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Editorial Note

National Center for Education Statistics

The National Center for Education Statistics (NCES) fulfills a congressional mandate to collect and report "statistics and information showing the condition and progress of education in the United States and other nations in order to promote and accelerate the improvement of American education."

Education Statistics Quarterly

Purpose and goals

At NCES, we are convinced that good data lead to good decisions about education. The *Education Statistics Quarterly* is part of an overall effort to make reliable data more accessible. Goals include providing a quick way to

- identify information of interest;
- review key facts, figures, and summary information; and
- obtain references to detailed data and analyses.

Content

The *Quarterly* gives a comprehensive overview of work done across all parts of NCES. Each issue includes short publications, summaries, and descriptions that cover all NCES publications and data products released during a 3-month period. To further stimulate ideas and discussion, each issue also incorporates

- a message from NCES on an important and timely subject in education statistics; and
- a featured topic of enduring importance with invited commentary.

A complete annual index of NCES publications will appear in the Winter issue (published each January). Publications in the *Quarterly* have been technically reviewed for content and statistical accuracy.

General note about the data and interpretations

Many NCES publications present data that are based on representative samples and thus are subject to sampling variability. In these cases, tests for statistical significance take both the study design and the number of comparisons into account. NCES publications only discuss differences that are significant at the 95 percent confidence level or higher. Because of variations in study design, differences of roughly the same magnitude can be statistically significant in some cases but not in others. In addition, results from surveys are subject to nonsampling errors. In the design, conduct, and data processing of NCES surveys, efforts are made to minimize the effects of nonsampling errors, such as item nonresponse, measurement error, data processing error, and other systematic error.

For complete technical details about data and methodology, including sample sizes, response rates, and other indicators of survey quality, we encourage readers to examine the detailed reports referenced in each article.

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Note From NCES

Martin Orland, Associate Commissioner, Early Childhood, International, and Crosscutting Studies Division

Understanding Teaching and Learning in the Classroom

The featured topic in this issue focuses on the classroom and begins to address the questions "How are teachers delivering instruction to students?" and "How does this contribute to our overall understanding of children's educational success?" As pointed out by one of the commentators, the findings from the 1994–95 Teacher Follow-up Survey "are unique because they provide national estimates of the proportion of teachers from all grade levels and subject areas . . . who use various teaching strategies." Indeed, good measures of classroom instructional practices might not only improve teaching but might also increase our understanding of the link between background factors and educational achievement.

Recognizing the importance of this line of research, NCES is committed to expanding and improving the collection and analysis of data relevant to classroom instructional processes. The challenge of this pursuit for a statistical agency is that this information does not lend itself easily to traditional survey methodologies. Although the efforts we have made so far show promise, they do not yet provide the full range of information needed to adequately understand the process of teaching and learning in our nation's classrooms. To expand this understanding, NCES is pushing ahead on several fronts.

Video

Videotaping classroom activities has recently been incorporated into an NCES survey with promising results. The Third International Mathematics and Science Study (TIMSS) collected nationally representative videotaped records of eighth-grade mathematics lessons in Germany, Japan, and the United States. The next iteration of this study, TIMSS-R, is expanding on the first effort by including science classrooms, more countries, and a second camera in each classroom. The video components of TIMSS provide objective observational measures of classroom instruction.

Videotaping will also be used in the Instructional Processes Research Program, the purpose of which is to test new ways of measuring what goes on in the classroom. Video will be used as a validation tool to help us understand the strengths and weaknesses of several measurement strategies.

Surveys

NCES is also supporting the improvement of information on instructional practices through more traditional survey techniques. For example, the Early Childhood Longitudinal Survey (ECLS) will collect information from teachers on their instructional practices through a teacher questionnaire. Research has shown that, while not as rich as direct observation or videotaping, teacher reports of classroom practice are generally accurate. These reports from teachers, in combination with

comprehensive student data, will improve our understanding of how classroom instruction varies by teacher and how it relates to children's success in school. We expect to capitalize on the longitudinal nature of the ECLS by studying whether and how the educational outcomes of individual students are related to basic instructional practices and classroom characteristics.

Three projects in the Instructional Processes Research Program will include the use of traditional survey techniques to collect data on teacher practices. One project will collect extremely detailed information on a limited set of aspects of classroom instruction. The goal is to trade breadth for depth and to probe more deeply into previous findings in order to identify important variations that have so far remained hidden. A second project will attempt to measure the extent to which instructional practice reflects efforts by teachers to work in a standards-based system, that is, to prepare students to meet demanding curricular standards. A third study builds on prior efforts to define and measure students' opportunities to learn. For this study, two new measures will be developed to improve our understanding of the cognitive aspects of the learning process and modes of presentation used by teachers.

Finally, the 1999–2000 Schools and Staffing Survey (SASS) will, for the first time, ask teachers a battery of questions that are designed to measure teaching practices in the classroom. The questions are very specific and ask, for example, about the number of minutes spent by the class in activities such as solving math story problems. The items measure not only the method used by the teacher but also the curriculum covered.

Daily Instructional Logs

In a fourth Instructional Processes project, NCES plans to use daily instructional logs to gather information from teachers on classroom instruction. This activity will be designed to capture information on highly specific instructional activities undertaken by teachers as they instruct students on particular types of academic content. As with the other projects, these results will be compared with video studies to cross-validate the research methodologies used.

NCES is committed to finding effective ways of measuring classroom processes. The examples of our ongoing work given above indicate the level to which NCES recognizes the difficulty of measuring the complex processes of teaching and learning, and our willingness to explore nontraditional research methods in order to accomplish our goals. We appreciate the importance of this endeavor for understanding our children's educational success and will continue to strive to improve this aspect of NCES data collection activities.

Featured Topic: Instructional Practices

Instructional Practices

What Happens in Classrooms? Instructional Practices in Elementary and Secondary Schools: 1994–95

Robin R. Henke, Xianglei Chen, and Gideon Goldman

This article was originally published as the Executive Summary of the Statistical Analysis Report of the same name. The sample survey data are from the 1994–95 Teacher Follow-up Survey (TFS:94–95), which sampled respondents to the 1993–94 Schools and Staffing Survey (SASS:93–94).

As education goals have been expanded and articulated in recent years, policymakers, educators, researchers, and the public have become more interested in how elementary and secondary school teachers teach their students. As part of a larger standards-setting movement intended to improve learning, elementary and secondary school teachers, college and university faculty, other educators, and business leaders have developed voluntary national curriculum standards in many subject areas. In addition, the National Board for Professional Teaching Standards (NBPTS) has developed standards for teaching various subjects at different grade levels. Together, these sets of standards provide both examples of reform-oriented teaching practice and a framework within which to examine teachers' practice at this stage of instruction reform.

This report presents estimates of the proportion of teachers who used a wide range of teaching practices, including both those frequently recommended in curriculum and teaching standards and those that have traditionally been part of teachers' practice. The report presents analyses of data collected in the 1994–95 Teacher Follow-up Survey (TFS:94–95), which administered for the first time a series of items on their instructional practices to a national sample of teachers in kindergarten through grade 12 and in all subject areas.

The report examines teachers' practices in four areas of instruction: the roles that teachers and students play in learning activities, the materials and technology that teachers and students use in the classroom, the kinds of learning tasks that students do both in the classroom and at home, and the methods that teachers use to assess and evaluate student learning. The report also discusses whether teachers' choices of instructional strategies vary with characteristics of teachers and their students.

Teacher and Student Roles in Instruction

Researchers and policymakers have become increasingly interested in teachers' grouping practices because of both

the increasing popularity of cooperative learning techniques in the United States and international research on instructional strategies. In the United States, cooperative learning—which involves dividing a class of students into small groups in which students help each other learn material or collaborate to complete a project—has been advocated by a number of researchers as an effective strategy for improving both student motivation and learning (Cohen 1994; Johnson and Johnson 1994; Slavin 1996). Moreover, cooperative learning is an instructional strategy in which many teachers are being trained: in 1993–94, 50 percent of teachers reported that they had attended a professional development session on cooperative learning since the end of the previous school year (Henke et al. 1997).

The TFS:94–95 data indicate that teachers and students work together in a wide range of grouping patterns. Nearly all teachers reported that during the semester preceding the survey they had provided students in their designated class with whole group (98 percent) and individualized instruction (96 percent) at least once a week, and most (86 percent) reported using small group instruction on a weekly basis as well (table A).[1] Compared with teachers in higher grades, teachers in lower grades, who spend more time per week with the same group of students, were more likely to use small group instruction and to ask students to discuss as a class the work they had done in small groups. In addition, social studies teachers were less likely than teachers in the other core academic subjects—English, mathematics, and science—to use alternatives to whole class instruction.

In addition, many recommendations for instruction reform emphasize that interaction among students and between teachers and students facilitates students' understanding of concepts. In the TFS:94–95, teachers were asked how frequently they used instructional strategies that can be broadly classified into three categories of interaction patterns: teacher talk, teacher-student talk, and student-student talk. All three of these interaction patterns quite

[1]Teachers responded to the items on their instructional strategies in reference to one of their classes, referred to in the survey and this report as the "designated class."

Table A.— Percentage of teachers who used various grouping patterns at least once a week during the last semester, by class grade levels and subject areas: 1994–95

	Teacher activities			Student activities				
	Provided whole group instruction	Worked with small groups	Worked with individual students	Worked individually on projects	Conferred with other students	Group project, individual grade	Group project, group grade	Whole class discussed group work
Total	97.8	86.2	96.3	46.2	66.0	32.9	18.1	31.2
Class grade level								
K–3 (primary)	99.3	95.7	98.7	54.5	67.7	25.9	13.0	40.0
4–6 (intermediate)	98.7	87.6	97.5	54.7	69.8	44.2	25.3	41.7
7–8 (middle and junior high)	98.9	72.9	92.1	32.6	62.1	28.1	15.9	19.9
9–12 (high school)	98.1	75.5	93.7	38.8	66.4	33.6	17.7	23.4
Mixed	96.2	84.6	95.5	48.9	61.2	34.4	21.8	28.7
Special education	95.3	94.6	98.3	44.7	65.0	33.6	18.4	29.5
Class subject area								
General elementary	99.2	95.0	99.4	58.4	70.9	33.0	19.9	45.0
English or language arts	97.1	74.3	97.1	39.2	59.9	26.4	12.5	22.5
Mathematics	99.8	87.9	98.9	27.6	74.4	28.3	13.1	24.3
Science	100.0	85.0	94.1	33.5	67.2	37.8	18.7	27.1
Social studies	99.5	61.3	85.9	30.6	52.3	29.1	12.1	23.4
Special education	95.3	94.6	98.3	44.7	65.0	33.6	18.4	29.5
Bilingual or ESL	100.0	77.7	99.8	56.4	61.1	42.6	16.1	28.6
Vocational education	93.8	75.7	96.5	68.6	72.7	38.6	28.1	19.2
Other	97.5	77.2	90.3	37.8	59.9	34.8	18.6	21.5

NOTE: Teachers responded to the survey items on instructional practices in terms of a "designated class" of students for whom they had primary responsibility during the previous semester or grading period. For teachers who were responsible for a single group of students all day, that group was the designated class. For teachers who were responsible for multiple classes or groups of students each day, their first instructional class or group of the day was the designated class.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Teacher Follow-up Survey: 1994–95. (Originally published as table 2 on p. 13 of the complete report from which this article is excerpted.)

commonly occurred in teachers' designated classes on a weekly basis. Most teachers reported that they lectured students (63 percent) and had students listen to and observe their presentations (76 percent) at least once a week, although teachers were more likely to report that they used teacher-student discussion strategies than lectures or presentations.

Materials Used in Instruction

In addition to the roles they and their students play in instruction, teachers must decide what materials they and their students will use as they teach and learn, within the constraints imposed by their districts and schools. Print materials have been mainstays of U.S. elementary and secondary education since the first common and charity schools of the 19th century (Kaestle 1983), and materials such as textbooks, supplementary reading materials, and workbooks and worksheets are commonly used today. Many reformers urge teachers to make less use of routine exercises commonly provided in textbooks and workbooks or worksheets, and instead to provide students with more original source materials (National Council for the Social Studies [NCSS] 1994; National Research Council [NRC] 1996). Moreover, print materials are not the only tools available to teachers today. In the past decade, instruction reformers have promoted the use of concrete materials (i.e., manipulatives, models, and other tools or objects) for mathematics and science lessons among older children as well as elementary grade children (National Council of Teachers of Mathematics [NCTM] 1989, 1991; NRC 1996). As computers, video, and other electronic technologies become both more common in society at large and less expensive, policymakers as well as education reformers are encouraging schools and teachers to make video, the Internet, and CD-ROMs part of everyday instruction (NCTM 1989; NRC 1996).

Although textbooks and workbooks or worksheets emphasizing routine practice were common, they were not used universally, and teachers assigned work with supplementary materials at least as often. Many teachers reported that their students used textbooks (74 percent) and supplementary printed materials (78 percent) in class at least once a week. About two-thirds of teachers had students do worksheets or workbook exercises emphasizing routine practice in class and at home weekly (68 and 65 percent, respectively). Overall, teachers were less likely to have students read supplementary materials than textbooks in their homework assignments, and this was particularly true of mathematics teachers.

Teachers' use of various print materials in class or homework assignments varies with their students' grade level. Compared with teachers in higher grades, teachers in lower grades were more likely to have students read supplementary materials in class and as homework and work on routine exercises in class. The proportion of teachers who had students read supplementary materials in class decreased from 91 percent of primary teachers to 66 percent of high school teachers, and the proportion who had students read supplementary materials as homework decreased from 57 percent among primary teachers to 43 percent among high school level teachers. In addition, intermediate teachers were more likely than teachers in the primary or middle and junior high grades to have students read textbooks in class (87 percent compared with 67 and 75 percent, respectively), perhaps because intermediate students have higher skills than primary students and spend more time with their teachers in class than middle and junior high school students, on average.[2]

Teachers commonly used concrete materials in their instruction, and less frequently used electronic media. Whereas 73 percent of teachers reported using manipulatives and models to demonstrate concepts, and 88 percent reported using the board or overhead to do so, 55 percent reported using a computer, video, or other electronic technology. Although primary teachers were more likely than teachers in other grade levels to have students use manipulatives at least once a week, 63 percent of high school teachers reported doing so. Mathematics, science, and social studies standards recommend that students use hands-on materials. However, science teachers were more likely to have students do so on a weekly basis: 79 percent of science teachers had students use hands-on materials weekly, compared with 62 percent of mathematics teachers and 43 percent of social studies teachers.

Classroom and Homework Activities

Reflecting the expansion of education goals to include higher order thinking as well as mastery of basic skills, curriculum standards in all four core academic subject areas emphasize that students' learning activities should include complex tasks that require higher order thinking.[3] University faculty, government agencies, academic and teacher professional organizations, and business leaders have called

[2]Primary teachers teach in grades K–3, intermediate teachers in grades 4–6, middle and junior high teachers in grades 7–8, and senior high teachers in grades 9–12.

[3]Core academic subject areas include English, mathematics, science, and social studies.

for teachers to provide more opportunities for students to become proficient at higher order thinking. Such learning activities include solving complex problems that require students to analyze, organize, and synthesize information and to communicate effectively, both orally and in writing (Marshall and Tucker 1992; Murnane and Levy 1996; NCTM 1989; The Secretary's Commission on Achieving Necessary Skills 1991). Moreover, curriculum standards in several subject areas recommend that teachers include authentic or real-world problems in the activities they ask students to do (NCSS 1994; National Council of Teachers of English/International Reading Association 1996; NCTM 1989).

The TFS:94–95 data indicate that nearly two-thirds of teachers asked students at least once a week to explain how what they had learned in class related to the real world, and about 60 percent had students work on problems that had several answers or methods of solution. Teachers were less likely, however, to have students engage in similar activities in their homework assignments. For example, 13 percent of teachers reported that homework assignments included problems with no obvious method of solution at least once a week. Teachers were more likely to assign routine exercises as homework: 65 percent did.

Older children's greater knowledge and skills might lead their teachers to use higher order thinking tasks more often than teachers of younger children. This expectation, however, was not supported by the TFS:94–95 data. Compared with higher grade teachers, teachers in the lower grades were more likely to ask students to explain how what they learned in class was linked to the real world. Primary teachers were more likely than intermediate teachers to ask students to put events or things in order and explain why they were organized that way (56 percent, compared with 39 percent). Intermediate teachers were more likely than senior high teachers to have students work on problems that required several methods of solution (68 percent, compared with 54 percent). They were also more likely than middle and junior high teachers to have students work on a project, gather data, or do an experiment at home (35 percent, compared with 18 percent).

Assessment of Student Learning

Researchers and education reformers have paid increasing attention not only to how teachers teach their students, but also to how teachers assess and evaluate students' learning (NCTM 1995; Stiggins and Conklin 1992). As the goals for elementary and secondary education have expanded to include higher order thinking skills, and as the school-age population becomes more culturally and linguistically diverse, some argue that assessment tools must expand beyond multiple-choice or short-answer tests in order to measure students' progress accurately (Herman, Aschbacher, and Winters 1992; Wiggins 1993). Although they are not without controversy (Shavelson, Baxter, and Gao 1993; Koretz et al. 1994), portfolios have been promoted as an assessment strategy that allows teachers to evaluate higher order, complex skills and also to provide opportunities for student goal setting and self-evaluation of progress (Arter and Spandel 1992; Darling-Hammond 1994).

Overall, 57 percent of teachers reported using portfolios during the semester preceding the survey. Teachers' use of portfolios was strongly associated with the grade level of their students. Nearly three-quarters of all primary teachers and 60 percent of intermediate teachers used portfolios to assess skills in at least one content area. In contrast, 41 percent of high school teachers reported using portfolios in at least one content area.

Teachers who use portfolios also use a wide variety of assessment tools, as shown by the kinds of student work they included in their portfolios. Teachers commonly included students' tests and assessments (62 percent) and worksheets (57 percent), and less commonly included homework assignments (35 percent) in portfolios (table B). These data indicate that many teachers are combining portfolios with traditional assessment strategies.

Perhaps the most common use of all the assessment information teachers collect is in determining end-of-semester or end-of-year letter grades or formal progress reports. Teachers can consider many factors when they determine student grades (Stiggins and Conklin 1992). While some may rely only on the absolute level of student achievement, others may consider additional factors, such as level of effort and degree of growth or improvement shown by their students (Brookhart 1993). Most, however, probably use a mixture of these factors, assigning a higher level of importance to some than to others (Brookhart 1993; Stiggins and Conklin 1992).

In the TFS:94–95, teachers were asked to indicate the importance of various aspects of student performance in assigning grades, including absolute achievement, level of effort, individual improvement, achievement relative to the

Table B.—Percentage of teachers who included various types of student work in student portfolios, by class grade level and subject area: 1994–95

	Work-sheets	Open-ended problems	Exploratory investi-gations	Long-term projects	Inter-disciplinary problems	Journal entries	Homework	Self-reflective writing	Narrative writing	Tests and assessments
Total	56.6	40.9	29.9	44.5	22.9	47.4	34.8	51.9	51.3	62.3
Class grade level										
K–3 (primary)	55.7	42.2	25.3	29.5	19.3	58.1	25.2	57.4	56.2	63.5
4–6 (intermediate)	56.3	40.8	30.6	52.7	24.2	48.0	35.0	55.7	60.5	66.0
7–8 (middle and junior high)	56.3	42.6	35.1	58.5	31.1	43.0	38.5	61.5	56.2	62.6
9–12 (high school)	50.7	40.7	33.3	55.3	23.3	32.3	44.9	40.4	40.1	59.0
Mixed	47.8	41.5	30.2	52.2	17.7	47.7	28.6	39.6	39.3	49.4
Special education	65.9	38.4	30.5	41.3	24.9	46.3	40.1	51.3	49.4	65.2
Class subject area										
General elementary	54.2	43.9	29.6	38.5	22.0	56.2	28.2	58.7	60.0	61.5
English or language arts	40.7	41.7	23.5	57.9	18.9	59.0	30.5	76.9	82.6	55.4
Mathematics	65.8	40.9	31.7	39.8	26.9	28.5	54.8	20.3	14.1	80.2
Science	61.5	53.1	58.6	55.8	32.5	30.7	44.1	28.4	24.6	68.2
Social studies	67.9	39.0	39.2	61.3	21.1	31.6	55.7	49.1	36.5	76.1
Special education	65.9	38.4	30.5	41.3	24.9	46.3	40.1	51.3	49.4	65.2
Bilingual or ESL	46.9	31.6	26.5	47.7	—	66.9	28.1	41.4	40.1	45.2
Vocational education	64.5	30.5	19.0	64.3	32.9	11.0	45.9	6.2	12.2	60.6
Other	52.6	32.3	23.6	45.2	19.9	31.3	29.5	37.8	31.4	51.8

—Too few cases for a reliable estimate.

NOTE: Teachers responded to the survey items on instructional practices in terms of a "designated class" of students for whom they had primary responsibility during the previous semester or grading period. For teachers who were responsible for a single group of students all day, that group was the designated class. For teachers who were responsible for multiple classes or groups of students each day, their first instructional class or group of the day was the designated class.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Teacher Follow-up Survey: 1994–95. (Originally published as table 9 on p. 31 of the complete report from which this article is excerpted.)

rest of the class, and portfolio items. Almost all teachers (97 percent) reported that measures of student effort were either very important or extremely important in determining grades. Eighty-four percent assigned the same level of importance to students' improvement over time, and 76 percent said that absolute achievement was very important. About one-half (49 percent) of teachers said that portfolio items were very important, and one-quarter said that achievement relative to the rest of the class was very important.

Class, School, and Teacher Characteristics Associated With Teachers' Instructional Practices

Beyond grade level and subject area, parents, educators, and policymakers are interested in whether and how instruction varies among teachers with different qualifications and among students of different backgrounds for at least two reasons. First, as debate regarding how teachers should teach continues, parents, educators, and policymakers worry that some children are consistently more likely to receive lower quality instruction than others. Second, some researchers claim that certain instructional strategies are particularly beneficial for children from low-income backgrounds or those with limited English proficiency (LEP) (Knapp 1995). To the degree that low-income children or children of cultural and linguistic minority backgrounds are better served by some instructional practices than others, therefore, systematic variation in instructional strategies may indicate appropriate, rather than lower quality, instruction.

Overall, the TFS:94–95 data indicate that public school teachers (who constitute 88 percent of all teachers) were generally more likely than private school teachers (12 percent of all teachers) to use recently recommended teaching practices in their classrooms.

Teachers' perceptions of student ability were associated in interesting ways with the instructional strategies they used. In the classroom, teachers who taught higher ability students tended to use recommended teaching strategies less often than did teachers who taught lower ability students. With homework assignments, however, teachers of higher ability classes were often more likely than teachers of lower ability classes to use recommended practices.

