and “0” coded for elementary school teachers and “1” coded for secondary school teachers), the means of the other three independent variables are plugged in the regression and the adjusted participation rate for elementary and secondary school teachers computed separately:

$$Y_0 \text{ (for } X_1=0) = e^{B_0 + B_2M_2 + B_3M_3 + B_4M_4} / (1 + e^{B_0 + B_2M_2 + B_3M_3 + B_4M_4});$$

$$Y_1 \text{ (for } X_1=1) = e^{B_0 + B_1 + B_2M_2 + B_3M_3 + B_4M_4} / (1 + e^{B_0 + B_1 + B_2M_2 + B_3M_3 + B_4M_4});$$

Finally, the adjusted difference in participation rate between elementary and secondary school teachers is computed by  $Y_1 - Y_0$ .

## Estimate of Standard Errors

Since all estimates reported in this study were based on a sample rather than a population, they may differ somewhat from the figures that would have been obtained if a complete census had been taken using the same survey instruments, instructions, and data collection procedures. Generally speaking, there are two types of errors possible with an estimate based on a survey sample: nonsampling errors and sampling errors. Nonsampling errors can be attributed to many sources, such as the inability to obtain information about all cases in the sample, differences in how questions are interpreted, respondents' inability or unwillingness to provide correct information, or errors made in processing the data, and so on.

Sampling errors are attributed to sampling variation—that is, the variation that occurs by chance because a sample, rather than a population, is surveyed. It is primarily measured by a standard error that describes the reliability and accuracy of an estimate. It is essential to estimate the standard error for a statistic in a study based on a sample, because doing so enables researchers to construct confidence intervals, test hypotheses, and determine the precision obtained in a particular sample.

Because the SASS sample design involved stratification, clustering, unequal selection probabilities, and multistage sampling, the resulting statistics are more variable (i.e., have larger standard errors) than they would have been if they had been based on data from a simple random sample of the same size. Calculation of standard errors requires procedures that are markedly different from the ones used when the data are from a simple random sample. Popular statistical packages, such as SPSS or SASS, do not take complex sample design into account when they calculate standard errors. Along with a set of replicate weights supplied by SASS, we used the MPR-produced SAS procedure, REPTAB, which used a bootstrap variance estimator to estimate proportions and their standard errors for the bivariate analysis in this study.