As the proportion of low-income students in their schools increased, teachers became more likely to use portfolio

assessment of student work during the semester and to use the following recommended practices on a weekly basis: facilitating discussions, using manipulatives or models to demonstrate concepts, and having students use hands-on materials. However, teachers in schools with higher proportions of low-income students were also more likely to have students do traditional routine exercises, both in class and as homework.

In general, teachers of language minority children used recommended practices more often, and other practices less often, than did other teachers. For example, as LEP enrollment increased, so did the proportion of teachers who worked with small groups, had the whole class discuss the work that students had done in small groups, and had students interact primarily with other students in the class. Higher LEP enrollment was also associated with greater teacher use of higher level tasks as well as portfolio assessment of student work overall and, specifically, in English, mathematics, science, and other fields (but not social studies).

More experienced teachers were less likely than less experienced teachers to use some recommended practices and more likely to use some traditional practices. For example, 35 percent of teachers with 1 to 4 years of experience had the whole class discuss work that students had done in small groups, compared with 32 percent of teachers with 5 to 20 years of experience and 28 percent of teachers with more than 20 years of experience. Conversely, teachers with more years of experience were more likely than their less experienced counterparts to report that they had students read textbooks at home, a traditional practice.

Teachers with more advanced degrees were more likely than others to use a number of recommended practices, such as having students work on group projects for individual grades, engage in discussion primarily with other students in class, read supplementary materials in class and as homework, use calculators in class, work on problems with several answers or methods of solution in class, and apply concepts to unfamiliar situations in homework assignments. They were also more likely to use portfolios to assess student work.

In general, teachers who had participated in professional development about a year before completing the TFS:94–95 were more likely than those who had not to use recommended teaching practices. For example, teachers who participated in professional development on cooperative learning were more likely to use small group instruction in general and, specifically, to have students confer with other students, work on a group project for individual grades, and discuss with the whole class work they had done in small groups. Similar relationships were observed between professional development on education technology and the use of technology in the classroom, and between professional development on assessment and the use of portfolios to assess student work.

Conclusion

The TFS:94–95 offers a unique perspective on instruction in elementary and secondary schools in that it provides the first nationally representative data on instruction across subject areas. Consistent with previous research, these data indicate that students' grade level and the subject area of classes, as well as other characteristics of students, schools, and teachers themselves, are related to the instructional strategies that teachers choose. Future research will be able to determine whether teaching has changed in the 1990s, as states and localities adopt curriculum standards, as teachers continue to participate in professional development programs, as technology becomes more available, and as the size and demographics of the school-aged population change.

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For technical information, see the complete report:

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To obtain the complete report (NCES 1999–348), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov),* or contact GPO (202–512–1800).

Instructional Change

Invited Commentary: Educational Reform and Instructional Change

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This commentary represents the opinions of the author and does not necessarily reflect the views of the National Center for Education Statistics.

The reform of education has been a major focus of policymakers at the local, state, and national levels since the publication in 1983 of *A Nation at Risk* (National Commission on Excellence in Education). Following the lead of the National Council of Teachers of Mathematics (NCTM 1989), nearly a dozen national subject-matter associations have issued new voluntary national curriculum standards that focus on conceptual understanding rather than basic skills. States have increased coursework requirements for high school graduation, developed content standards for K–12 education that generally reflect national standards, sought greater rigor in textbooks and student outcomes, and aligned statewide assessment and accountability programs with the more ambitious curriculum standards. The federal government has sought to ensure that students with special needs—such as low-achieving students, limited-English-proficient (LEP) students, and students with disabilities—are included in these reform efforts through changes in Title I of the Elementary and Secondary Education Act and the Individuals with Disabilities Education Act.

The new curriculum standards require teachers to make tremendous changes in what and how they teach and in their roles in classrooms and schools. The NCTM standards, for example, envision classrooms as places where students regularly explore interesting problems using important mathematical concepts, rather than memorizing isolated mathematical facts and computational procedures. These "active" classrooms should include the use of small group work, work with concrete materials, and problem solving in the context of projects. Students are encouraged to communicate mathematics ideas orally and in writing through questioning procedures and results, discussing and evaluating alternative approaches, and providing written explanations of their reasoning. Teachers are seen as facilitators of goals, rather than the exclusive source of mathematical knowledge (Lindquist, Dossey, and Mullis n.d.).

The push to include *all* students in standards-based reforms raises questions about how these kinds of learning opportunities are distributed across different kinds of students, classrooms, and schools. As decisions about promotion, high school graduation, and entry into either the job market or postsecondary education become tied to more rigorous tests, students must be given an equal opportunity to learn the new knowledge and skills that are being assessed.

The featured report, *What Happens in Classrooms? Instructional Practices in Elementary and Secondary Schools: 1994–95*, sheds light on the extent to which teachers use instructional practices recommended in the voluntary national curriculum standards and whether teachers' practices differ depending on the backgrounds of their students or their own experience and training. The authors examine four dimensions of instruction addressed by the national standards: the roles that teachers and students play in learning activities, the materials and technology used in the classroom, the kinds of learning tasks that students are asked to do both in the classroom and at home, and how teachers assess and evaluate student learning.

The data, from a nationally representative sample of elementary and secondary teachers in all subject areas, were collected in the 1994–95 Teacher Follow-up Survey (TFS:94–95).[1] Because the survey items were designed to capture practices across subject areas and grade levels, the information is considerably less detailed than that provided in other National Center for Education Statistics (NCES) and National Science Foundation surveys devoted to specific subject areas. But *What Happens in Classrooms?* provides a unique opportunity to compare and contrast some aspects of teaching across all grade levels and subject areas, and across different kinds of teachers and schools.

Four broad findings about instructional practices and access to learning opportunities emerge from the analyses presented in this report. First, teachers at all grade levels and in different subject areas used a variety of instructional practices in their classes, combining traditional practices (such as giving lectures and having students read textbooks and do exercises that emphasize routine practice) with practices promoted in the reform documents (such as cooperative learning, the use of supplementary printed materials and manipulatives, and assigning tasks that involve higher order thinking).

[1]The TFS is conducted 1 year after the administration of the Schools and Staffing Survey (SASS), a set of national surveys of public and private schools and the teachers and administrators who work in them.

This finding should not be surprising, as the new ideas about what students should know and be able to do, how students should be taught, and how they should be assessed challenge the conceptions of student learning and teaching that all actors in the education system—students, parents, educators, policymakers, and the public—hold dear. For example, while there is strong public support for the concept of higher academic standards, citizens want students to master the basics before moving on to "higher order" skills (Immerwahr and Johnson 1996). Even teachers who support the new directions of reform express the need to balance old and new ways of teaching reading, writing, and mathematics to ensure that their students learn spelling, grammar, mathematical computation, and number facts (Goertz, Floden, and O'Day 1995).

Second, elementary school teachers, particularly those who work in the primary grades (K–3), appeared more likely to have adopted reform-oriented instructional practices than were teachers in higher level grades. Elementary school teachers generally reported greater use of small groups, strategies involving student talk, supplementary print materials, and manipulatives and other hands-on materials. These teachers were also more likely to report that they had students work in class on tasks that involved higher order thinking or had some of the characteristics of authentic problems. The authors of the report hypothesize that these differences may result from the amount of time that teachers spent with their designated classes each week. Accomplishing group work or having students work individually on longer term assignments might be difficult within the 45- to 50-minute class periods typically available to secondary teachers. Indeed, some junior and senior high schools have instituted block scheduling to address these constraints.

Two other explanations for the differential use of instructional practices are possible, however. First, because much of the early standards-based curriculum development, especially in mathematics and science, focused on the elementary grades, commercial publishers began to make new instructional materials available at the elementary school level. In contrast, Porter and Associates (1994) found that instructional materials were not available to support mathematics and science reforms at the high school level in the early 1990s. Second, much of the professional development sponsored and supported by subject-matter associations, school districts, and states has targeted elementary school teachers. For example, most states that received grants from the National Science Foundation's Statewide Systemic Initiatives (SSI) Program targeted the majority of their funds to the elementary and middle school grades (Shields, Corcoran, and Zucker 1994).

A third finding from *What Happens in Classrooms?* supports this hypothesized connection between professional development and changes in instructional practice in elementary schools. Elementary school teachers were somewhat more likely to have participated in professional development on instructional methods, student assessment, and cooperative learning than other teachers (Choy and Chen 1998). And teachers who participated in professional development on new instructional practices were more likely than those who had not to use the recommended strategies in group work, teacher-student interactions, and assessments.

Finally, the data from this study show that low-achieving students and students who attend high-poverty schools and schools with large concentrations of LEP students have similar or greater access to many of the instructional practices endorsed by reformers.[2] For example, teachers in higher poverty schools or schools with more LEP students were more likely to facilitate a discussion, use manipulatives or models to demonstrate a concept, and use portfolios to assess student progress. But teachers were also more likely to have low-achieving students do routine exercises in class while giving students in higher ability classes more access to problems that require higher order thinking skills.

In summary, *What Happens in Classrooms?* paints a picture of teachers' instructional practices in the early days of standards-based reform. Teachers incorporated some recommended practices into their classrooms, but did not decrease their conventional practices. Pedagogical reforms appear to have penetrated more deeply into elementary than secondary classrooms, perhaps due to greater exposure to the reforms or perhaps because elementary teachers are more willing to try new instructional approaches. Professional development had a positive impact on the practices it targeted. Finally, many reform practices had found their way into classrooms serving poor, low-achieving, and LEP students.

The data from the TFS:94–95 provide an important baseline for tracking changes in teacher practices as states adopt and

[2]High-poverty schools are defined as those where 40 percent or more of the students receive free or reduced-price lunch. Schools with large concentrations of LEP students are those where the LEP enrollment is 10 percent or more.

schools and districts implement curriculum standards in different subject areas. But these kinds of survey questions, by their design, can tell only part of the story of classroom change. Research tells us that teachers can change some dimensions of their teaching, such as materials and grouping arrangements, more readily than other dimensions, such as the content of academic tasks (e.g., Cohen and Ball 1990; *Educational Evaluation and Policy Analysis* 1990; Spillane and Zeuli 1999). And we are learning that student performance is more likely to improve when educational improvement is focused on having teachers learn and teach academic content (e.g., Cohen and Hill 1998).

Thus, policymakers and educators need data on the content, as well as the process, of instruction in order to document the extent and depth of reform in the nation's classrooms. The National Assessment of Educational Progress (NAEP), the Third International Mathematics and Science Study (TIMSS), new longitudinal surveys launched by NCES, and the 1999–2000 administration of the Schools and Staffing Survey (SASS) can provide more comprehensive information on teacher practice. These multiple data sources should expand our understanding of educational change.

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Invited Commentary: Moving Toward Better Instructional Practice Data

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This commentary represents the opinions of the author and does not necessarily reflect the views of the National Center for Education Statistics.

The Need for Teaching Practice Data

What Happens in Classrooms? Instructional Practices in Elementary and Secondary Schools: 1994–95 is a timely response to policymakers' increasing interest in improving education by reforming teaching practices or strategies (Blank and Pechman 1995). Measuring teaching practices using survey data, however, is still in its "infancy" (Brewer and Stasz 1996). To date, there have been very few studies that have used teacher surveys to describe the instructional strategies used throughout the country and, of these, none provides as detailed information as does *What Happens in Classrooms?* This is due to the fact that, historically, education reforms have tinkered at the edges of the educational process (Marshall, Fuhrman, and O'Day 1994, 12). Even the extensive reform efforts of the 1970s and 1980s remained aloof from teaching practices. During those decades, policymakers tried to improve schooling by adjusting resource allocations (e.g., striving for racial balance and financial equity) and by setting outcome goals (e.g., setting minimum course requirements and implementing minimum competency tests). Arguably, the perceived inadequacies of these policies have led to the country's current enthusiasm for educational standards aimed at influencing teaching practices.

To monitor the impact of these unprecedented reform efforts, the country needs accurate and nationally representative teaching practice data. The push for the routine collection of nationally representative data of this type only began in the late 1980s (e.g., Murnane and Raizen 1988; Office of Educational Research and Improvement 1988; Porter 1991; Shavelson et al. 1987). But a perceived inability of surveys to measure instructional practices, combined with policymakers' and researchers' historical emphasis on input-output studies, helps explain why much of what the country currently knows about the instructional process comes from in-depth studies in a handful of classrooms. A major limitation of in-depth studies is that their generalizability to other classrooms is unknown. Unfortunately, as reform initiatives increasingly focus on instructional processes, demand for accurate instructional practice data will remain high and the generalizability limitations of in-depth studies will become increasingly problematic. In turn, surveys will grow in appeal since they are a cost-effective way to include large numbers of classrooms in studies.

Alternative study models that straddle these two approaches for gathering teacher practice data are being tried. The Third International Mathematics and Science Study (TIMSS) supplemented teacher surveys with a "video survey" of 231 eighth-grade math classrooms in three countries. The video survey, like classroom observations, promises objectivity and specificity and has the added advantage of being available for wider and more systematic scrutiny. The TIMSS approach does not, however, surmount the primary hurdle associated with conducting classroom observations, namely, cost. Regularly conducting video surveys in a nationally representative sample of classrooms of different grade levels and subject areas would undoubtedly be cost prohibitive. Consequently, teacher self-reports of the sort collected in large national surveys such as the 1994–95 Teacher Follow-up Survey (TFS:94–95)—the data source for the findings reported in *What Happens in Classrooms?*—remain the most viable means for obtaining information about the status of teaching practices in the United States.

The TFS:94–95 findings reported in *What Happens in Classrooms?* are unique because they provide national estimates[1] of the proportion of teachers from all grade levels and major subject areas (English, mathematics, history, and science) who use various teaching strategies. Using data that are slightly dated but are unfortunately the most recent available, it examines the degree to which teaching practices vary by grade level and subject area; how instructional approaches vary with the characteristics of teachers, students, and schools; and the degree to which teachers use the reform instructional approaches advocated by the National Board for Professional Teaching Standards and several voluntary national curriculum standards.

The report presents some surprising findings. For example, one would expect that because older students have more knowledge and skills, the teachers of these students would tend to put more emphasis on higher order thinking skills than the teachers of younger students. But *What Happens in Classrooms?* finds that, in several instances, the opposite is the case. Also surprisingly, while several other studies

[1]The TFS:94–95 is not representative of the entire 1994–95 teacher population because teachers were not eligible for the TFS sample unless they had been teaching in 1993–94. Therefore, it excludes 1994–95 first-year teachers and experienced teachers who were not teaching in 1993–94 but returned to the teaching force in 1994–95.

(Mayer 1998; Metz 1978; Oakes 1985; Raudenbush, Rowan, and Cheong 1993) have found that teachers of high-achieving students are more likely to use reform teaching practices (those emphasizing application, reasoning, and conceptual understanding) than traditional practices (those emphasizing memorization of facts and the mastery of routine skills), *What Happens in Classrooms?* finds that, in many instances, the opposite is true.

While the country needs information of the sort gathered by the TFS:94–95 and presented in *What Happens in Classrooms?*, many educators and researchers are skeptical about the ability of surveys to truly capture what goes on in classrooms. And given that national data collection efforts that use teacher surveys to describe teaching practices are in their infancy, researchers and policymakers want to know how much faith they can have in this type of data.

How Accurate Are Surveys?

Studies that have investigated the reliability and validity of using surveys to gather information on teaching practices have produced both encouraging and discouraging findings. The reliability of a survey describes whether its use in repeated trials will yield the same results. Low reliability could be the result of teachers finding the questions difficult to interpret or inaccurately recalling what they do in their classrooms. But knowing that an instrument is reliable does not justify the assumption that it is valid. Validity describes the extent to which an instrument accurately measures the phenomena of interest. One of the chief concerns about teaching practice survey data is that they may not provide an accurate depiction of what goes on in classrooms, for several possible reasons: (1) the teaching process consists of complex interactions between students and teachers that a survey cannot accurately depict, (2) teachers provide biased responses to a survey because they feel that they should (for a variety of reasons) respond to the questions in an "acceptable" or "socially desirable" way, and (3) teachers unknowingly provide misleading responses to the survey questions. Research suggests that teachers sometimes truly believe they are embracing pedagogical reforms, but in practice their teaching comes nowhere near the vision of the reformers (Cohen 1990).

To date, efforts to evaluate the reliability of the TFS items on teaching practices have raised questions but not resolved them. The National Center for Education Statistics (NCES) contracted with the U.S. Census Bureau to examine the reliability of selected TFS:94–95 survey questions. Twenty-two of the teaching practice questions used in the analyses in *What Happens in Classrooms?* were included in this study, and the reliability of *all* 22 was found to be "problematic" (Henke, Chen, and Goldman 1999). Though the analyses used in the report try to account for this, the authors note that the findings should be interpreted with caution. Using a much smaller sample, but similar survey questions, I conducted an exploratory study that also found the items to be unreliable (Mayer 1999). On the other hand, Smithson and Porter (1994) and Burstein et al. (1995) conducted studies that led them to conclude that these types of instructional practice questions can be quite reliable.[2]

In my study, I did find that when variables representing similar pedagogical philosophies were grouped together to give a portrait of the preferred pedagogical style of teachers, the reliability of that composite variable was quite high[3] (and was, in this case, significantly related to middle school algebra learning) (Mayer 1998). Combining items makes sense because a single item cannot "provide a coherent picture of instruction" (Burstein et al. 1995, 36). Other composites, such as academic aptitude test scores and the Consumer Price Index (CPI), provide a good analogy. Aptitude tests always consist of multiple questions that measure an underlying characteristic, such as mathematics ability. Likewise, the CPI, which tracks inflation, is created by monitoring the cost of a "basket" of goods that consumers might purchase in a given month. Tracking the cost of only one product, such as canned soup, would not provide an accurate or informative picture of inflation. And answering one algebra question would not provide an accurate measure of mathematics aptitude. In *What Happens in Classrooms?*, interesting summary variables were created, but unfortunately they were discussed only briefly, and the relationships between these variables and other variables were not presented in the report.

The validity of teaching practice items has also been investigated and resulted in similarly mixed conclusions. Burstein et al. (1995, 45) compare classroom artifacts (i.e., textbooks and assignments) with teacher survey responses concerning the characteristics of their exams and homework assignments. They conclude: "To the extent that we were able to validate the survey data on teachers' instructional strategies, we found that those data report accurately

[2] I do not think their findings are as encouraging as they do. For a discussion of why, see Mayer (1999).

[3] This is not unexpected given that when multiple items measure the same underlying characteristic (e.g., a reform instructional approach) and are grouped together, the reliability of the construct will always be greater than the reliability of the individual items (Carmines and Zeller 1979) .

the instructional strategies used most often by teachers…." In another study (Mayer 1999), a composite representing the amount of time spent using reform mathematics teaching practices based on survey data and a parallel composite based on classroom observations also produced a high correlation (r = .85). Despite this encouraging finding, the same classroom observations also revealed that the survey did not adequately capture the *quality* of the teachers' use of various practices.

NCES Is Developing Better Measures of Teaching Practice

Studies that have investigated the reliability and validity of using surveys to gather information on teaching practices suggest important ways in which this effort can be improved. The teaching practice items on the upcoming 1999–2000 Schools and Staffing Survey (SASS:1999–2000) will reflect some of these strategies. For example, on the TFS:94–95, teachers were asked to describe their teaching over the past semester, but research by Mullens and Gayler (1999) suggests that teachers cannot accurately recall the whole semester. Therefore, SASS:1999–2000 will ask teachers to refer to their last 2 weeks of typical instruction when describing their teaching practices.

On the TFS:94–95, teachers were also asked to report whether they used teaching practices "almost every day," "once or twice a week," "once or twice a month," "once or twice a semester," or "never." These response options are limited in at least two ways. First, Burstein et al. (1995) found that because "almost every day" and "once or twice a week" were such similar response options, teachers could not distinguish between them, thereby reducing their reliability. Second, because these response options only ask teachers to assess how *often* they use particular teaching approaches and not *how much* time they spend on each approach, the results can be uninformative and misleading. For example, *What Happens in Classrooms?* reports that at least 85 percent of teachers stated they used numerous practices at least once a week (e.g., working in small groups, providing whole group instruction, and having students answer open-ended questions), but this result inappropriately lumps together teachers who use a given approach for only a few minutes a week with those who use it for several hours. As a remedy to these problems, SASS:1999–2000 will ask teachers to estimate how often *and* for how many minutes they use each of the instructional techniques over a 2-week period.

In addition to the improvements that will likely result from the new SASS items, NCES is sponsoring a 4-year research and development effort through the Education Statistics Services Institute (ESSI) aimed explicitly at creating more accurate teaching practice indicators.

Conclusion

The TFS:94–95 findings reported in *What Happens in Classrooms?* provide important information about the instructional practices being used throughout the country, but they also offer an opportunity to further our understanding of how to use surveys to measure instructional practice. Carefully used, surveys offer the most cost-efficient means to measure instructional practice. To move instructional practice surveys into the next stage of development, NCES has been refining the teaching practice measures used on its surveys. The fruits of this labor should help policymakers and reformers as they attempt to assess the degree to which new policies aimed at influencing teaching practices are taking hold and having their desired effect.

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Elementary and Secondary Education

1998 Reading Report Card

The NAEP 1998 Reading Report Card for the Nation and the States

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This article was originally published as* The NAEP 1998 Reading Report Card: National and State Highlights. *Some of the tables and sections from the* Highlights *have been omitted. The sample survey data are from the National Assessment of Educational Progress (NAEP) 1998 Reading Assessment.

America's children are its greatest resource. Educators, parents, and concerned citizens want to provide young people with the academic opportunities to compete and succeed in a challenging world. One resource that can help inform the public about the academic preparedness of America's youth is the National Assessment of Educational Progress (NAEP), often referred to as "the Nation's Report Card."

In 1998, the National Center for Education Statistics (NCES) administered the NAEP reading assessment to a national sample of students at grades 4, 8, and 12, and to state samples of students at grades 4 and 8. The results of this assessment present a broad view of how America's students are achieving in reading—one of the most important sets of skills that young people acquire and develop

throughout their lives. Because the assessment administered in 1998 shared a common set of reading passages and comprehension questions with assessments given in 1992 and 1994, it is possible to use NAEP results to chart the progress American students have made in reading since 1992.

This article provides highlights from the 1998 NAEP reading assessment, describing its content, its major findings at the national and state levels, and students' experiences at school and at home that support achievement in reading. Student performance is reported as an average score based on the NAEP reading scale, which ranges from 0 to 500. The average scale score reflects the overall reading performance of a particular group of students. Student reading performance is also reported in terms of three achievement levels: *Basic*, *Proficient*, and *Advanced*. The achievement levels are performance standards, adopted by the National Assessment Governing Board (NAGB) as part of its statutory responsibilities. The levels are collective judgments of what students should know and be able to do for each grade tested. They are based on recommendations by broadly representative panels of classroom teachers, education specialists, and members of the general public.

As provided by law, the Commissioner of Education Statistics, upon review of a congressionally mandated evaluation of NAEP, has determined that the achievement levels are to be considered developmental and should be interpreted and used with caution. However, both the Commissioner and NAGB believe these performance standards are useful for understanding trends in student achievement. They have been widely used by national and state officials, including the National Education Goals Panel, as a common yardstick of academic performance.

The NAEP 1998 Reading Assessment

The NAEP reading framework developed by NAGB describes reading as an interactive process. To comprehend what is being read, the reader must interact with the written word and interpret ideas presented in the reading material based, in part, upon the reader's knowledge and purpose for reading. The NAEP reading assessment included three types of reading material that represent different purposes for reading: reading for literary experience, reading to gain information, and reading to perform a task.

The materials that were used in the NAEP reading assessment were taken from sources that are typically available to students, such as collections of stories, children's or youth magazines, or informational books. These materials were presented in their original formats in the test booklets so as to reproduce, as much as possible, an "authentic" reading experience. By giving students different types of reading materials, NAEP was able to provide a measure of reading performance that reflects students' typical reading experiences both in and out of school.

To measure students' comprehension of the reading materials included in the assessment, students responded to both multiple-choice and open-ended questions. At all three grades, at least half of the questions required students to provide their own written responses, so that they could explain and support their understanding.

NAEP Reading Assessment Results for the Nation

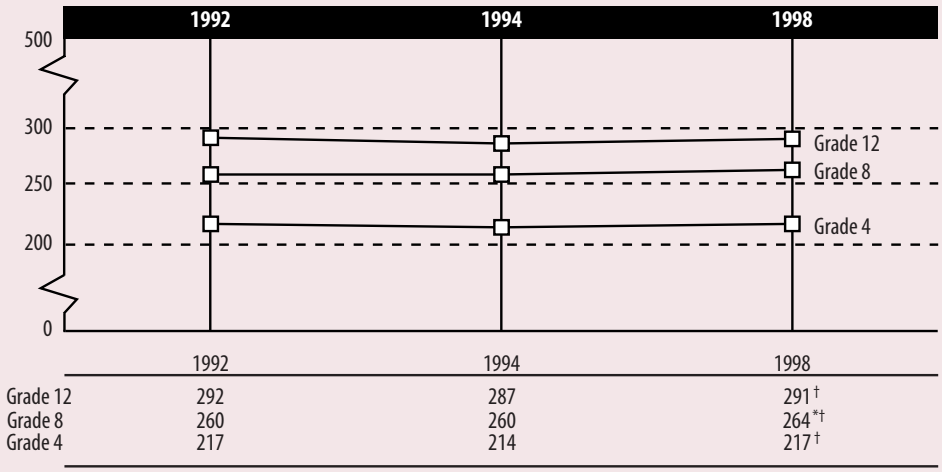
The results of the 1998 reading assessment are mixed. At grade 8, the 1998 average reading score was higher than the 1992 and 1994 scores (figure A). In contrast, although the scores increased between 1994 and 1998 for students in grades 4 and 12, these increases showed no net gains over the 1992 average scores for reading.

Achievement-level results for the nation's 4th-, 8th-, and 12th-grade students are presented in table A. In reading this table, it is necessary to keep in mind that the levels are cumulative. The percentage of students who are at or above *Basic* includes not only students at the *Basic* level of performance, but also those students who attained the *Proficient* and *Advanced* levels. Likewise, the percentage of students at or above *Proficient* includes those who attained the *Advanced* level.

In 1998, performance at or above the *Proficient* level—the achievement level identified as the standard all students should reach—was attained by 31 percent of students at grade 4, 33 percent of students at grade 8, and 40 percent of students at grade 12.

- At grade 4, there was no significant change in achievement-level performance across the three assessment years.
- At grade 8, the percentages of students at or above *Basic* and at or above *Proficient* were higher in 1998 than in 1994 and in 1992.

Figure A.—Average reading scores for the nation: 1992, 1994, and 1998



	1992	1994	1998
Grade 12	292	287	291†
Grade 8	260	260	264*†
Grade 4	217	214	217†

*Indicates that the 1998 score is significantly different from the 1992 score.

†Indicates that the 1998 score is significantly different from the 1994 score.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1992, 1994, and 1998 Reading Assessments. (Previously published on p. 6 of *The NAEP 1998 Reading Report Card: National and State Highlights.*)

- At grade 12, the achievement-level results were somewhat mixed. Higher percentages of students attained each level of performance in 1998 than in 1994. In addition, the percentage of students at the *Advanced* level was higher in 1998 than in 1992. Although the percentage of students at or above *Basic* increased between 1994 and 1998, it was still lower than it had been in 1992.

Table A shows cumulative percentages of students "at or above" each achievement level. A large proportion of students at each grade did not reach the *Proficient* level of reading performance.

Reading performance of male and female students

In 1992, 1994, and 1998, the average reading scores for females were higher than those for males at all three grades. The results are generally positive, showing that most students are making gains in reading.

- At grade 4, the average score for male students went up between 1994 and 1998; however, there was no change in the average score for female students.
- At grade 8, the average scores for both male and female students in 1998 were higher than in 1994 and in 1992.
- At grade 12, the average score for female students went up between 1994 and 1998. The apparent gain between 1994 and 1998 for male 12th-graders was not significant, and their average score in 1998 remained lower than it was in 1992.

More females than males were at or above the *Proficient* level. In 1998, one-third or fewer of males in each grade reached or exceeded this level—28 percent at grade 4, 27 percent at grade 8, and 32 percent at grade 12. In comparison, one-third or more of females in each grade were at or above *Proficient*—33 percent at grade 4, 40 percent at grade 8, and 48 percent at grade 12.

For both males and females at grade 8, there were gains in the percentage of students at or above *Proficient*. In 1998, the percentage of male eighth-graders was higher than in 1994 and in 1992, and the percentage of female students was higher than in 1992. Among female 12th-graders, a higher percentage of students were at or above *Proficient* in 1998 than in 1994.

Table A.—Percentage of students at or above the reading achievement levels for the nation: 1992, 1994, and 1998

	Below basic	At or above basic	At or above proficient	Advanced
Grade 4				
1998	38	62	31	7
1994	40	60	30	7
1992	38	62	29	6
Grade 8				
1998	26*†	74*†	33*†	3
1994	30	70	30	3
1992	31	69	29	3
Grade 12				
1998	23*†	77*†	40†	6*†
1994	25	75	36	4
1992	20	80	40	4

*Indicates that the 1998 percentage is significantly different from the 1992 percentage.

†Indicates that the 1998 percentage is significantly different from the 1994 percentage.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1992, 1994, and 1998 Reading Assessments. (Previously published on p. 6 of *The NAEP 1998 Reading Report Card: National and State Highlights*.)

Reading performance by racial/ethnic subgroups

In 1998, white and Asian fourth-grade students outscored their black, Hispanic, and American Indian peers. American Indian students also scored higher than black students at grade 4. Among eighth-graders, white and Asian students again scored higher than their black, Hispanic, and American Indian peers. At grade 12, white students had higher scores than black, Hispanic, and American Indian students. Asian students outscored their black and Hispanic peers, and Hispanic students had higher scores than black students.

- At grade 4, the average score for black students went up between 1994 and 1998.
- At grade 8, the average scores for both white and black students in 1998 were higher than in 1994 and 1992.
- At grade 12, the average scores for both white and Hispanic students went up between 1994 and 1998.

In 1998, the average scores for Asian/Pacific Islander and American Indian students had not changed significantly at any grade since 1992 or 1994.

Across the three grades in 1998, between 39 and 47 percent of white students were at or above the *Proficient* level. In comparison, 10 to 18 percent of black students and 13 to 26 percent of Hispanic students reached or exceeded this level of performance. The only significant increases seen in the percentages of students at or above the *Proficient* level in any racial/ethnic group were for white students at grades 8 and 12 between 1994 and 1998.

Reading performance by type of school

Results are reported in terms of average reading scores for students attending two types of schools: public and nonpublic. Included among nonpublic school students are those who attended Catholic schools and those who attended other nonpublic schools. For all three grades in 1998, students in nonpublic schools had higher reading scores than their peers in public schools. It should be noted that differences between the performance of students in public and nonpublic schools may be due to a variety of factors, such as student selection and parental involvement.

In 1998, scores for students in nonpublic schools were not significantly different from scores in 1994 and in 1992. The 1998 score for fourth-graders in public schools also was not significantly different from those in the previous two assessments. However, there were some gains for 8th- and 12th-graders in public schools.

- At grade 8, the average score for public school students in 1998 was higher than in 1994 and in 1992.
- At grade 12, the average score for public school students went up between 1994 and 1998.

At each grade, a higher percentage of nonpublic school students reached or exceeded the *Proficient* level of performance than did public school students. Across the three grades in 1998, between 46 and 54 percent of

nonpublic school students were at or above *Proficient*. In comparison, 29 to 39 percent of public school students were at or above this level.

The only significant increase seen in the percentages of students at or above the *Proficient* level was for public school students at grade 8; the percentage in 1998 was higher than that in both 1994 and 1992.

School and Home Factors Related to Reading Achievement

Do students' reading habits in school and at home affect their reading proficiency? Is there a relationship between students' television viewing habits and their reading achievement? What kinds of teaching practices seem to enhance students' reading performance? NAEP collects information that can help researchers answer these questions.

This information may be especially useful. It may help educators discover, for example, that some of their own established classroom activities are also practiced by their colleagues across the nation. It also can suggest different approaches to help students become better readers, and provide a resource for parents to strengthen their children's at-home reading habits.

Daily reading habits

Research has found that children who read every day have the best chance of becoming competent readers. Daily practice at reading in school and for homework may not only increase fluency, but may also encourage both literacy habits and literary appreciation. Although the amount of reading students do each day may vary depending on a school's instructional goals and student needs, most schools do require their students to read on a daily basis.

Students in the NAEP 1998 reading assessment were asked about the number of pages they read daily in school and for homework. The data show that the more students read each day, the higher their scores were on the NAEP reading assessment. Eighth- and 12th-graders in 1998 were reading more pages each day in school and for homework than were 8th- and 12th-graders in 1994.

Reading and writing

Most educators today agree that integrating reading and writing benefits the development of literacy. Numerous studies have shown that reading development does not take place in isolation; children develop simultaneously as readers, listeners, speakers, and writers. The NAEP reading assessment recognized the importance of these interrelationships by asking students and teachers questions about the ways in which reading and writing are combined in their classrooms.

Students in the NAEP 1998 reading assessment were asked how frequently in school they were asked to write long answers to questions on tests or assignments that involved reading. The data show an increase since 1994 in the percentage of students at grades 4 and 8 who wrote long answers to questions at least once a week. The students who said they wrote long answers on a weekly or monthly basis had higher scores than those who said they did so twice a year or less.

Discussing studies at home

The lessons students learn in school are reinforced when they have opportunities to share them with caring family members. Research studies have documented the higher achievement of students whose families have taken an active role in their learning. Recognizing this, recent education reform efforts, such as Goals 2000, have sought to strengthen cooperation between parents and schools.

The NAEP 1998 reading assessment sought to gauge the impact of parental involvement on students' reading achievement by asking students how often they discuss their studies with someone at home. Students in all three grades who discussed studies at home at least weekly had higher reading scores than students who did so less frequently. At grades 8 and 12, students who did this almost every day had the highest reading scores. There were no significant changes over time in the frequency of this activity.

Television viewing

Television watching has been widely criticized for distracting children from their studies and discouraging recreational reading. Numerous research findings provide support for these concerns and underscore the negative relationship between TV viewing and literacy development.

The NAEP reading assessment has long recognized the importance of monitoring the effects of television watching on students' reading achievement. Students in the assessment were asked how many hours of television they watched each day. At all three grades, students who watched 3 hours or less of television daily had higher

reading scores than students who watched 4 or more hours daily. The percentages of students watching 4 or more hours daily generally decreased between 1994 and 1998, suggesting that students are watching less television on a daily basis.

Reading Performance Within States

While the average scores of students across the nation provide parents and educators with a broad view of how well the nation's students are performing in reading, it is also informative to examine the reading performance of students within individual states. In 1998, the NAEP assessment was conducted not only at the national level, but also within states or other jurisdictions that volunteered to participate in the state-level assessments at grades 4 and 8.

Fourth-grade reading performance

Table B compares the average score of each of the 43 states or jurisdictions that participated in the 1998 state assessment at grade 4 with the national average score. Thirteen states or jurisdictions had average scores that were above the national average, 15 were at or around the national average, and 15 were below the national average.

Eighth-grade reading performance

Table C compares the average score of each of the 40 states or jurisdictions that participated in the 1998 state assessment at grade 8 with the national average score. Fifteen states or jurisdictions had average scores that were above the national average, 11 were at or around the national average, and 14 were below the national average.

State-level trends in reading scores

The 1998 NAEP reading assessment was the third in which states or jurisdictions could participate in a state-level assessment of reading at grade 4. Thus, it is possible to observe changes over time in students' reading performance by comparing the 1998 score to the 1994 and 1992 scores in each state or jurisdiction. Because 1998 was the first time a state-level assessment of reading was conducted at grade 8, it is not possible to observe changes across time in the reading performance for eighth-graders in each state.

Between 1992 and 1998, the reading scores for fourth-grade public school students went up in Colorado, Connecticut, Kentucky, Mississippi, North Carolina, and the Virgin Islands. However, in Utah, Wyoming, and the District of Columbia, the reading score in 1998 was lower than it was in 1992.

Table B.—1998 NAEP reading comparison of state versus national average reading scores for public schools: Grade 4

Above the national average	At or around the national average	Below the national average
Colorado	Kentucky	Alabama
Connecticut	Maryland	Arizona
DDESS	Michigan	Arkansas
DoDDS	Missouri	California†
Iowa†	New York†	Delaware
Kansas†	North Carolina	District of Columbia
Maine	Oregon	Florida
Massachusetts†	Rhode Island	Georgia
Minnesota†	Tennessee	Hawaii
Montana†	Texas	Louisiana
New Hampshire†	Utah	Mississippi
Oklahoma	Virginia	Nevada
Wisconsin†	Washington	New Mexico
	West Virginia	South Carolina
	Wyoming	Virgin Islands

†Indicates jurisdiction did not meet one or more of the guidelines for school participation.

NOTE: Differences between states and jurisdictions may be partially explained by other factors not included in these tables. DDESS: Department of Defense Domestic Dependent Elementary and Secondary Schools; DoDDS: Department of Defense Dependents Schools (Overseas).

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1998 Reading Assessment. (Previously published on p. 12 of *The NAEP 1998 Reading Report Card: National and State Highlights.*)

Table C.—1998 NAEP reading comparison of state versus national average reading scores for public schools: Grade 8

Above the national average	At or around the national average	Below the national average
Connecticut	Arizona	Alabama
DDESS	Colorado	Arkansas
DoDDS	Kentucky	California†
Kansas†	Maryland†	Delaware
Maine	Missouri	District of Columbia
Massachusetts	North Carolina	Florida
Minnesota†	Rhode Island	Georgia
Montana†	Tennessee	Hawaii
New York†	Texas	Louisiana
Oklahoma	West Virginia	Mississippi
Oregon	Wyoming	Nevada
Utah		New Mexico
Virginia		South Carolina
Washington		Virgin Islands
Wisconsin†		

†Indicates jurisdiction did not meet one or more of the guidelines for school participation.

NOTE: Differences between states and jurisdictions may be partially explained by other factors not included in these tables. DDESS: Department of Defense Domestic Dependent Elementary and Secondary Schools; DoDDS: Department of Defense Dependents Schools (Overseas).

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1998 Reading Assessment. (Previously published on p. 13 of *The NAEP 1998 Reading Report Card: National and State Highlights.*)

Between 1994 and 1998, the reading scores for fourth-grade public school students went up in Colorado, Connecticut, Delaware, Kentucky, Louisiana, Maryland, South Carolina, Virginia, Washington, and Department of Defense overseas schools. There were no significant declines in scores between 1994 and 1998 for any participating jurisdiction.

State-level trends in achievement-level performance

Between 1992 and 1998, the percentage of public school fourth-graders who reached or exceeded the *Proficient* level increased in Colorado, Connecticut, Kentucky, Louisiana, Maryland, Minnesota, Mississippi, and the Virgin Islands. There were no significant decreases for any state or jurisdiction.

Between 1994 and 1998, the percentage of public school fourth-graders at or above *Proficient* increased in Colorado, Connecticut, Louisiana, and Department of Defense overseas schools. There were no significant decreases for any state or jurisdiction.

Data source: The National Assessment of Educational Progress (NAEP) 1998 Reading Assessment.

For technical information, see the complete report:

Donahue, P.L., Voelkl, K.E., Campbell, J.R., and Mazzeo, J. (1999). *The NAEP 1998 Reading Report Card for the Nation and the States* (NCES 1999–500).

For additional details about NAEP 1998 methodology, see

Allen, N.L., Donoghue, J.R., and Schoeps, T.L. (forthcoming). *The NAEP 1998 Technical Report.*

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To obtain the complete report (NCES 1999–500), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site (*http://nces.ed.gov*), or contact GPO (202–512–1800).

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1996 Trends in Writing

NAEP 1996 Trends in Writing: Fluency and Writing Conventions

Nada Ballator, Marisa Farnum, and Bruce Kaplan

This article was excerpted from the Introduction and Summary of the report of the same name. The sample survey data are from the National Assessment of Educational Progress (NAEP) 1996 Long-Term Trend Assessment.

Introduction

The NAEP long-term trend writing assessment

The National Assessment of Educational Progress (NAEP) long-term trend writing assessment provides an important picture of students' progress over time because it compares performance on the same writing tasks, administered in identical fashion to comparable samples of students and yielding comparable scores. There have been six national assessments of writing conducted during the school years ending in 1984, 1988, 1990, 1992, 1994, and 1996. The 1996 assessment included the same set of 12 writing tasks that had been administered in the five previous assessments. Each of these trend assessments was administered to nationally representative samples of students in grades 4, 8, and 11.

Over the past three decades, many teacher educators and classroom teachers have been emphasizing the writing process. The writing process approach focuses on the iterative nature of writing, in which writers plan, write, and revise their ideas in several drafts before a final version is produced. It is during the revision or editing stages of this process that writers focus on correcting grammatical and mechanical errors. Grammatical and mechanical correctness is not viewed as an end in and of itself, but eliminating these errors is an important part of improving the final draft. This report focuses on what changes, if any, have occurred in student writing between 1984 and 1996, the period examined by the NAEP long-term trend writing assessment.

This report

Results of the 1996 long-term trend writing assessment are reported in two publications. This report describes two aspects of writing for which change has been measured since 1984: writing fluency, as determined by *holistic scoring*; and mastery of the conventions of written English (spelling, punctuation, grammar) as determined by *mechanics scoring*. This report is supplementary to *NAEP 1996 Trends in Academic Progress* (Campbell, Voelkl, and Donahue 1997), the main report for the NAEP long-term trend assessment. That document reports trends in writing scores since 1984 as determined by *primary trait scoring*.

This report presents the results of the holistic scoring of a subgroup of 4 of the 12 writing tasks, and the mechanics scoring of 2 of these 4 tasks.

The NAEP long-term trend writing assessments discussed here and in *NAEP 1996 Trends in Academic Progress* should not be confused with the main NAEP writing assessments. The long-term trend writing assessment was begun in 1984, and has presented students with the same writing tasks in the five ensuing assessments. These writing tasks are completely different from the prompts in the main NAEP assessment.[1] The use of different writing prompts, as well as other procedural differences, precludes direct comparison of the results of the long-term trend assessment discussed here with those of the main assessment.

Multiple tasks and multiple measures of writing

In order to assess students' abilities to write in a variety of formats and genres, the NAEP long-term trend writing assessment asks them to respond to several different tasks in each of three types of writing:

- informative tasks ask students to write descriptions, reports, and analyses;
- persuasive tasks ask students to write convincing letters and arguments; and
- narrative tasks ask students to write stories.

The NAEP long-term trend instrument consists of 12 distinct writing tasks; however, each student who participated in the assessment responded to only a few (usually two) of the 12 tasks. These tasks are assessed using three types of measures:

- primary trait scoring, as described in *NAEP 1996 Trends in Academic Progress*, measures success in accomplishing the specific task (e.g., writing persuasively);
- holistic scoring, reported here, measures fluency in a subgroup of 4 of the 12 tasks; and

[1]The NAEP long-term trend assessments have been administered in mathematics, science, reading, and writing to national samples of students. Eighth-graders are assessed in the fall, 4th-graders in the winter, and 11th-graders in the spring, and the test booklets remain the same over all assessments. In contrast, the main NAEP 1992 Writing Assessment was conducted in the first quarter of 1992 at grades 4, 8, and 12, and the main NAEP 1998 Writing Assessment (based on a new framework) was conducted at grades 4, 8, and 12 in the first quarter of 1998. The 1998 main writing assessment was also administered to students in participating states at grade 8.

- mechanics scoring, also reported here, measures conventions of written English using a subgroup of two of the four holistically scored tasks.

Primary trait scoring is based on established criteria that reflect the success of the student in accomplishing the specific writing task; for primary trait scoring, a unique scoring guide was used for each of the tasks. Student responses to all 12 writing tasks received primary trait scoring, as reported in the principal 1996 long-term trend report, *NAEP 1996 Trends in Academic Progress*.

However, there are other aspects of writing that it is also important to assess. For instance, general writing quality or fluency—the student's capacity to organize and develop a written piece, to use correct syntax, and to observe the conventions of standard written English—is important. These aspects of written communication, taken together, are what holistic evaluation of writing addresses.[2]

The long-term trend writing assessment consisted of three distinct parts: primary trait, holistic, and mechanics scoring criteria.

- First, all 12 of the long-term trend writing tasks were scored using primary trait scoring criteria. The results of this are reported in *NAEP 1996 Trends in Academic Progress*.[3]
- Next, a subgroup of four of these tasks was scored holistically—two tasks at each grade level (figure A). Different scoring guides were used for holistic scoring of narrative, informative, and persuasive tasks.
- Lastly, to gain information about students' mastery of the conventions of written English, a subgroup of two of the holistic tasks was scored for mechanics—one at each grade level (figure A). For mechanics scoring, the same criteria were used to evaluate all tasks.

Measuring the fluency of writing

Holistic scoring is the most commonly used method for evaluating students' writing performance in the United States today. Holistic scoring for NAEP focuses on the writer's fluency in responding to a task relative to the performance of other students at that grade level (Cooper 1977). Fluency reflects a writer's facility with language both in terms of the development and organization of ideas and in the use of syntax, diction, and grammar. Holistic scoring methods were specifically designed to assess writing fluency. The underlying assumption of holistic scoring is that the whole piece of writing is greater than the sum of its parts. In holistic scoring, readers do not make separate judgments about specific aspects of a written response, but rather consider the overall effect, rating each paper on the basis of its general fluency.

In the NAEP long-term trend assessment, responses to four tasks are scored holistically, two tasks at each of the three grades (the same two tasks are administered at both 8th and 11th grades). The characteristics of general fluency are assessed on a six-point scale. In order to make comparisons of students' writing fluency across all 6 years of the assessment, all papers from the previous years were scored holistically, along with all of the 1996 papers. For each year, approximately 1,200 papers[4] from each grade are scored.

As is typical with all holistic scorings, raters are trained on a particular task immediately before scoring the papers written in response to that task. For each task, the papers from all years are randomly mixed and then assigned one of six scores. To detect changes in fluency from one assessment to another, the percentages of papers from each year within a given score category are compared. The comparisons reported here are for the first or base year and the current year, as in previous reports (e.g., Campbell et al. 1996).

Thus, while primary trait scoring is based on specific constant criteria and so permits year-to-year and grade-to-grade comparisons, holistic scoring allows within-grade comparisons of relative fluency over all years according to contemporaneous criteria.

[2]It should be noted that holistic evaluation depends in part on aspects of writing measured in mechanics scores.

[3]Previous years of the *Trends* report (Campbell et al. 1996; Mullis et al. 1991; Mullis et al. 1994) also contain results from holistic and mechanics scoring of the tasks presented here. The 1994 *Trends* (Campbell et al. 1996) is also on the Web, as is the 1996 edition (Campbell, Voelkl, and Donahue 1997).

[4]For the first or base year of the assessment (1984), the number of papers was about half the quantity of that in ensuing years.

Figure A. — Task by type of writing and summary of writing tasks scored for fluency (H) and for mechanics (M)

Tasks by type of writing	Summary of writing tasks scored for fluency (H)[1] and for mechanics (M)[2]	Administered at Grade 4	8	11
Informative	**Food on the Frontier** required students to read a social studies passage about frontier life and then to explain why modern-day food differs from frontier food		H	H
Persuasive	**Spaceship** required students to form their own points of view about whether creatures from another planet should be allowed to return home or be detained for scientific study, and to support their points of view in ways that would convince others to agree with them	H, M		
Persuasive	**Recreation Opportunities** required students to take a stand on whether their own town should purchase an abandoned railroad track or a warehouse as a recreation center, to defend their choice, and to refute the alternative choice		H, M	H, M
Narrative	**Flashlight** required students to write a story about their imagined adventures with a flashlight that has special powers	H		

[1]Holistic scoring measures writing fluency.

[2]Mechanics scoring measures the writer's control of the conventions of written English.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Assessment of Educational Progress, 1996 Long-Term Trend Assessment. (Originally published as figure I.1 on p. 4 of the complete report from which this article is excerpted.)

Measuring the mechanics of writing

Another set of analyses, applied to papers written for two of the tasks, focused on the mechanics of students' writing. While error counts do not fully reflect a writer's fluency and competency, many educators, policymakers, and parents are interested in the kinds of surface errors students make as they write (Shaughnessy 1977). Students' mastery of the sentence-level and word-level conventions of English, as well as their use of correct spelling and punctuation, was examined. In order to examine changes in students' success in using the conventions of written English, one task at each grade was selected for a detailed analysis of writing mechanics, including spelling, word choice, punctuation, and syntactic errors.

Summary of Findings

Fluency in writing

Modest improvements in writing fluency between 1984 and 1996 were seen in fourth- and eighth-grade students' essays.

At grade 4, holistic scoring of the persuasive task "Spaceship" showed no overall increase in students' writing fluency between 1984 and 1996. However, there was a significant increase in the percentage of papers rated in the upper half of the holistic scale (that is, papers receiving a rating of 4, 5, or 6). Fourth-graders writing for the narrative task "Flashlight" showed an increase in the percentage of papers receiving a rating of 4, but no change in the overall rating of performance between 1984 and 1996.

Eighth-graders' essays showed improvement in 1996 on both of the tasks analyzed holistically, the informative task "Food on the Frontier" and the persuasive task "Recreation Opportunities." At grade 11, no change was seen in writing fluency on either of these tasks when comparing 1996 papers to those written in 1984.

Grammar, spelling, and punctuation

Differences in the use of grammar, spelling, and punctuation conventions between 1984 and 1996 were primarily in the direction of improvement at grades 8 and 11. For both 8th- and 11th-graders, the percentage of awkward sentences and punctuation error rates decreased, even as papers contained more sentences and more words. But there was a more mixed picture at grade 4: fourth-graders showed a decrease in one kind of error but an increase in three other kinds of errors.

English language conventions were examined in papers written in 1984 and 1996 for the task "Spaceship" at grade 4 and for the task "Recreation Opportunities" at grades 8 and 11. A subsample of papers from 1984 and 1996 had been coded by experts so that students' control of the conventions of the English language could be analyzed. Overall, these indicators of performance at the three grades suggest that there were some changes in students' mastery of English language conventions between 1984 and 1996.

The number of words and sentences written by 8th- and 11th-grade students increased between 1984 and 1996. Over the same period, however, there was no change in the rate of errors (number of errors per 100 words) in all three grades.

While there were increases in percentages of sentence fragments in 4th- and 8th-grade papers, there were declines in the percentage of awkward sentences in 8th- and 11th-graders' papers compared to 1984.

At all grades, the percentage of spelling errors remained unchanged, comparing 1984 to 1996. The percentage of incorrect word choices was unchanged in grades 8 and 11 but increased at grade 4. At grades 8 and 11, the punctuation error rate decreased while the number of punctuation marks used per paper increased.

Figure B provides a synopsis comparing student use of grammar, punctuation, and spelling conventions in 1984 and 1996. Measures in the first section are characteristics desirable for these NAEP long-term trend writing tasks. An increase in prevalence in 1996 compared to 1984 is desirable, and "increase" is shown in bold text. Decreases in 1996 compared to 1984 are undesirable, and those cells are black with white text. The middle section contains characteristics that are neutral; that is, changes in these measures are of interest, but there is no clear advantage or disadvantage to either increase or decrease. The lower section contains measures of writing error, with the notation of increase or decrease. In this section, decreases are desirable and are in bold text, while increases (undesirable) are shown in black cells with white text. Throughout the table, empty cells indicate that no statistically significant change occurred in 1996 compared to 1984.

Of the measures of students' control of writing reported here, at grade 4, one measure of writing error showed improvement (that is, the percentage of sentences with end mark errors declined), while three showed increases in error rate (that is, the prevalence of sentence fragments, incorrect word choice, and comma/dash errors increased). At grade 4, there was no change in most characteristics reported here. At grades 8 and 11, students were writing more in 1996, although the rate at which they used more sophisticated sentence constructions had decreased. At grade 8, the good news was that two desirable characteristics improved and three errors decreased, and only two changes indicated problems (that is, the use of complex sentence structures decreased while sentence fragments increased). At grade 11, improvement occurred in two desirable characteristics and for three types of errors, while only one change in a desirable characteristic indicated a problem (that is, the use of complex sentence structures decreased).

Observations

Students at all three grade levels wrote at least as fluently in 1996 as they did in 1984, while students at grade 8 demonstrated improved fluency on the informative and persuasive tasks.

When writing mechanics are considered, the overall picture is of improvement in grades 8 and 11, but there are several declines at grade 4. In the 8th and 11th grades, students wrote more, as indicated by the increase in the number of words and sentences in their responses, while demonstrating no increase in the number of errors per 100 words. A summary of the measures can be seen in figure B.

Thus, increased instructional emphasis on writing processes over the 12 years between 1984 and 1996 appears associated with modest improvements in students' mastery of the conventions of written English at grades 8 and 11. During this time period, the overall fluency of 8th-graders' writing has also improved. It appears that the process approach to writing, in which planning, writing, and revision through several drafts are practiced, gives students the opportunity to write more and to employ editing strategies, which in turn affords them the opportunity to improve their mastery of the writing conventions reported here.

Figure B.—Average change from 1984 to 1996 in writing mechanics measures in this report

Mechanics measures	Grade 4	Grade 8	Grade 11
Desirable characteristics—increase shows improvement			
Average number of full words per paper		**increase**	**increase**
Average number of sentences per paper		**increase**	**increase**
Average number of words per sentence			
Percentage of complex or compound sentences		**decrease**	**decrease**
Neutral characteristics			
Percentage of simple sentences			increase
Average number of punctuation marks used		increase	increase
Comma and dash use rate			
End mark use rate			increase
Other punctuation use rate	increase		increase
Writing errors—decrease shows improvement			
Average number of all errors per 100 words			
Percentage of run-on sentences			
Percentage of sentence fragments	**increase**	**increase**	
Percentage of awkward sentences		**decrease**	**decrease**
Percentage of incorrect word choice	**increase**		
Percentage of spelling errors			
Punctuation error rate (without omissions)		**decrease**	**decrease**
Punctuation omission rate			
Comma and dash error rate	**increase**		
End mark error rate		**decrease**	
Percentage of sentences with end mark errors	**decrease**		**decrease**
Other punctuation error rate			

NOTE: If neither increase nor decrease is shown, there was no statistically significant change. Bold text indicates a *desirable* change; white text indicates an *undesirable* change; and regular text a *neutral* change.

SOURCE: National Center for Education Statistics, National Assessment of Educational Progress, 1996 Long-Term Trend Assessment. (Originally published as figure S.1 on p. 33 of the complete report from which this article is excerpted.)

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Data source: The National Assessment of Educational Progress (NAEP) 1996 Long-Term Trend Assessment.

For technical information, see the complete report:

Ballator, N., Farnum, M., and Kaplan, B. (1999). *NAEP 1996 Trends in Writing: Fluency and Writing Conventions* (NCES 1999–456).

For additional details about long-term trend methodology, see

Allen, N.L., Carlson, J.E., and Zelenak, C.A. (1999). *The NAEP 1996 Technical Report* (NCES 1999–452).

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To obtain the complete report (NCES 1999–456), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov)*, or contact GPO (202–512–1800).

Community Service Participation of Students in Grades 6–12

This article was originally published as an Indicator of the Month, taken from The Condition of Education 1998. *The sample survey data are from the NCES National Household Education Survey (NHES).*

One objective of the National Education Goals is that all students be involved in activities that promote and demonstrate good citizenship and community service. Participating in community service may reduce the feeling of alienation from society that adolescents often experience and may have a positive effect on students' grades and school attendance. Student participation in service activities also benefits the community by providing scarce resources for various service projects. Data on student participation in community service activities may help school administrators assess their current community service requirements and help them find ways to integrate community service activities into the curriculum.

- In 1996, about half (49 percent) of students in grades 6–12 participated in community service: 26 percent participated on a regular basis, and 23 percent participated once or twice during the school year.
- Students in grades 6–12 were more likely to participate in community service if an adult in the household also did so. For example, 32 percent of students who lived in a household with an adult who participated in community service participated regularly, compared to 19 percent of students in a household with an adult who did not participate.

Percentage of students in grades 6–12 who participated or planned to participate in community service, by selected student characteristics: 1996

Student characteristics	Participated in community service[1]			Will participate before the end of the school year[2]	Plan to do community service next year
	Total	Regular participation	One or two times		
Total	49.1	25.6	23.4	31.1	80.5
Grade level					
6–8	47.4	23.0	24.4	34.1	84.4
9–10	45.4	23.6	21.8	34.5	82.9
11–12	56.1	32.4	23.7	22.3	71.1
Parents' highest education level					
Less than high school diploma	33.8	15.4	18.4	43.5	78.8
High school diploma or GED	42.1	22.3	19.8	35.5	76.5
Some college or vocational/technical	48.4	25.4	23.0	30.5	79.4
Bachelor's degree	58.0	29.2	28.7	25.7	83.5
Graduate/professional school	64.3	35.2	29.1	21.6	88.2
Any adult in the household who performs community service					
Yes	57.5	31.7	25.8	28.4	86.4
No	39.4	18.7	20.8	34.2	73.7

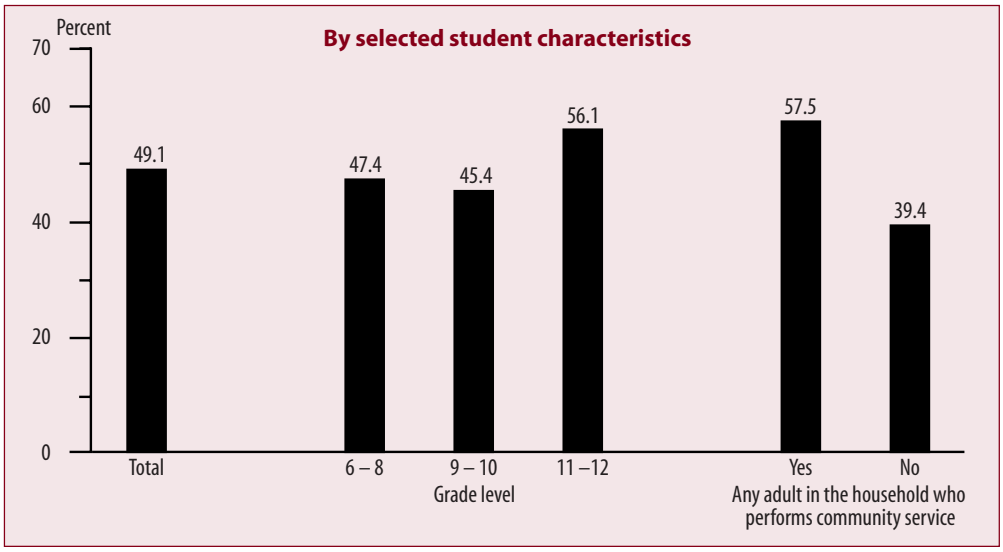
[1]Data were collected from January 2, 1996, through April 13, 1996. Any student who reported participating in at least one activity more than twice during the school year was classified as a regular participant. Students may have participated in multiple activities without being classified as regular participants if no individual activity was performed more than twice.

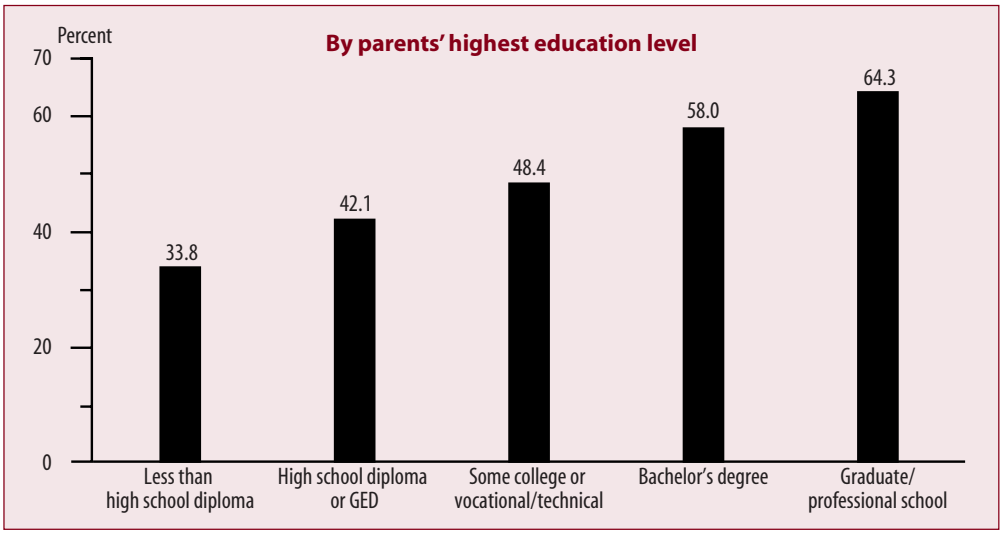
[2]Only students who had performed no community service by the time of the interview were asked if they had plans to participate.

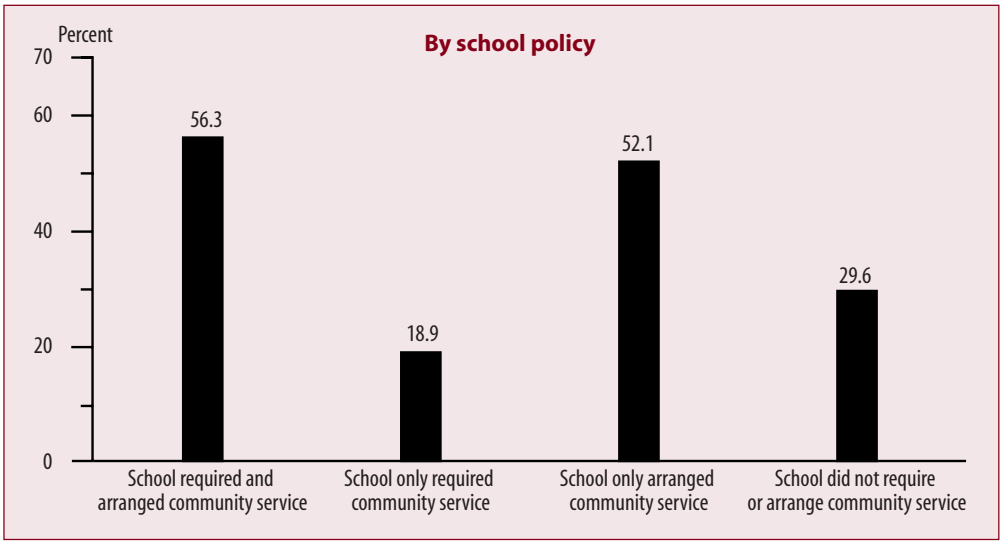
NOTE: Includes students in school in grades 6–12, not just those who participated or planned to participate in community service. Ungraded students or children who were home schooled were not included in this analysis. Details may not add to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Household Education Survey (NHES), 1996 (Youth Civic Involvement Component).

Percentage of students in grades 6–12 who participated in community service: 1996







NOTE: Includes students in school in grades 6–12, not just those who participated or planned to participate in community service. For schools that required students to participate in community service, students must have completed the community service before graduation.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Household Education Survey (NHES), 1996 (Youth Civic Involvement Component).

- Students who were involved in student government, other school activities, or nonschool activities, or who worked for pay, were more likely to participate in community service than students who were not involved in these activities.
- Student participation rates in schools that only arranged community service were higher than student participation rates in schools that only required community service. Participation rates in schools that both required and arranged community service were similar to the rates in schools that only arranged community service.

Data source: The following component of the 1996 National Household Education Survey (NHES): Youth Civic Involvement.

For technical information, see

Wirt, J., Snyder, T., Sable, J., Choy, S.P., Bae, Y., Stennett, J., Gruner, A., and Perie, M. (1998). *The Condition of Education 1998* (NCES 98–013).

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For complete supplemental and standard error tables, see either

- the electronic version of *The Condition of Education 1998 (http://nces.ed.gov/pubs98/condition98/index.html)*, or
- volume 2 of the printed version (forthcoming): *The Condition of Education 1998 Supplemental and Standard Error Tables* (NCES 1999–025).

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Summer Activities

Summer Activities of Students Enrolled in Grades 1–12

This article was originally published as an Indicator of the Month, taken from The Condition of Education 1998. *The sample survey data are from the October Current Population Survey (CPS), conducted by the U.S. Census Bureau.*

Students engage in a variety of activities during their summer vacations that provide them with educational opportunities. Some students attend summer school to retake subjects failed during the academic year, to improve their basic skills, or to take courses that are unavailable or for which there is not sufficient time during the regular school year. If they are older, students may take college-level courses for credit. Other students may choose to participate in organized activities, such as sports or activities for which they do not have time during the academic year, and some may work for pay or participate in internships or community service. Examining which summer activities students participate in may indicate which opportunities are valued most by students and their parents.

- In summer 1996, 9 percent of students in grades 1–12 attended summer school, and 38 percent participated in other organized summer activities. Among students who were enrolled in grades 8–12, 26 percent worked for pay during the summer, 2 percent participated in unpaid internships, and 9 percent participated in community service.
- In summer 1996, students in grades 1–7 were more likely than students in higher grades to attend summer school to improve basic skills, while students in grades 8–12 were more likely than students in grades 1–7 to attend summer school to retake a subject.

Percentage of students ages 6–20 who were enrolled in grades 1–12 and who participated in various summer activities, by selected student characteristics: Summer 1996

Student characteristics	Attended summer school	Participated in other organized summer activities	Worked for pay[1]	Participated in unpaid internship[1]	Participated in community service[1]
Total[2]	9.2	37.7	26.3	2.0	9.4
Grade level					
1–7	7.5	41.9	—	—	—
8–10	9.9	35.5	13.2	1.8	9.0
11–12	14.9	27.7	47.5	2.3	10.4
Race/ethnicity					
White	7.3	45.0	30.8	2.2	10.9
Black	11.0	24.8	17.4	1.5	6.5
Hispanic	14.0	19.2	16.0	1.5	5.9
Parents' highest education level[3]					
Less than high school diploma	10.5	12.1	14.3	1.1	3.4
High school diploma or GED	7.8	28.1	25.6	1.8	5.8
Some college	9.5	40.5	29.5	2.0	10.2
Bachelor's degree or higher	9.9	57.2	28.6	2.6	15.0

— Not applicable.

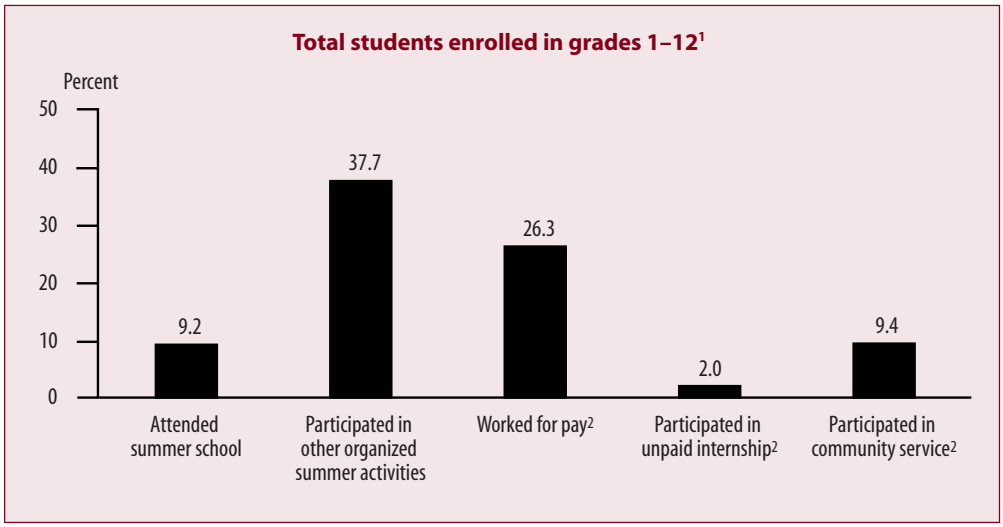
[1]For students enrolled in grades 8–12.

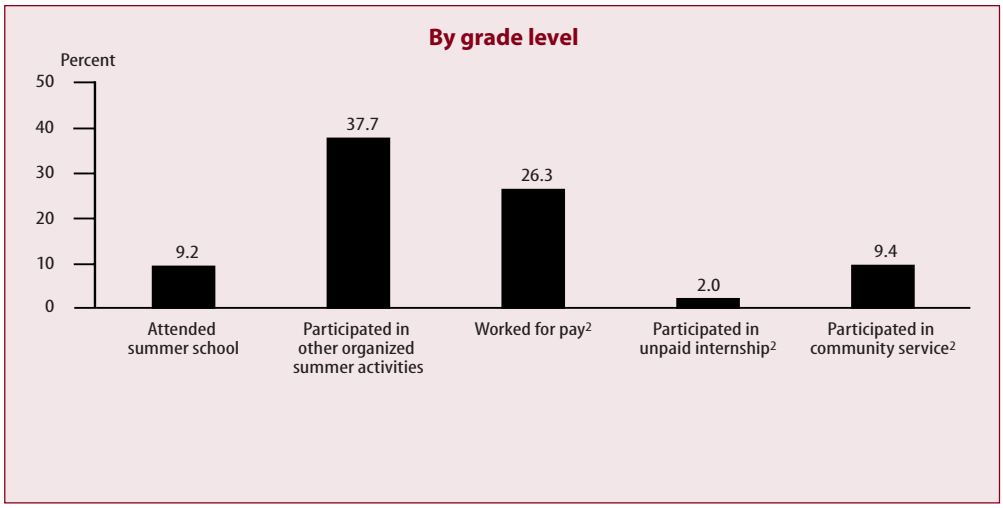
[2]Included in the total but not shown separately are students ages 6–20 whose grade levels were unknown, students from other racial/ethnic groups, and students whose parents' highest education level was not available.

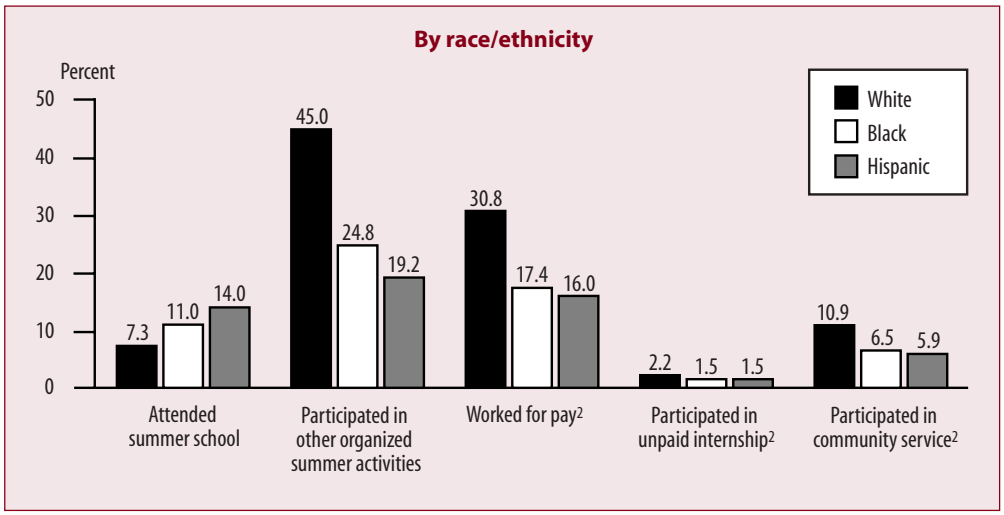
[3]A parent's highest education level was determined by merging information from the parent's records with information from the child's records. When no parent resided with the student, information from the child's guardian was used.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October 1996.

Percentage of students ages 6–20 who were enrolled in grades 1–12 and who participated in various summer activities: Summer 1996







[1]Included in the total but not shown separately are students ages 6–20 whose grade levels were unknown and students from other racial/ethnic groups.

[2]For students enrolled in grades 8–12.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October 1996.

- Black and Hispanic students in grades 1–12 were more likely to attend summer school than their white peers. White students in grades 8–12, however, were more likely than black and Hispanic students to work for pay and participate in community service.
- Students in grades 1–12 were equally likely to attend summer school, regardless of family income. In contrast, students from high-income families were more likely to participate in community service and other organized summer activities and to work for pay than their peers from low- or middle-income families.

Data source: The U.S. Census Bureau's Current Population Survey (CPS), October 1996.

For technical information, see

Wirt, J., Snyder, T., Sable, J., Choy, S.P., Bae, Y., Stennett, J., Gruner, A., and Perie, M. (1998). *The Condition of Education 1998* (NCES 98–013).

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Student Work and Teacher Practices in Mathematics

Julia H. Mitchell, Evelyn F. Hawkins, Pamela M. Jakwerth, Frances B. Stancavage, and John A. Dossey

This article was excerpted from the Introduction and Summary of the report of the same name. The sample survey data are from the National Assessment of Educational Progress (NAEP) 1996 Mathematics Assessment.

Introduction

The National Assessment of Educational Progress (NAEP) is mandated by the United States Congress to survey the educational accomplishments of U.S. students and monitor changes in those accomplishments. For more than 25 years, NAEP has assessed the educational achievement of 4th-, 8th-, and 12th-grade students in selected subject areas, making it the only nationally representative and continuing assessment of what U.S. students know and can do. NAEP assessments are based on content frameworks and specifications developed through a national consensus process involving teachers, curriculum experts, parents, and members of the general public. The frameworks are designed to reflect a balance among the emphases suggested by current instructional efforts, curriculum reform, contemporary research, and desirable levels of achievement.

Purpose and audience for the report

In 1996, NAEP assessed the abilities of students at grades 4, 8, and 12 in the subjects of mathematics and science. The first release of results from the mathematics assessment appeared in the *NAEP 1996 Mathematics Report Card* (Reese et al. 1997), a report designed to provide policymakers and the public with a broad view of student achievement.

The current report, which provides a more detailed perspective on mathematics achievement and practices in 1996, is primarily for teachers, curriculum specialists, and school administrators. To illustrate what students know and can do, the report presents examples of student work in five different content strands of mathematics. Information on current instruction in mathematics classes, as reported by students and teachers, also is included.

A companion report, *School Policies and Practices Affecting Instruction in Mathematics* (Hawkins, Stancavage, and Dossey 1998), provides information on school policies and other practices affecting mathematics education.

Content of the report

This report presents three types of information derived from the NAEP 1996 mathematics assessment: (1) information on what students know and can do in mathematics, (2) information on course-taking patterns and current classroom practices in this subject area, and (3) information on student attitudes about mathematics. The first portion of this information is derived from an analysis of student performance on the actual assessment exercises; the latter two portions draw upon the questionnaires completed by the students who participated in the assessment and their mathematics teachers.

The chapters on student work are organized around the five content strands assessed by NAEP: Number Sense, Properties, and Operations; Measurement; Geometry and Spatial Sense; Data Analysis, Statistics, and Probability; and Algebra and Functions. Within these chapters, the discussion also highlights students' proficiency on a number of cognitive skills that cut across the different content areas. These include conceptual understanding, procedural knowledge, and problem solving, as well as the ability to reason in mathematical situations, to communicate perceptions and conclusions drawn from a mathematical context, and to connect the mathematical nature of a situation with related mathematical knowledge and information gained from other disciplines or through observation.

Student Work

Trend comparisons

In 1990, NAEP gathered baseline achievement data for 4th-, 8th-, and 12th-grade students, using a newly developed mathematics framework. Two subsequent assessments, based on the same framework and administered in 1992 and 1996, offered the opportunity to track trends in achievement. The results have been promising, indicating statistically significant improvements in overall mathematics performance at all three grade levels and in each of the five content strands. The gains were largest between 1990 and 1992, but additional gains also were evident between 1992 and 1996 on the overall composite scale and for some of the content strands. Specifically, student performance in Geometry and Spatial Sense and in Algebra and Functions improved at all grade levels; performance in Number Sense, Properties, and Operations and in Data Analysis, Statistics, and Probability improved at 4th grade; and student performance in Measurement and in Data Analysis, Statistics, and

Probability improved at 12th grade. When the achievement trends were disaggregated by race and gender, the direction of change still was generally positive for most comparisons. However, trend comparisons for some of the smaller or more diverse groups did not achieve statistical significance; as a result, one cannot say with certainty that these gains did not simply reflect chance variation due to sampling.

Subgroup comparisons

Gender. In 1996, gender differences in performance favoring males were observed for overall proficiency and three content strands at grade 4 (Number Sense, Properties, and Operations; Measurement; and Algebra and Functions) and for two content strands at grade 12 (Measurement, and Geometry and Spatial Sense).

Race/ethnicity. In 1996, white and Asian/Pacific Islander students at grades 4 and 12 and white students at grade 8 performed better than other racial/ethnic groups overall and in each of the content strands of mathematics.[1] Hispanic students performed better than black students in Geometry and Spatial Sense at grade 4; in Measurement and in Geometry and Spatial Sense at grade 8; and in Measurement and in Data Analysis, Statistics, and Probability at grade 12. American Indian students performed better than black and Hispanic students in all strands at grade 4 and outperformed black students in all content strands and Hispanic students in all strands but Geometry and Spatial Sense at grade 8. At grade 12, Asian/Pacific Islander students performed better than white students in Algebra and Functions.

Course taking. In general, taking more mathematics courses and more advanced mathematics courses was associated with improved mathematics performance in all content strands. Eighth-grade students enrolled in algebra performed better in all content strands than eighth-grade students enrolled in pre-algebra or eighth-grade mathematics, and eighth-grade students enrolled in pre-algebra performed better than students enrolled in eighth-grade mathematics in all but one of the content strands (Geometry and Spatial Sense).

Twelfth-grade results show a similar story. Students at any given point in the algebra-through-calculus sequence performed better than students whose mathematics exposure had stopped at the next lowest course in the sequence, with one exception: students whose highest course had been pre-algebra did not perform significantly better than students who had taken neither pre-algebra nor algebra. Similarly, students who had taken geometry performed better in all content strands than those who had not taken geometry.

In addition, taking more mathematics courses in high school was related to higher mathematics performance, with one exception: students who took 3–4 semesters of mathematics did not perform significantly better in Measurement than students who took only 1–2 semesters.

Content strands

Number Sense, Properties, and Operations. Students scoring in the *Basic* achievement level or above appeared to grasp many of the fundamental concepts and properties of and relationships between numbers, and displayed the skills required for manipulating numbers and completing computations. Questions assessing proportional thinking, requiring multistep solutions, or involving new concepts tended to be more difficult. Additionally, questions requiring students to solve problems and communicate their reasoning proved challenging, and often it was the communication aspect that provided the most challenge.

Measurement. Many of the measurement questions were difficult for students, particularly those requiring unit conversions, calculations of volume and circumference, and estimation.

Eighth-grade algebra students tended to perform better than other eighth-grade students, whereas eighth-grade students in pre-algebra or eighth-grade mathematics tended to perform similarly. At the 12th-grade level, students whose highest course was second-year algebra tended to outperform those who had only reached first-year algebra, and students who reported calculus as their highest mathematics course tended to perform better than those who had taken less advanced mathematics courses.[2]

Geometry and Spatial Sense. Most of the questions in this content strand required a drawn or written response, and many were difficult for students. Questions in this content

[1]Results for eighth-grade Asian/Pacific Islander students are not included in the main body of this report due to concerns about the accuracy and precision of the national estimates.

[2]Performance in Measurement and in Geometry and Spatial Sense was not analyzed with respect to whether students had taken a course in geometry because of the variability in mathematics course sequencing, the small percentage of students for whom the impact of geometry can be isolated, and the difficulty associated with identifying the effect of a particular curriculum on the performance of students in advanced mathematics.

strand also relied upon students' visual-spatial skills. In several of the sample questions, a significant difference was found between the performance of male and female students. Here also, eighth-grade algebra students tended to outperform other eighth-grade students, whereas eighth-grade students in pre-algebra and those in eighth-grade mathematics performed similarly. In addition, on some of the questions, 12th-grade students who had taken at least second-year algebra outperformed those who had not and, similarly, students who had taken at least third-year algebra or pre-calculus outperformed those who had not.

Data Analysis, Statistics, and Probability. In this content strand, students seemed to perform better on questions that asked them to make straightforward interpretations of graphs, charts, and tables as opposed to those requiring them to perform calculations with displayed data. Students had difficulty explaining why one method of reporting or displaying data was better than another, even though they may have recognized which was the better method. Questions asking students to determine chance or probability also were difficult.

Algebra and Functions. The majority of students at all grade levels appeared to understand basic algebraic representations and simple equations, as well as how to find simple patterns. The more proficient students at grades 8 and 12 were able to demonstrate knowledge of linear equations, algebraic functions, and trigonometric identities, but even those students found that questions requiring them to identify and generalize complex patterns and solve real-world problems were challenging. In general, for 8th- and 12th-grade students, those with more advanced coursework performed better in this content strand.

Classroom Teaching

Course-taking patterns

In 1996, the modal group, but not the majority, of eighth-grade students, regardless of whether they were male or female, were enrolled in eighth-grade mathematics, and most of the remaining students were enrolled in pre-algebra or algebra. Trends over time show increases in the percentage of eighth-grade students taking more advanced mathematics courses.

These positive trends also were evident at the 12th-grade level. For example, the 1996 percentage of 12th-grade students enrolled in mathematics was significantly higher than the 1990 percentage. In addition, over time more students appear to be initially taking first-year algebra earlier in their school careers. Examination of the highest course taken by 12th-grade students in an algebra-through-calculus sequence showed that in 1996, almost half of the 12th-grade students indicated second-year algebra as their highest course taken. In the remaining half, fewer students indicated a course higher than second-year algebra as their highest course taken than indicated a lower level course as their highest course taken.

Classroom practices

In 1996, teachers of fourth- and eighth-grade students were asked about the emphasis they placed on different mathematics content and processes in their mathematics instruction. The majority of fourth- and eighth-grade students were receiving mathematics instruction with more emphasis on Number Sense, Properties, and Operations; Measurement; and Geometry and Spatial Sense than on Data Analysis, Statistics, and Probability; and Algebra and Functions. Perhaps as expected, more emphasis was placed on Data Analysis, Statistics, and Probability and on Algebra and Functions at the eighth-grade level than at the fourth-grade level. In all of the eighth-grade mathematics classes, students experienced similar levels of emphasis on the mathematics content strands, except for Algebra and Functions, which was more heavily emphasized in the algebra classes. Mathematics instruction at grades 4 and 8 placed more emphasis on learning mathematics facts and concepts and on learning skills and procedures needed to solve routine problems than on developing reasoning ability or on learning how to communicate ideas in mathematics effectively.

Teachers of 4th- and 8th-grade students, as well as 12th-grade students, were asked about a variety of instructional practices that were being implemented in their mathematics classes. In 1996, results showed differences in the frequencies of implementation of some practices at different grade levels. For example, working with objects like rulers and other manipulatives was more common at the 4th-grade level and in less advanced mathematics courses taken by 8th-grade students. Similarly, the majority of 4th- and 8th-grade students worked at least once a week with other students to solve mathematics problems, while this type of structured interaction was less frequent among 12th-grade students.

Reports on these practices over time show some significant changes. For example, while the practice of writing a few sentences about how to solve a mathematics problem was relatively rare among fourth-grade students, there have been increases in frequency over time. On average, few students at grades 4 and 8 were writing reports or doing mathematics projects, but changes over time show increases in the frequency of implementation of this practice also.

In 1996, the frequency with which calculators were used increased with increasing grade level and with mathematics content at the 8th-grade level. Furthermore, the use of calculators has increased over time. The majority of 8th- and 12th-grade students taking mathematics reported using scientific calculators to do schoolwork. At the 8th-grade level, the use of scientific and graphing calculators was more common in the higher level mathematics courses than in the lower level courses. A majority of the 12th-grade students taking mathematics reported using graphing calculators, although only about one in ten 8th-grade students did. In addition, the unrestricted use of calculators and the use of calculators on mathematics tests were more common among 8th-grade than 4th-grade students and among 8th-grade students in higher level mathematics courses than among those in lower level courses.

Finally, students in grade 12 reported being tested more frequently in mathematics than teachers reported that fourth- and eighth-grade students were tested. Teachers of grades 4 and 8 reported less testing with multiple-choice questions than with constructed-response questions and less use of individual or group projects than of written responses. Teachers' use of portfolios was more common with fourth- than with eighth-grade students.

Student Attitudes Toward Mathematics

The NAEP 1996 mathematics assessment probed student attitudes and beliefs about mathematics. In particular, it examined students' agreement with three specific statements: "I like mathematics"; "If I had a choice, I would not study any more mathematics"; and "Everyone can do well in mathematics if they try." In general, the majority of students at each grade level rendered a response that was favorable to mathematics. However, the percentage offering a favorable response declined with grade level.

Liking mathematics and being willing to study more mathematics were both positively associated with students' mathematics course taking. That is, favorable responses were more frequent among 8th-grade students enrolled in algebra, 12th-grade students enrolled in any mathematics class, and 12th-grade students who had completed more advanced coursework. These associations with course taking were not, however, apparent in students' opinions on the relationship between effort and mathematics achievement. In fact, 8th-grade students enrolled in algebra were *less* likely than those enrolled in 8th-grade mathematics to agree that "everyone can do well in mathematics if they try."

Conclusions

Performance of U.S. students in mathematics continues to improve. Since 1990, improved performance overall at all three grade levels and in each of the five content strands has been observed. When the achievement trends observed in 1996 were disaggregated by race and gender, improvement in performance continued to be observed for most groups. In addition, taking more, and more advanced, coursework in mathematics was associated with improved performance in all content strands.

Examination of student work revealed that certain types of questions were harder for some students than others. In particular, questions involving new concepts or requiring multistep solutions, written (or drawn) explanations of students' reasoning, problem solving, estimation, or the use of spatial skills were difficult for students. Straightforward questions that required simple (decontextualized) calculations were easier.

While examination of 1996 course-taking patterns revealed that more students appear to be taking more, and more advanced, mathematics courses than before, a look at classroom practices indicated that students still need more exposure to communicating effectively about mathematics. In particular, students need more practice writing about how to solve mathematical problems and discussing how to solve problems reflecting real-life situations. Activities of this sort invite students to engage more fully with the content of mathematics, can serve to increase students' ability to think analytically, and are necessary for improving performance on more difficult cognitive questions.

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For additional details on survey methodology, see

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To obtain the complete report (NCES 1999–453), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov)*, or contact GPO (202–512–1800).

Science Work and Practices

Student Work and Teacher Practices in Science

Christine Y. O'Sullivan and Andrew R. Weiss

This article was originally published as the Highlights of the report of the same name. The sample survey data are from the National Assessment of Educational Progress (NAEP) 1996 Science Assessment.

In 1996, the National Assessment of Educational Progress (NAEP) assessed the knowledge and skills of students in the areas of earth science, life science, and physical science. It also collected information relating to the background of students (grades 4, 8, and 12), their teachers (grades 4 and 8), and the schools they attended (grades 4, 8, and 12). This report is intended primarily for teachers; hence, the results presented relate directly to students' performance, classroom practices, and school climate. The report also discusses students' attitudes and beliefs about science.

Performance, Knowledge, and Skills

- At grades 4 and 8, the amount of exposure to the different fields of science was not associated with differences in the composite, life science, earth science, or physical science average scale scores of students or the percentage of students at or above *Proficient*.
- At grades 4 and 8, male students had a higher average question score than female students for questions that measured conceptual understanding. At grade 12, male students outperformed female students on questions that measured conceptual understanding and practical reasoning.
- At grades 4, 8, and 12, white students had a higher average question score than black and Hispanic students for questions that measured earth, physical, and life science and also for questions that measured conceptual understanding, scientific investigation, and practical reasoning.

Classroom Practices

- Seventy-eight percent of fourth-graders and 88 percent of eighth-graders had teachers who reported placing heavy emphasis on understanding key science concepts. These students had higher average scale scores and were more likely to be at or above the *Proficient* level than students whose teachers placed less emphasis on this objective.
- Forty-one percent of students in grade 8 had teachers who reported placing a heavy emphasis on developing laboratory skills; 15 percent of fourth-graders had teachers who reported the same emphasis. The eighth-grade students had higher average scale scores and were more likely to perform at or above the *Proficient* level than eighth-graders whose teachers reported placing less emphasis on laboratory skills. There was no difference in performance among fourth-graders that was associated with how much emphasis their teachers gave to developing laboratory skills.
- Teachers of 56 percent of fourth-graders and 80 percent of eighth-graders reported students doing hands-on activities at least once or twice a week. At the eighth-grade level, students who did hands-on activities almost every day or once or twice a week had higher scale scores and were more likely to be at or above the *Proficient* level than students who did hands-on activities once or twice a month or never or hardly ever. A similar pattern was seen at grade 12, based on self-reporting by students. No differences were seen at the fourth-grade level.
- Approximately half of the student population at grades 4 and 8 had teachers who reported not using computers for instruction in science.
- Teachers of 42 percent and 87 percent of students in grades 4 and 8, respectively, reported that they expected their students to spend 1 hour or more on their homework each week.

Attitudes, Motivation, and School Climate

- At the 4th-grade level, 67 percent of students said they liked science. The percentages were somewhat lower for 8th- and 12th-graders: 50 and 52 percent, respectively. Those who said they liked science outperformed those who said they did not like science.
- In general, the greater the number of positive attitudes toward science, the higher the performance of students at grades 4, 8, and 12.

- The percentage of students who thought it was important to do well on the NAEP science assessment was highest at the 4th-grade level, 59 percent, and lowest at the 12th-grade level, 9 percent. Students who thought it most important to do well did not necessarily perform better than students who thought it less important to do well.
- Where the school problems of student absenteeism, teacher absenteeism, and lack of parental involvement were more severe, as reported by school administrators, student performance was lower.

Data source: The National Assessment of Educational Progress (NAEP) 1996 Science Assessment.

For technical information, see the complete report:

O'Sullivan, C.Y., and Weiss, A.R. (1999). *Student Work and Teacher Practices in Science* (NCES 1999–455).

For additional details on survey methodology, see

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To obtain the complete report (NCES 1999–455), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov)*, or contact GPO (202–512–1800).

Dropout Rates

Dropout Rates in the United States: 1997

Phillip Kaufman, Steve Klein, and Mary Frase

This article was originally published as the Executive Summary of the Statistical Analysis Report of the same name. The sample survey data come primarily from the U.S. Census Bureau's October Current Population Survey (CPS), and the universe data primarily from the NCES Common Core of Data (CCD).

This is the 10th in a series of National Center for Education Statistics reports on high school dropout and completion rates. It presents data on rates in 1997, the most recent year for which data are available, and includes time series data on high school dropout and completion rates for the period 1972 through 1997. In addition to extending time series data reported in earlier years, this report examines the characteristics of high school dropouts and high school completers in 1997.

Event Dropout Rates

Event dropout rates for 1997 describe the proportion of youths ages 15 through 24 years who dropped out of grades 10 to 12 in the 12 months preceding October 1997. Demographic data collected in the Current Population Survey (CPS) permit event dropout rates to be calculated across a variety of individual characteristics, including race, sex, region of residence, and income level.

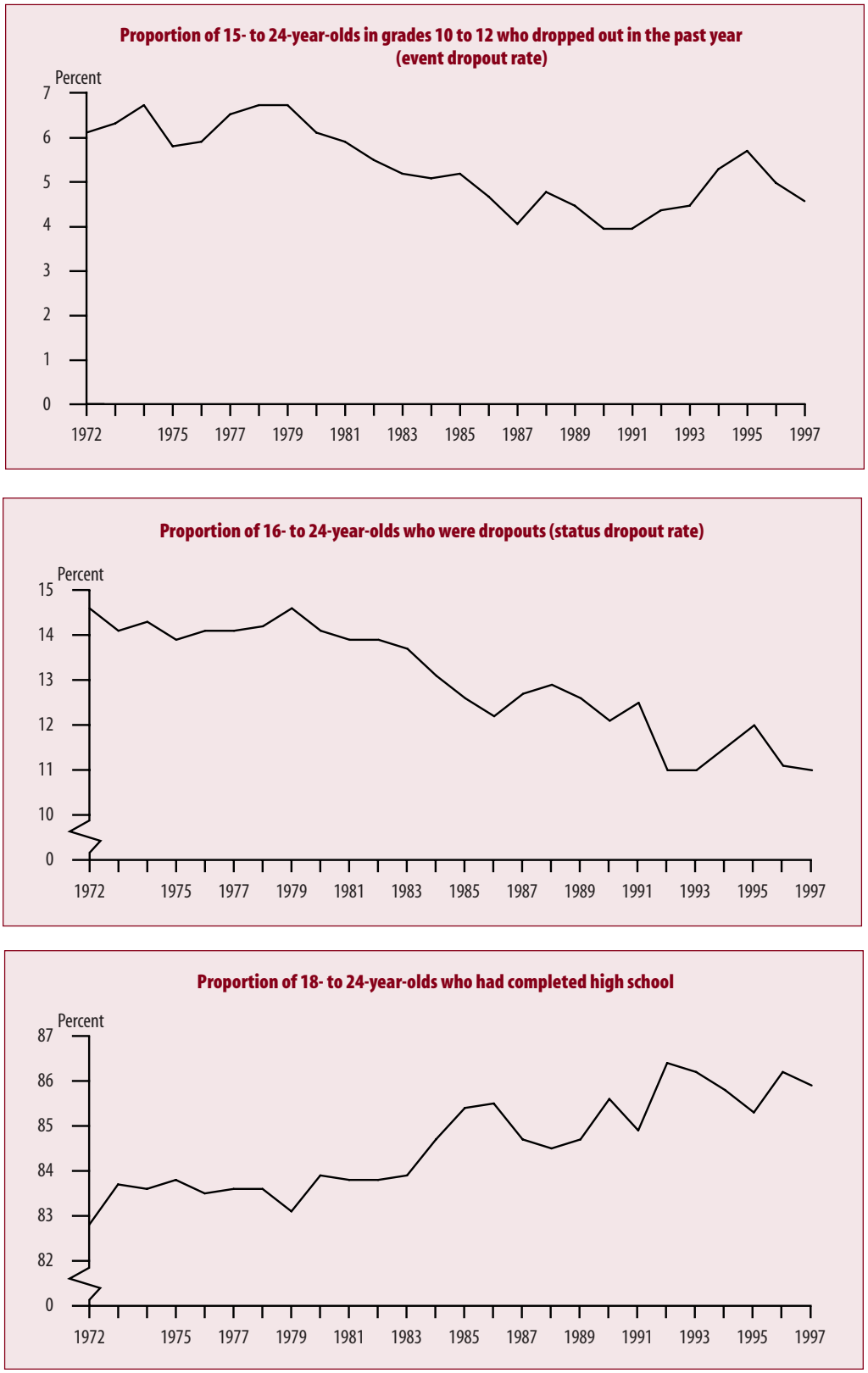
- About 5 out of every 100 young adults enrolled in high school in 1996 left school before October 1997 without successfully completing a high school program. This estimate of 4.6 percent was similar to those reported over the last 10 years, but lower than in the early 1970s (table A and figure A).
- Hispanic students were more likely than white and black students to leave school short of completing a high school program: in 1997, 9.5 percent of Hispanics were event dropouts, compared with 3.6 percent of white and 5.0 percent of black students. Event dropout rates were not significantly different between white and black students.
- In 1997, young adults living in families with incomes in the lowest 20 percent of all family incomes were nearly seven times as likely as their peers from families in the top 20 percent of the income distribution to drop out of high school.
- Students who remained in high school longer than the majority of their age cohort dropped out at higher rates than their younger peers.
- Although dropout rates were highest among students age 19 or older, about two-thirds (69 percent) of the current-year dropouts were ages 15 through 18; moreover, 35 percent of the 1997 dropouts were 15 through 17 years of age.

Status Dropout Rates

Over the last decade, between 300,000 and 500,000 10th- through 12th-grade students left school each year without successfully completing a high school program. Each year, some of these young adults return to school or an alternative certification program, and others pass out of this age group. Status dropout rates represent the proportion of young adults ages 16 through 24 who are out of school and who have not earned a high school credential.

- In October 1997, some 3.6 million young adults were not enrolled in a high school program and had not completed high school. These youths accounted for 11.0 percent of the 33 million 16- through 24-year-olds in the United States in 1997 (table A and figure A). As noted with event rates, this estimate is consistent with those reported over the last 10 years, but lower than in the early 1970s.
- Status dropout rates of whites remain lower than for blacks, but over the past quarter century the difference between blacks and whites has narrowed.
- Hispanic young adults in the United States continue to have higher status dropout rates than either whites or blacks. In 1997, 25.3 percent of Hispanic young adults were status dropouts, compared to 13.4 percent of blacks and 7.6 percent of whites.
- Thirty-nine percent of Hispanic young adults born outside the 50 states and the District of Columbia were high school dropouts. Although the dropout rates of Hispanics born in the United States were lower, they were higher than the dropout rates of non-Hispanics born in the United States.

Figure A.—Proportion of 15- to 24-year-olds dropping out of grades 10 to 12, proportion of 16- to 24-year-olds who were dropouts, and proportion of 18- to 24-year-olds who had completed high school: October 1972 to October 1997



SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years).

Table A.—Proportion of 15- to 24-year-olds dropping out of grades 10 to 12, proportion of 16- to 24-year-olds who were dropouts, and proportion of 18- to 24-year-olds who had completed high school, by race/ethnicity: October 1997

Dropout and completion measures	Total	White, non-Hispanic	Black, non-Hispanic	Hispanic
Percent of youth 15 to 24 in grades 10 to 12 dropping out, October 1996 to October 1997	4.6	3.6	5.0	9.5
Percent of youth 16 to 24 who were dropouts in 1997	11.0	7.6	13.4	25.3
Percent of youth 18 to 24 who were high school completers in 1997*	85.9	90.5	82.0	66.7

*Excludes those still enrolled in high school.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October 1997, unpublished data.

High School Completion Rates

The high school completion rate represents the proportion of 18- to 24-year-olds who have completed a high school diploma or an equivalent credential, including a General Educational Development (GED) credential.

- In 1997, about 86 percent of all 18- through 24-year-olds, not enrolled in school, had completed high school—a slight increase since the early 1970s (table A and figure A).
- The high school completion rate has increased for white and black young adults since the early 1970s, with 1997 rates of 90.5 percent for whites and 82.0 percent for blacks. Hispanic young adults have not shared in this improvement, with 66.7 percent reported as having completed high school in 1997.

Method of High School Completion

Most young adults complete a regular diploma and graduate from high school; others complete high school by an alternative route, such as by passing the GED test.

- During the 1990s, the percentage of young adults, not enrolled in school, holding a high school credential has remained relatively unchanged; however, the percentage holding an alternative certification increased from 4.9 percent in 1990 to 9.1 percent in 1997, and the percentage holding regular diplomas decreased by a similar amount.

Data sources:

NCES: The Common Core of Data (CCD), Public Elementary/Secondary Agency Universe Survey, 1993–94 through 1995–96; the National Education Longitudinal Study of 1988 (NELS:88), base year (1988), first follow-up (1990), second follow-up (1992), and third follow-up (1994); and the High School and Beyond Study (HS&B), Sophomore Cohort, first follow-up (1982).

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To obtain the complete report (NCES 1999–082), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov)*, or contact GPO (202–512–1800).

Internet Access in Public Schools and Classrooms: 1994–98

Cassandra Rowand

This article was originally published as an Issue Brief. The sample survey data are from several surveys—listed at the end of this article—on advanced telecommunications and Internet access in U.S. public schools. The surveys were conducted through the NCES Fast Response Survey System (FRSS).

What sort of progress is being made in connecting every public school and classroom to the Information Superhighway? Since 1994, the federal government has been committed to assisting every school and classroom to connect to the Internet by the year 2000, and the National Center for Education Statistics (NCES) has been tracking the rate at which public schools and classrooms are meeting that goal. In 1994, NCES began surveying approximately 1,000 public schools each year about their access to the Internet, access in classrooms, and, since 1996, their type of Internet connections. NCES measured Internet access in private schools in 1995 and is currently gathering data for 1998–99.

How Much Progress Have Schools Made?

Public schools in the United States have continued to make progress toward meeting the goal of connecting every school to the Internet by the year 2000. Indeed, schools have shown increases every year since 1994, when 35 percent of public schools were connected to the Internet (table 1). In the fall of 1998, 89 percent of public schools were connected to the Internet. This is an increase of 11 percentage points from the 78 percent reported in 1997.

In 1997, schools with different characteristics had different rates of Internet access; for example, high-poverty schools,[1] schools with high minority enrollment, and smaller schools were less likely to have Internet access than other schools. By 1998, most of these differences no longer existed. High-poverty and small schools were as likely to have access to the Internet as low-poverty and larger schools. However, schools with 11 to 30 percent and 31 to 70 percent of students in poverty were slightly more likely to have Internet access than the high-poverty schools.

What Proportion of Classrooms Are Connected?

While having Internet access in 89 percent of public schools is an achievement, this number does not tell us about the degree to which students have access to the Internet. Thus, in addition to having every school connected to the Internet by the year 2000, a second goal is to have every instructional room (e.g., every classroom, computer lab, and library/media center) connected to the Internet. Schools have made strides toward this goal, with 51 percent of instructional rooms in public schools connected to the Internet in 1998. This number has nearly doubled since 1997, when 27 percent of instructional rooms were connected (table 1). The rate at which classrooms are connected may continue to grow because of the funds available starting in 1998 through the E-rate (Education rate) program. This program was established by the Telecommunications Act of 1996 to help make telecommunications services and technologies available to schools and libraries at discounted rates.[2]

There continue to be differences in instructional room access to the Internet related to school characteristics. In 1998, public schools with 50 percent or more minority enrollment had Internet access in 37 percent of instructional rooms, compared to 52, 59, and 57 percent in schools with 21 to 49 percent, 6 to 20 percent, and less than 6 percent minority enrollment, respectively. Similarly, public schools with 71 percent or more students eligible for free or reduced-price school lunch had 39 percent of their instructional rooms connected to the Internet, compared to 53 percent of rooms in schools with 11 to 30 percent of students eligible and 62 percent of rooms in schools with less than 11 percent of students eligible. Additionally, schools in the Northeast had a lower proportion of rooms connected to the Internet than schools in the Southeast, Central, and West regions (39 percent compared to 51, 61, and 51 percent, respectively).

Another measure of the pervasiveness of computers in public schools is the ratio of students to computers. According to the President's Committee of Advisors on Science and Technology (1997), a ratio of 4 to 5 students per computer represents a reasonable level for the effective use of computers within schools. Data from 1998 show approximately 6 students per instructional

[1] High-poverty schools are defined as those with 71 percent or more of their students eligible for free or reduced-price school lunch.

[2] More information about the E-rate program is available online: *http://www.sl.universalservice.org*

Table 1.—Percent of public schools having access to the Internet, and percent of instructional rooms having access to the Internet, by school characteristics: 1994, 1997, and 1998

School characteristic	Schools			Instructional rooms		
	1994	1997	1998	1994	1997	1998
All public schools	35	78	89	3	27	51
Instructional level*						
Elementary	30	75	88	3	24	51
Secondary	49	89	94	4	32	52
Size of enrollment						
Less than 300	30	75	87	3	27	54
300 to 999	35	78	89	3	28	53
1,000 or more	58	89	95	3	25	45
Metropolitan status						
City	40	74	92	4	20	47
Urban fringe	38	78	85	4	29	50
Town	29	84	90	3	34	55
Rural	35	79	92	3	30	57
Geographic region						
Northeast	34	78	90	3	22	39
Southeast	29	84	92	2	26	51
Central	34	79	90	3	33	61
West	42	73	86	5	27	51
Percent minority enrollment						
Less than 6 percent	38	84	91	6	37	57
6 to 20 percent	38	87	93	4	35	59
21 to 49 percent	38	73	91	4	22	52
50 percent or more	27	63	82	3	13	37
Percent of students eligible for free or reduced-price school lunch						
Less than 11 percent	40	88	87	4	36	62
11 to 30 percent	39	83	94	4	32	53
31 to 70 percent	33	78	91	3	27	52
71 percent or more	19	63	80	2	14	39

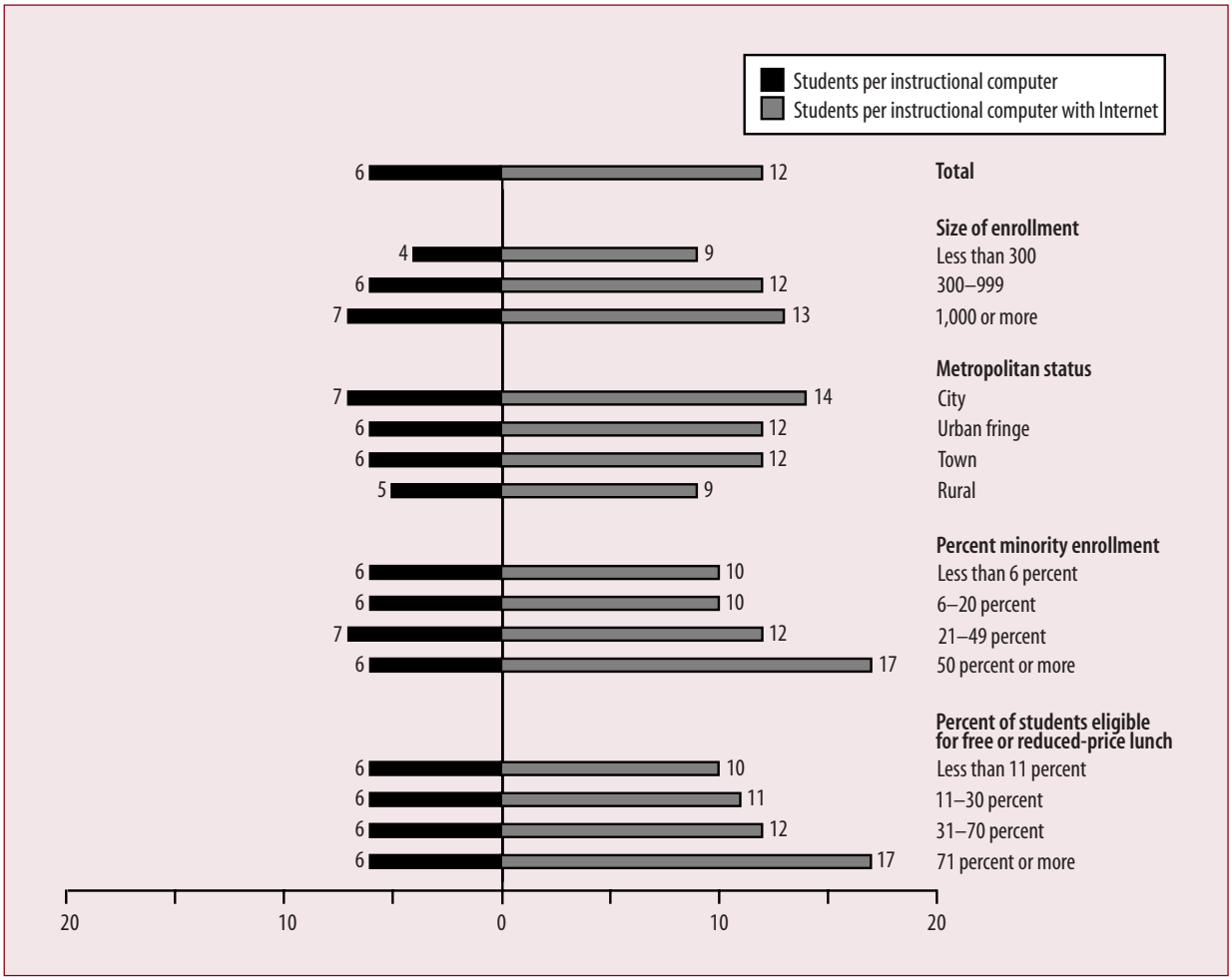
*Data for combined schools are included in the totals and in analyses by other school characteristics but are not shown separately.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Advanced Telecommunications in U.S. Public Schools, K–12* (NCES 95–731); *Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, 1995* (NCES 96–854); *Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996* (NCES 97–944); *Internet Access in Public Schools* (NCES 98–031); and data from the Fast Response Survey System, "Survey on Internet Access in U.S. Public Schools, Fall 1998," FRSS 69, 1998.

computer in public schools (figure 1). Medium-sized schools, i.e., those with 300–999 students, and large schools, those with 1,000 or more students, had less access to instructional computers than small schools, those with less than 300 students (6 and 7 students per instructional computer compared to 4). Schools located in cities had more students per instructional computer (7) than schools in urban fringe areas and towns (6 students per instructional computer for both) and schools in rural areas (5 students per instructional computer).

The ratios of students per instructional computer *with Internet access* also varied in similar ways (figure 1). Medium-sized and large schools had more students per computer with Internet access than small schools, that is, 12 and 13 students per Internet-connected computer compared to 9. Schools located in cities and urban fringe areas had more students per computer with Internet access (14 and 12, respectively) than schools in rural areas (9). Public schools with 71 percent or more students eligible for free or reduced-price school lunch had less access to computers with Internet access on a per-student basis than schools with less than 11 percent and those with 11 to 30 percent of students eligible for free or reduced-price school lunch. Schools with 50 percent or more minority enrollment also had less access than schools with less than 6 percent, 6 to 20 percent, and 21 to 49 percent minority enrollments.

Figure 1.—Ratio of students per instructional computer and students per instructional computer with Internet access, by school characteristics: Fall 1998

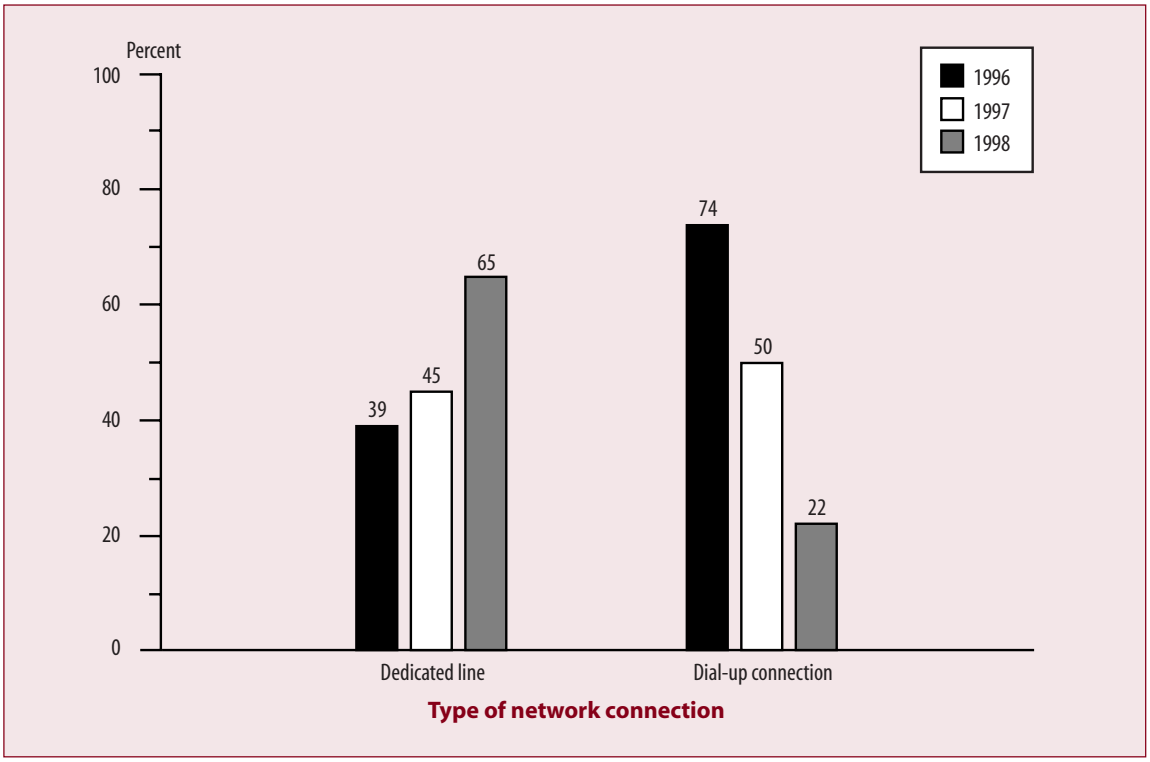


SOURCE: U.S. Department of Education, National Center for Education Statistics, *Internet Access in Public Schools* (NCES 98–031); and data from the Fast Response Survey System, "Survey on Internet Access in U.S. Public Schools, Fall 1998," FRSS 69, 1998.

How Are Schools Connecting to the Internet?

One of the major determinants of the extent to which schools are able to make use of the Internet is the speed at which they are able to connect. Changes have occurred over the past 2 years regarding the type of network connections used by public schools and, therefore, the speed at which they are able to connect. In 1996, 74 percent of public schools with Internet access were connecting using dial-up connections; in 1997, 50 percent of schools were using this type of connection; and in 1998, 22 percent (figure 2). In 1998, higher speed connections using a dedicated line were used by 65 percent of public schools. This is a continued increase from 1996, when 39 percent of schools were connecting using a dedicated line, and 1997, when 45 percent were so connected. Large schools with Internet access were more likely to connect using a dedicated line than small and medium-sized schools (79 percent compared to 63 and 64 percent, respectively; data not shown). On the other hand, schools in the Northeast were more likely to connect using a dial-up connection than schools in the Central and West regions (34 percent compared to 20 and 17 percent, respectively; data not shown).

Figure 2.—Percent of public schools with Internet access, by type of network connection: Fall 1996–98



NOTE: Data were also collected for ISDN, cable modem, and wireless connections.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996* (NCES 97–944); *Internet Access in Public Schools* (NCES 98–031); and data from the Fast Response Survey System, "Survey on Internet Access in U.S. Public Schools, Fall 1998," FRSS 69, 1998.

Conclusion

Differences among public schools with Internet access have decreased in 1998; however, schools with the highest proportion of minority enrollments and schools with the highest proportion of students eligible for free or reduced-price school lunch continue to have fewer instructional rooms with Internet access. And, while the ratio of students per instructional computer is approaching the ratio recommended by the President's Committee of Advisors on Science and Technology, the ratio of students to computer with Internet access is nearly double the recommended student to computer ratio. Public schools have shown a commitment toward securing more efficient means of connecting to the Internet; more schools are connecting to the Internet using dedicated lines than in previous years.

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Data sources: The following surveys, conducted through the NCES Fast Response Survey System (FRSS): Survey on Advanced Telecommunications in U.S. Public Schools, K–12 (FRSS 51, 1994); Survey on Advanced Telecommunications in U.S. Public Schools, K–12 (FRSS 57, 1995); Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1996 (FRSS 61, 1996); Survey on Advanced Telecommunications in U.S. Public Schools, Fall 1997 (FRSS 64, 1997); and Survey on Internet Access in U.S. Public Schools, Fall 1998 (FRSS 69, 1998).

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State Counts

Public School Student, Staff, and Graduate Counts by State: School Year 1997–98

Ghedam Bairu

This article was originally published as a Statistics in Brief report. The universe data are from the NCES Common Core of Data (CCD). Technical notes and definitions from the original report have been omitted.

How many students were enrolled in elementary and secondary public schools in 1997–98? How many staff members were paid to teach, supervise, and provide support services for education? How many students graduated from high school in 1996–97? The information to answer these and other questions is reported from the National Center for Education Statistics (NCES) State Nonfiscal Survey of Public Elementary and Secondary Education, School Year 1997–98.

How Many Students Were Enrolled in Public Elementary and Secondary Schools?

In school year 1997–98, there were 46 million students enrolled in public elementary and secondary schools in the 50 states and the District of Columbia (table 1). Of these students, 25.7 million were in prekindergarten through grade 6, an additional 19.8 million were in grades 7 through 12, and the remaining 0.7 million were ungraded students.*

California had the most public elementary and secondary school students (5,804,000), followed by Texas (3,892,000) and New York (2,862,000). The three lowest student counts were in the District of Columbia (77,000), Wyoming (97,000), and Vermont (106,000).

How Many Teachers Were There?

About 2.7 million full-time-equivalent teachers provided instruction in public elementary and secondary schools in the 1997–98 school year (table 2). Among this group, 1,519,000 were elementary school teachers (including prekindergarten and kindergarten teachers) and 983,000 were secondary school teachers. The remaining 242,000 teachers taught ungraded classes or were not assigned a specific grade.

The ratio of total students to total teachers for the nation was 16.8 students per teacher. These ratios ranged from lows of 13.4 students per teacher in Vermont and 13.5 in Maine to highs of 22.9 in Utah and 21.6 in California. The median student/teacher ratio was 16.3:1; that is, about half of the states had a student/teacher ratio equal to or greater than 16.3:1, and half had a lower ratio. Student/teacher ratio should not be interpreted as average class size since not all teachers are assigned to a class (for example, music and reading teachers in elementary schools).

How Many Staff Supervised or Provided Support Services for Public Education?

In addition to the teachers described previously, about 556,000 teachers' aides directly assisted teachers in providing instruction (table 3). An additional 35,000 instructional coordinators and supervisors helped teachers through curriculum development and inservice training. Support staff for students included 91,000 guidance counselors and 52,000 librarians. This translates to about 508 students for every guidance counselor reported, and 884 students for each librarian. An additional 1,245,000 staff members provided support services for students. This support included food, health, library, maintenance, transportation, security, and other services in the nation's public schools. There were 126,000 school administrators (mostly principals and assistant principals), 51,000 school district administrators, and about 358,000 administrative support staff.

The relative distribution of all staff is illustrated in figure 1. Instructional staff (teachers, instructional aides, and coordinators) made up 63.5 percent of all staff. Another 26 percent of all staff (librarians, counselors, psychologists, and other support staff) provided support services to schools and students. Administrators and administrative support staff made up 10 percent of all education staff. On the average, there were 16 teachers and 13 other staff for each administrator. All of these distributions and ratios vary greatly from state to state.

*Throughout this Statistics in Brief, the five outlying areas and the Department of Defense Dependents Schools are not included in national totals.

How Many Students Graduated From High School During the 1996–97 School Year?

Some 2,341,000 students received regular high school diplomas in the 50 states and the District of Columbia during the 1996–97 school year and subsequent summer (table 4). An additional 185,000 students received other (alternative) diplomas or high school equivalency certificates (the latter group includes only those who were 19 or younger). National totals for alternative and high school equivalency certificate recipients and other completers represent an undercount due to missing data in some states. Finally, some 29,000 students received some high school completion certificate other than a diploma or an equivalency certificate. (Note that some states grant only regular diplomas and the high school equivalency certificates.)

Data source: The NCES Common Core of Data (CCD), State Nonfiscal Survey, 1993–94, 1996–97, and 1997–98.

For technical information, see the complete Statistics in Brief:

Bairu, G. (1999). *Public School Student, Staff, and Graduate Counts by State: School Year 1997–98* (NCES 1999–327).

Author affiliation: G. Bairu, NCES.

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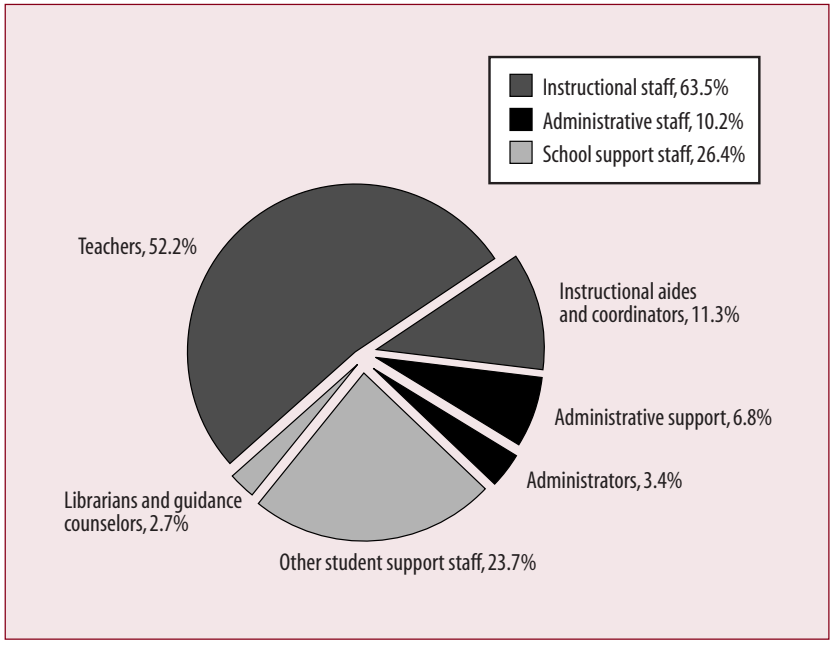
To obtain the Statistics in Brief (NCES 1999–327), call the toll-free ED Pubs number (877–433–7827) or visit the NCES Web Site *(http://nces.ed.gov)*.

Figure 1.—Distribution of elementary and secondary education staff by category: School year 1997–98



NOTE: Details may not add to 100 percent due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "State Nonfiscal Survey," 1997–98.

Table 1.—Public school student membership, by grade and state: Fall 1997

State	Total student membership	Pre-kindergarten	Kindergarten	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
United States	[1]46,127,194	[1]694,857	3,503,173	3,754,896	3,689,185	3,597,190	3,507,494	3,457,588
Alabama	[1]749,187	[1]9,866	58,326	63,553	60,682	58,969	57,431	57,360
Alaska	132,123	2,183	10,249	10,596	10,625	10,544	10,473	10,185
Arizona	814,113	4,674	63,857	70,928	68,478	66,045	65,170	63,429
Arkansas	456,497	1,672	35,761	36,984	35,899	35,001	34,067	33,695
California	[1]5,803,734	[1]76,431	463,684	488,429	489,070	463,034	451,069	434,280
Colorado	687,167	12,861	51,408	55,035	54,437	53,710	53,023	53,377
Connecticut	535,164	9,680	42,382	45,440	44,701	44,276	43,175	41,935
Delaware	111,960	572	8,039	9,114	8,707	8,441	8,758	8,405
District of Columbia	77,111	5,156	6,982	7,756	6,972	6,644	5,357	4,850
Florida	2,294,077	54,044	174,874	185,618	186,229	184,144	180,873	177,260
Georgia	1,375,980	29,357	111,081	115,462	114,559	111,495	108,023	106,114
Hawaii	189,887	606	15,473	16,330	16,445	15,562	15,127	14,785
Idaho	244,403	2,109	17,499	18,584	18,648	18,398	18,527	18,238
Illinois	1,998,289	55,835	153,934	161,992	159,328	157,765	146,478	145,916
Indiana	987,483	5,561	73,012	82,792	79,072	77,304	75,328	72,649
Iowa	501,054	4,757	36,486	35,982	36,314	35,521	34,950	34,921
Kansas	468,687	5,373	32,274	35,695	35,631	34,922	35,172	35,387
Kentucky	669,322	22,065	48,324	[2]52,193	[2]51,086	[2]49,965	47,241	47,589
Louisiana	776,813	15,442	60,679	63,503	59,691	57,936	57,485	57,498
Maine	212,526	969	15,543	16,433	16,550	16,596	16,834	16,553
Maryland	830,744	19,739	60,385	67,742	67,998	66,482	64,763	63,554
Massachusetts	949,006	18,226	73,125	79,785	79,534	77,849	75,586	73,697
Michigan	1,702,672	22,423	133,202	137,352	136,096	128,797	123,229	122,669
Minnesota	853,621	8,945	62,126	62,339	64,122	63,628	63,494	63,436
Mississippi	504,792	1,289	39,378	43,764	40,774	38,716	38,266	37,085
Missouri	910,654	16,372	71,235	71,589	70,166	68,980	67,802	67,889
Montana	162,335	[3]484	11,553	12,092	12,030	11,866	12,165	12,417
Nebraska	292,681	4,514	21,436	21,646	22,048	21,342	21,168	21,461
Nevada	296,621	1,902	23,809	26,377	26,083	24,963	23,936	23,476
New Hampshire	201,629	1,577	8,763	17,514	17,087	16,883	16,688	16,802
New Jersey	1,250,276	10,220	92,171	103,003	100,961	98,719	94,806	91,352
New Mexico	331,673	4,131	24,346	26,715	25,996	25,756	25,521	25,887
New York	2,861,823	32,086	206,548	229,133	227,572	219,229	210,379	203,511
North Carolina	1,236,083	8,195	102,951	107,437	104,724	102,937	98,688	96,086
North Dakota	118,572	713	8,373	8,548	8,442	8,640	8,678	8,697
Ohio	1,847,035	20,763	137,371	148,819	143,620	141,821	138,301	137,723
Oklahoma	623,681	2,494	54,203	54,161	47,604	46,659	46,397	46,425
Oregon	541,346	781	38,976	42,742	42,938	42,547	41,710	41,663
Pennsylvania	1,815,151	2,979	129,198	146,168	141,752	139,156	138,585	137,087
Rhode Island	153,321	629	11,397	12,831	12,839	12,382	12,083	11,814
South Carolina	[1]659,256	[1]8,682	46,748	55,479	48,638	53,744	51,992	51,195
South Dakota	142,443	924	10,465	10,265	10,382	10,395	10,375	10,735
Tennessee	[1]893,020	[1]11,760	74,912	77,627	72,040	69,187	67,196	67,462
Texas	3,891,877	135,616	289,683	313,192	307,106	299,984	296,894	296,071
Utah	482,957	3,806	35,310	36,057	35,880	35,045	35,306	34,308
Vermont	105,984	1,222	7, 281	7,882	8,063	8,198	8,029	8,116
Virginia	1,110,815	4,036	85,729	90,271	89,801	87,396	83,447	82,557
Washington	991,235	6,671	72,922	77,762	78,135	76,876	75,322	75,660
West Virginia	301,419	4,838	22,282	23,169	22,346	21,877	21,405	21,926
Wisconsin	881,780	19,627	60,932	64,114	64,297	64,031	63,661	65,120
Wyoming	97,115	[4]0	6,496	6,902	6,987	6,833	7,061	7,281
Outlying Areas and DOD Dependents Schools								
DOD Dependents Schools	78,254	1,619	7,843	7,950	8,044	7,608	6,975	6,592
American Samoa	15,214	1,515	1,205	1,218	1,205	1,205	1,152	1,164
Guam	32,444	463	2,765	2,809	2,919	2,761	2,697	2,549
Northern Marianas	9,246	588	566	872	850	781	799	816
Puerto Rico	617,322	358	43,886	51,549	51,266	51,108	50,232	49,743
Virgin Islands	22,136	[4]0	1,518	1,823	1,710	1,595	1,655	1,690

See footnotes on second page of this table.

Table 1.—Public school student membership, by grade and state: Fall 1997—Continued

State	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10	Grade 11	Grade 12	Ungraded
United States	3,492,505	3,519,847	3,415,151	3,818,929	3,376,595	2,972,004	2,673,067	654,713
Alabama	57,154	59,488	58,210	63,707	52,780	47,389	44,272	0
Alaska	10,298	10,542	9,954	10,671	9,561	8,471	7,771	0
Arizona	64,243	64,019	60,138	66,357	58,472	48,676	44,259	5,368
Arkansas	34,451	36,585	36,229	37,038	35,333	31,874	29,204	2,704
California	426,302	426,245	412,604	458,650	423,865	378,819	317,595	93,657
Colorado	54,004	53,406	52,632	56,644	50,972	45,380	39,263	1,015
Connecticut	41,267	40,650	39,089	41,713	36,746	32,753	29,660	1,697
Delaware	8,746	9,085	8,905	10,259	8,807	7,381	6,741	0
District of Columbia	4,713	4,802	4,376	4,913	4,473	3,549	2,961	3,607
Florida	181,704	181,657	173,913	203,561	168,060	133,774	108,366	0
Georgia	106,131	105,222	103,107	121,511	94,881	79,682	69,355	0
Hawaii	14,420	13,755	13,829	16,573	14,074	12,535	10,266	107
Idaho	18,077	19,048	19,696	20,431	19,957	18,171	17,020	0
Illinois	159,902	148,381	145,853	156,022	142,442	130,581	129,084	4,776
Indiana	73,804	75,600	75,621	82,813	75,227	69,188	64,883	4,629
Iowa	36,680	38,136	37,631	40,806	39,679	38,235	36,808	14,148
Kansas	36,449	37,338	36,832	39,397	36,399	33,464	30,922	3,432
Kentucky	48,502	50,740	50,385	57,537	49,963	44,440	40,153	[2]9,139
Louisiana	60,298	61,919	55,957	65,496	54,878	46,065	41,527	18,439
Maine	17,431	17,631	17,203	16,629	15,101	14,020	12,781	2,252
Maryland	62,145	62,200	60,010	66,172	57,711	51,580	46,532	13,731
Massachusetts	72,208	72,275	69,388	72,256	65,793	60,116	54,354	4,814
Michigan	122,917	125,368	119,473	129,251	116,471	102,991	92,690	89,743
Minnesota	65,640	67,466	66,529	68,770	68,472	64,927	63,727	0
Mississippi	37,645	39,982	38,455	41,768	35,246	29,499	26,788	16,137
Missouri	69,551	70,545	68,197	74,724	66,902	60,866	55,812	10,024
Montana	12,867	13,196	13,035	13,753	13,094	12,140	11,301	342
Nebraska	22,128	22,751	23,190	24,559	23,457	22,069	20,912	0
Nevada	23,072	22,643	21,910	22,037	21,344	18,638	15,782	649
New Hampshire	16,480	16,785	15,967	16,336	14,955	13,354	11,656	782
New Jersey	89,004	88,214	83,985	86,192	79,314	72,813	68,008	91,514
New Mexico	25,713	26,003	25,525	29,843	26,201	21,956	18,080	0
New York	201,678	203,038	197,148	245,320	215,097	168,983	146,818	155,283
North Carolina	95,917	96,266	93,033	106,559	87,549	72,987	62,552	202
North Dakota	9,099	9,585	9,555	10,053	9,935	9,439	8,815	0
Ohio	140,445	143,868	138,634	156,863	140,660	130,259	120,051	7,837
Oklahoma	47,820	48,639	48,030	51,060	47,758	41,543	37,568	3,320
Oregon	42,548	42,917	42,466	45,211	42,477	37,452	34,419	2,499
Pennsylvania	139,804	139,877	135,882	151,930	139,180	126,527	117,432	29,594
Rhode Island	11,595	11,735	11,272	12,362	10,971	9,407	8,633	3,371
South Carolina	52,427	52,984	50,775	62,018	48,576	39,422	36,576	0
South Dakota	11,076	11,415	11,370	12,352	11,431	10,578	9,939	741
Tennessee	66,654	67,096	64,518	73,477	63,496	53,805	48,881	14,909
Texas	297,957	303,310	292,648	347,951	270,516	234,021	206,928	0
Utah	35,098	35,634	36,365	37,254	38,787	37,286	35,900	10,921
Vermont	8,237	8,290	8,375	8,827	7,908	7,270	6,831	1,455
Virginia	84,696	85,913	82,753	88,374	78,960	69,767	66,430	30,685
Washington	76,684	77,795	76,664	83,616	78,155	70,242	64,731	0
West Virginia	22,509	23,200	23,002	25,119	24,521	22,607	21,765	853
Wisconsin	66,745	68,580	66,601	75,862	71,522	67,500	63,188	0
Wyoming	7,570	8,028	8,232	8,332	8,466	7,513	7,077	337
Outlying Areas and DOD Dependents Schools								
DOD Dependents Schools	6,034	5,625	5,140	4,683	4,112	3,301	2,728	0
American Samoa	1,065	1,026	1,009	960	946	804	704	36
Guam	2,559	2,281	2,173	3,310	2,321	1,528	1,309	0
Northern Marianas	671	656	585	581	555	426	500	0
Puerto Rico	47,871	51,342	46,126	44,105	45,044	38,276	32,536	13,880
Virgin Islands	1,576	2,110	1,577	2,015	1,539	1,102	1,193	1,033

[1]Data imputed based on current-year (fall 1997) data.

[2]Data disaggregated from reported total.

[3]Montana reports some prekindergarten students as kindergarten students.

[4]Wyoming and the Virgin Islands do not have a prekindergarten program.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "State Nonfiscal Survey," 1997–98.

Table 2.—Public school student/teacher ratio, student membership, and teachers, by level of instruction and state: Fall 1997

State	Total student/ teacher ratio	Total student membership	Total teachers	Pre-kindergarten teachers	Kindergarten teachers	Elementary teachers	Secondary teachers	Teachers of ungraded classes
United States	16.8	[1]46,127,194	[1]2,744,493	[1]27,731	[1]131,936	[1]1,359,272	[1]983,217	242,337
Alabama	16.3	[1]749,187	[1]45,973	[1]510	3,608	21,670	20,185	0
Alaska	17.3	132,123	7,625	31	360	4,465	2,769	0
Arizona	19.8	814,113	41,129	195	1,636	27,895	11,403	0
Arkansas	16.9	456,497	[1]26,932	[1]86	2,008	11,944	12,706	188
California	21.6	[1]5,803,734	[1]268,581	[1]3,951	18,499	153,039	66,388	26,704
Colorado	18.2	687,167	37,840	316	1,278	17,720	18,526	0
Connecticut	14.2	535,164	37,658	150	1,424	20,390	11,067	4,627
Delaware	16.3	111,960	6,850	29	194	3,139	3,488	0
District of Columbia	17.5	77,111	[1]4,399	[1]41	[1]198	[1]2,345	[1]1,815	0
Florida	18.4	2,294,077	124,473	917	6,980	45,586	47,411	23,579
Georgia	16.2	1,375,980	85,005	2,247	5,349	42,447	34,962	0
Hawaii	17.8	189,887	10,653	[2]97	[2]459	[2]5,590	4,463	44
Idaho	18.5	244,403	13,207	113	440	6,197	6,300	157
Illinois	16.8	1,998,289	118,734	1,381	4,654	65,199	30,164	17,336
Indiana	17.2	987,483	57,371	349	2,290	26,515	25,368	2,849
Iowa	15.3	501,054	32,717	462	1,872	17,170	12,088	1,125
Kansas	14.9	468,687	31,527	180	1,123	13,458	13,469	3,297
Kentucky	16.5	669,322	40,488	623	1,195	26,867	11,803	0
Louisiana	16.0	776,813	48,599	403	2,778	30,534	14,280	604
Maine	13.5	212,526	15,700	[2]170	[2]801	[2]9,758	4,971	0
Maryland	17.2	830,744	48,318	587	1,503	22,288	23,940	0
Massachusetts	14.1	949,006	67,170	[2]420	[2]1,984	[2]22,164	33,319	9,283
Michigan	18.8	1,702,672	90,529	959	3,438	34,822	41,117	10,193
Minnesota	16.4	853,621	51,998	95	1,763	25,404	24,709	27
Mississippi	17.1	504,792	29,441	225	1,602	13,129	9,464	5,021
Missouri	15.0	910,654	60,869	964	3,061	26,570	29,535	739
Montana	15.9	162,335	10,228	[2]111	[2]523	[2]6,373	3,221	0
Nebraska	14.5	292,681	20,139	[2]185	[2]873	[2]10,634	8,373	74
Nevada	18.5	296,621	16,053	240	510	7,425	5,752	2,126
New Hampshire	15.6	201,629	12,931	93	271	8,487	4,080	0
New Jersey	13.9	1,250,276	89,671	234	3,172	46,923	26,383	12,959
New Mexico	16.9	331,673	19,647	220	797	10,459	4,644	3,527
New York	15.0	2,861,823	190,874	1,921	10,133	85,374	65,232	28,214
North Carolina	15.9	1,236,083	77,785	681	5,239	41,310	27,697	2,858
North Dakota	14.7	118,572	8,070	90	291	4,626	3,063	0
Ohio	16.7	1,847,035	110,757	1,090	3,909	68,578	36,951	229
Oklahoma	15.5	623,681	40,215	235	1,608	16,824	17,348	4,200
Oregon	20.1	541,346	26,935	40	1,032	13,419	8,210	4,234
Pennsylvania	16.8	1,815,151	108,014	[2]781	[2]3,691	[2]44,940	45,221	13,381
Rhode Island	14.5	153,321	10,598	34	283	4,392	4,385	1,504
South Carolina	15.6	[1]659,256	42,336	461	1,782	26,944	13,149	0
South Dakota	15.3	142,443	9,282	28	288	5,216	2,846	904
Tennessee	16.5	[1]893,020	54,142	168	3,699	34,262	14,610	1,403
Texas	15.3	3,891,877	254,557	4,051	13,157	102,657	87,379	47,313
Utah	22.9	482,957	21,115	134	832	9,092	8,681	2,376
Vermont	13.4	105,984	7,909	65	275	2,805	3,066	1,698
Virginia	14.7	1,110,815	[1]75,524	[1]209	[2]3,575	[2]42,684	29,056	0
Washington	20.2	991,235	49,074	73	2,041	22,703	19,937	4,320
West Virginia	14.4	301,419	20,947	153	1,117	8,997	7,065	3,615
Wisconsin	15.4	881,780	57,227	933	2,135	34,933	17,731	1,495
Wyoming	14.5	97,115	6,677	[3]0	206	2,910	3,427	134
Outlying Areas and DOD Dependents Schools								
DOD Dependents Schools	16.1	78,254	5,227	47	188	2,095	1,976	921
American Samoa	20.0	15,214	762	115	34	389	209	15
Guam	23.8	32,444	1,363	14	129	469	622	129
Northern Marianas	19.1	9,246	483	3	17	261	199	3
Puerto Rico	15.8	617,322	38,953	43	1,275	20,577	14,268	2,790
Virgin Islands	14.2	22,136	1,559	[3]0	70	702	777	10

[1]Data imputed based on current-year (fall 1997) data.

[2]Data disaggregated from reported total.

[3]Wyoming and the Virgin Islands do not have prekindergarten programs.

NOTE: Teacher counts are full-time-equivalency (FTE) counts. Elementary and secondary teacher counts are not directly comparable across states due to differences in the grades included in these designations.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "State Nonfiscal Survey," 1997–98.

Table 3.—Number of staff employed by public elementary and secondary school systems and percentage of total staff, by category and state: Fall 1997

State	Total staff	Teachers		Instructional aides		Instructional coordinators and supervisors		Guidance counselors	
		Number	Percent	Number	Percent	Number	Percent	Number	Percent
United States	[1]5,258,671	[1]2,744,493	52.2	[1]556,435	10.6	[1]34,844	0.7	[1]90,757	1.7
Alabama	[1]85,951	[1]45,973	53.5	7,294	8.5	1,020	1.2	1,718	2.0
Alaska	[1]14,952	7,625	51.0	1,957	13.1	[1]113	0.8	220	1.5
Arizona	80,907	41,129	50.8	10,283	12.7	186	0.2	1,079	1.3
Arkansas	[1]51,272	26,932	52.5	3,837	7.5	163	0.3	1,219	2.4
California	[1]493,837	[1]268,581	54.4	59,381	12.0	5,318	1.1	5,422	1.1
Colorado	72,247	37,840	52.4	6,850	9.5	800	1.1	1,222	1.7
Connecticut	73,529	37,658	51.2	8,881	12.1	409	0.6	1,145	1.6
Delaware	12,554	6,850	54.6	958	7.6	52	0.4	221	1.8
District of Columbia	[1]8,706	[1]4,399	50.5	[1]1,011	11.6	[1]66	0.8	[1]172	2.0
Florida	256,313	124,473	48.6	27,801	10.8	667	0.3	5,026	2.0
Georgia	[1]157,593	85,005	53.9	[1]18,040	11.4	1,276	0.8	2,271	1.4
Hawaii	17,117	10,653	62.2	886	5.2	407	2.4	571	3.3
Idaho	23,100	13,207	57.2	2,237	9.7	226	1.0	558	2.4
Illinois	[1]228,599	118,734	51.9	[1]26,199	11.5	2,053	0.9	2,871	1.3
Indiana	121,748	57,371	47.1	16,839	13.8	1,406	1.2	1,763	1.4
Iowa	64,261	32,717	50.9	6,866	10.7	376	0.6	1,341	2.1
Kansas	59,603	31,527	52.9	5,476	9.2	86	0.1	1,101	1.8
Kentucky	[1]88,996	40,488	45.5	12,858	14.4	420	0.5	1,283	1.4
Louisiana	98,537	48,599	49.3	10,363	10.5	1,079	1.1	2,910	3.0
Maine	30,534	15,700	51.4	4,321	14.2	130	0.4	598	2.0
Maryland	87,367	48,318	55.3	7,332	8.4	697	0.8	1,876	2.1
Massachusetts	121,359	67,170	55.3	14,870	12.3	1,059	0.9	2,229	1.8
Michigan	202,128	90,529	44.8	19,809	9.8	712	0.4	2,968	1.5
Minnesota	97,365	51,998	53.4	13,954	14.3	938	1.0	977	1.0
Mississippi	61,693	29,441	47.7	8,744	14.2	520	0.8	885	1.4
Missouri	107,681	60,869	56.5	8,823	8.2	769	0.7	2,485	2.3
Montana	[1]18,993	10,228	53.9	[1]2,128	11.2	135	0.7	420	2.2
Nebraska	37,851	20,139	53.2	3,764	9.9	249	0.7	752	2.0
Nevada	27,830	16,053	57.7	1,976	7.1	107	0.4	608	2.2
New Hampshire	24,778	12,931	52.2	4,290	17.3	[2]144	0.6	665	2.7
New Jersey	166,796	89,671	53.8	15,644	9.4	1,292	0.8	3,215	1.9
New Mexico	39,920	19,647	49.2	4,794	12.0	566	1.4	676	1.7
New York	374,182	190,874	51.0	31,167	8.3	1,378	0.4	5,559	1.5
North Carolina	[1]149,229	77,785	52.1	24,591	16.5	647	0.4	3,123	2.1
North Dakota	14,862	8,070	54.3	1,636	11.0	78	0.5	262	1.8
Ohio	203,073	110,757	54.5	11,869	5.8	407	0.2	3,267	1.6
Oklahoma	69,294	40,215	58.0	5,349	7.7	150	0.2	1,418	2.0
Oregon	53,094	26,935	50.7	7,099	13.4	302	0.6	1,251	2.4
Pennsylvania	205,642	108,014	52.5	17,508	8.5	1,518	0.7	3,762	1.8
Rhode Island	17,197	10,598	61.6	1,862	10.8	51	0.3	314	1.8
South Carolina	[1]78,951	42,336	53.6	[1]8,643	10.9	448	0.6	1,557	2.0
South Dakota	16,846	9,282	55.1	1,871	11.1	107	0.6	359	2.1
Tennessee	102,349	54,142	52.9	11,139	10.9	[2]814	0.8	1,638	1.6
Texas	492,932	254,557	51.6	48,626	9.9	1,169	0.2	8,720	1.8
Utah	39,630	21,115	53.3	5,571	14.1	527	1.3	673	1.7
Vermont	16,388	7,909	48.3	3,359	20.5	240	1.5	365	2.2
Virginia	[1]142,567	[1]75,524	53.0	12,273	8.6	1,342	0.9	3,269	2.3
Washington	[2]92,338	49,074	53.0	9,469	10.2	[2]668	0.9	1,861	2.0
West Virginia	38,499	20,947	54.4	3,169	8.2	344	0.9	621	1.6
Wisconsin	[1]103,900	57,227	55.1	11,254	10.8	1,104	1.1	1,981	1.9
Wyoming	13,581	6,677	49.2	1,514	11.1	109	0.8	290	2.1
Outlying Areas and DOD Dependents Schools									
DOD Dependents Schools	7,616	5,000	65.7	779	10.2	115	1.5	172	2.3
American Samoa	1,466	728	49.7	107	7.3	27	1.8	29	2.0
Guam	3,367	1,802	53.5	408	12.1	14	0.4	61	1.8
Northern Marianas	1,024	422	41.2	205	20.0	11	1.1	25	2.4
Puerto Rico	69,748	39,328	56.4	—	—	621	0.9	884	1.3
Virgin Islands	3,218	1,622	50.4	326	10.1	19	0.6	84	2.6

See footnotes on second page of this table.

Table 3.— Number of staff employed by public elementary and secondary school systems and percentage of total staff, by category and state: Fall 1997—Continued

State	Librarians		Other student support staff		School administrators		School district administrators		Administrative support staff	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
United States	[1]52,172	1.0	[1]1,244,633	23.7	[1]126,093	2.4	[1]50,955	1.0	[1]358,289	6.8
Alabama	1,285	1.5	22,322	26.0	2,285	2.7	445	0.5	3,609	4.2
Alaska	145	1.0	[2]2,867	19.2	825	5.5	[2]68	0.5	1,132	7.6
Arizona	754	0.9	18,610	23.0	1,819	2.2	406	0.5	6,641	8.2
Arkansas	963	1.9	13,703	26.7	1,505	2.9	549	1.1	2,401	4.7
California	958	0.2	[2]93,052	18.8	10,870	2.2	2,255	0.5	48,000	9.7
Colorado	718	1.0	15,849	21.9	1,984	2.7	885	1.2	6,099	8.4
Connecticut	713	1.0	17,424	23.7	1,883	2.6	1,084	1.5	4,332	5.9
Delaware	124	1.0	2,957	23.6	430	3.4	90	0.7	872	6.9
District of Columbia	[1]102	1.2	[1]2,043	23.5	[1]236	2.7	[1]103	1.2	[1]574	6.6
Florida	2,599	1.0	62,638	24.4	6,111	2.4	1,636	0.6	25,362	9.9
Georgia	1,989	1.3	[1]33,557	21.3	4,145	2.6	1,077	0.7	[1]10,233	6.5
Hawaii	286	1.7	2,794	16.3	495	2.9	135	0.8	890	5.2
Idaho	191	0.8	4,690	20.3	688	3.0	116	0.5	1,187	5.1
Illinois	1,924	0.8	[1]53,124	23.2	5,341	2.3	3,493	1.5	[1]14,860	6.5
Indiana	1,039	0.9	32,403	26.6	2,867	2.4	920	0.8	7,140	5.9
Iowa	747	1.2	15,591	24.3	1,773	2.8	881	1.4	3,969	6.2
Kansas	994	1.7	14,415	24.2	1,698	2.8	1,272	2.1	3,034	5.1
Kentucky	1,101	1.2	[1]25,767	29.0	1,808	2.0	1,053	1.2	4,218	4.7
Louisiana	1,219	1.2	28,039	28.5	2,536	2.6	292	0.3	3,500	3.6
Maine	237	0.8	[2]6,504	21.3	853	2.8	465	1.5	[2]1,726	5.7
Maryland	1,059	1.2	20,443	23.4	2,810	3.2	722	0.8	4,110	4.7
Massachusetts	676	0.6	22,812	18.8	2,146	1.8	1,035	0.9	9,362	7.7
Michigan	1,565	0.8	69,111	34.2	5,413	2.7	2,066	1.0	9,955	4.9
Minnesota	994	1.0	18,693	19.2	2,190	2.2	1,163	1.2	6,458	6.6
Mississippi	887	1.4	15,353	24.9	1,557	2.5	930	1.5	3,376	5.5
Missouri	1,472	1.4	[2]22,829	21.2	2,762	2.6	1,095	1.0	[2]6,577	6.1
Montana	363	1.9	[1]3,816	20.1	532	2.8	164	0.9	[1]1,207	6.4
Nebraska	560	1.5	8,957	23.7	948	2.5	548	1.4	1,934	5.1
Nevada	267	1.0	6,136	22.0	793	2.8	205	0.7	1,685	6.1
New Hampshire	269	1.1	4,579	18.5	[2]503	2.0	353	1.4	1,044	4.2
New Jersey	1,766	1.1	34,588	20.7	4,343	2.6	1,661	1.0	14,616	8.8
New Mexico	258	0.6	9,237	23.1	884	2.2	587	1.5	3,271	8.2
New York	3,176	0.8	101,852	27.2	7,025	1.9	2,762	0.7	30,389	8.1
North Carolina	2,237	1.5	[1]27,397	18.4	4,144	2.8	1,390	0.9	7,915	5.3
North Dakota	195	1.3	3,277	22.0	411	2.8	445	3.0	488	3.3
Ohio	1,673	0.8	47,258	23.3	1,052	0.5	5,540	2.7	21,250	10.5
Oklahoma	888	1.3	14,096	20.3	1,949	2.8	733	1.1	4,496	6.5
Oregon	569	1.1	10,294	19.4	1,599	3.0	727	1.4	4,318	8.1
Pennsylvania	2,194	1.1	51,693	25.1	4,005	1.9	1,365	0.7	15,583	7.6
Rhode Island	67	0.4	2,629	15.3	375	2.2	140	0.8	1,161	6.8
South Carolina	1,095	1.4	[1]17,468	22.1	2,254	2.9	247	0.3	[1]4,903	6.2
South Dakota	208	1.2	3,257	19.3	566	3.4	339	2.0	857	5.1
Tennessee	1,445	1.4	[2]20,585	20.1	4,264	4.2	1,769	1.7	[2]6,553	6.4
Texas	4,357	0.9	142,726	29.0	12,039	2.4	2,661	0.5	18,077	3.7
Utah	298	0.8	7,944	20.0	980	2.5	107	0.3	2,415	6.1
Vermont	220	1.3	2,945	18.0	403	2.5	145	0.9	802	4.9
Virginia	2,079	1.5	32,770	23.0	3,509	2.5	2,440	1.7	9,361	6.6
Washington	1,298	1.4	[1]19,998	21.6	2,602	2.8	1,082	1.2	6,286	6.8
West Virginia	355	0.9	9,453	24.6	1,071	2.8	322	0.8	2,217	5.8
Wisconsin	1,458	1.4	[1]20,578	19.8	2,457	2.4	876	0.8	6,965	6.7
Wyoming	136	1.0	3,510	25.8	355	2.6	111	0.8	879	6.5
Outlying Areas and DOD Dependents Schools										
DOD Dependents Schools	152	2.0	236	3.1	295	3.9	84	1.1	783	10.3
American Samoa	7	0.5	357	24.4	68	4.6	33	2.3	110	7.5
Guam	27	0.8	741	22.0	40	1.2	13	0.4	261	7.8
Northern Marianas	2	0.2	172	16.8	28	2.7	15	1.5	144	14.1
Puerto Rico	900	1.3	21,158	30.3	1,335	1.9	674	1.0	4,848	7.0
Virgin Islands	44	1.4	711	22.1	88	2.7	71	2.2	253	7.9

— Data missing or not applicable.

[1]Data imputed based on current-year (fall 1997) data.

[2]Data disaggregated from reported total.

NOTE: All staff counts are full-time-equivalency (FTE) counts.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "State Nonfiscal Survey," 1997–98.

Table 4.—Number of public school graduates, 12th-grade student membership, and 9th-grade student membership 3 years earlier, by state: School year 1996–97

State	Regular high school graduates 1996–97	Other diploma recipients 1996–97	12th-grade membership 1996–97	9th-grade membership 1993–94	High school equivalency recipients 1996–97*	Other high school completers 1996–97
United States	2,341,468	57,264	2,586,448	3,486,958	128,148	28,877
Alabama	35,611	—	42,510	62,141	2,839	3,605
Alaska	6,133	—	7,370	9,608	990	42
Arizona	34,082	—	42,041	54,878	—	113
Arkansas	25,146	—	27,613	36,045	4,243	253
California	269,071	42,747	298,669	406,551	5,378	—
Colorado	34,231	—	37,179	47,344	—	553
Connecticut	27,009	20	28,882	36,481	1,412	—
Delaware	5,623	330	6,447	8,930	197	58
District of Columbia	2,853	—	3,042	5,003	827	—
Florida	92,430	2,652	105,469	164,978	17,401	3,167
Georgia	57,284	1,712	65,527	107,625	0	2,008
Hawaii	8,895	34	10,466	14,219	—	812
Idaho	15,380	27	17,075	19,537	227	32
Illinois	110,170	—	123,783	143,950	—	—
Indiana	57,477	0	62,923	81,632	1,596	440
Iowa	32,735	251	35,650	38,637	2,703	83
Kansas	26,648	—	29,244	35,955	—	—
Kentucky	36,941	—	38,460	54,502	—	—
Louisiana	36,495	—	41,759	66,376	3,443	918
Maine	11,827	192	12,851	16,630	327	8
Maryland	42,856	—	44,232	60,213	—	509
Massachusetts	49,008	—	52,569	64,643	—	—
Michigan	87,457	2,238	95,028	126,933	825	533
Minnesota*	48,193	—	60,413	62,353	6,535	—
Mississippi	23,388	0	25,711	41,660	—	2,069
Missouri	50,354	—	54,488	71,288	4,878	—
Montana	10,322	—	11,018	12,737	1,367	—
Nebraska	18,601	35	19,786	22,627	453	94
Nevada	11,299	1,126	15,316	17,014	3,931	222
New Hampshire	9,581	—	11,158	14,039	1,616	—
New Jersey	70,028	—	67,460	81,629	—	—
New Mexico	15,700	—	17,073	27,115	2,397	217
New York	137,176	3,685	146,738	225,243	—	280
North Carolina	57,886	—	61,593	94,369	6,420	1,439
North Dakota	8,025	—	8,686	9,230	481	—
Ohio	105,424	—	117,161	151,241	6,325	0
Oklahoma	35,948	—	36,113	46,597	11,364	0
Oregon	27,720	0	34,794	41,129	4,359	3,636
Pennsylvania	108,817	—	114,183	143,719	7,981	—
Rhode Island	7,840	10	8,428	11,060	680	8
South Carolina	30,829	—	35,546	58,795	2,160	2,071
South Dakota	9,126	121	9,552	11,276	—	19
Tennessee	39,866	—	50,332	71,363	5,772	3,667
Texas	181,794	—	195,075	308,461	3,282	—
Utah	29,007	1,746	34,795	37,270	1,750	279
Vermont	6,096	85	6,622	7,515	0	41
Virginia	60,587	—	64,497	80,277	—	1,671
Washington	51,484	125	62,235	72,322	4,691	—
West Virginia	19,502	71	21,215	26,196	1,697	0
Wisconsin	55,189	—	60,542	69,407	7,601	—
Wyoming	6,324	57	7,129	8,215	—	30
Outlying Areas and DOD Dependents Schools						
DOD Dependents Schools	2,731	—	2,860	—	—	0
American Samoa	710	0	739	907	10	7
Guam	1,103	—	1,258	2,964	0	—
Northern Marianas	309	0	363	480	—	0
Puerto Rico	29,692	14,695	32,361	46,689	11,768	—
Virgin Islands	937	139	1,063	1,801	102	—

— Data missing or not applicable.

*Includes recipients age 19 or younger, except in Minnesota where they are age 20 or younger.

NOTE: National totals for some items may be undercounts due to missing data in some states. Regular high school graduates may include students not included in 12th-grade membership.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "State Nonfiscal Survey," 1993–94 and 1996–97.

Early Estimates of Public Elementary and Secondary Education Statistics: School Year 1998–99

Lena M. McDowell

This article was originally published as an Early Estimates report. The universe data are from the NCES Common Core of Data (CCD). Technical notes and definitions from the original report have been omitted.

The Early Estimates System

The early estimates system is designed to allow the National Center for Education Statistics (NCES) to publish selected key statistics during the school year in which they are reported. The source of universe statistical information about public elementary and secondary education is the Common Core of Data (CCD)—data collected annually by NCES from state education agencies. The estimates included in this report were reported in December 1998 for the 1998–99 school year.*

In early October 1998, survey forms were sent out to each state education agency. States were asked to complete the form and return it by mail or facsimile (fax). Those states that had not responded by mid-November were contacted by telephone. All data were checked for reasonableness against prior years' reports, and follow-up calls were made to resolve any questions. When states did not supply a data item, NCES estimated a value. These values are footnoted. If one or more states required an estimated number, then the national total for that item is marked as estimated. Any early estimate that indicated a change of greater than 10 percentage points more or less than the national growth rate was replaced with an adjusted early estimate.

Forty-five states and four of the outlying areas participated in the 1998–99 public school Early Estimates Survey. The estimates reported here were provided by state education agencies and represent the best information on public elementary and secondary schools available to states at this stage of the school year. They are, however, subject to revision. All estimates for the five nonreporting states, the District of Columbia, and one outlying area were calculated by NCES. (New Jersey, Ohio, Virginia, and Puerto Rico did not return the survey. Arizona, District of Columbia, and Missouri survey forms were received after the cut-off date.) NCES also estimated missing data items for a number of reporting states.

The tables in this publication include three kinds of data for the different years. "Reported" data are previously published figures. "Preliminary" data have not been published previously by NCES; for these, data collection is complete, and processing and data adjustments are through all but the final stage of review. "Estimated" data are those for the current (1998–99) school year.

Estimated data for the current school year are of three types: estimates derived by the states for NCES (most of the data are of this type); preliminary actual counts reported by individual states; and estimated values developed by NCES using a combination of state-specific and national data.

Highlights

The estimates in this publication are key statistics reported during the 1998–99 school year. They include the number of students in membership, teachers, and high school graduates for public elementary and secondary schools, and total revenues and expenditures for the operation of public elementary and secondary schools. Highlights of these statistics include the following:

- There were approximately 46.3 million students in the nation's public elementary and secondary schools in fall 1998, compared with 46.1 million in fall 1997. Student membership has increased by 2.2 million since fall 1994 (table 1).
- Public school students were taught by an estimated 2.8 million teachers in school year 1998–99 (table 2).
- The student membership and teacher count data yield a pupil-to-teacher ratio of 16.6 for grade levels prekindergarten through 12 for public schools in school year 1998–99 (table 7).
- An estimated 2.4 million public school students graduated from high school in the 1997–98 school year. In the 1998–99 school year, 2.5 million students are expected to graduate from high school (table 3).

*For other CCD surveys, in contrast, most nonfiscal data for school year 1998–99 are reported to NCES from March 1999 through September 1999, after which they undergo NCES and state editing and are adjusted for missing data. High school graduate and fiscal data are reported a year later than student and teacher data.

- Revenues for public elementary and secondary education in fiscal year 1998 are estimated to be $321.1 billion (table 4), and they are expected to rise to approximately $342.1 billion in FY 1999. The per-pupil expenditure for public education is anticipated to be $6,407 per student in membership for the 1998–99 school year (table 7).

Data source: The NCES Common Core of Data, 1998–99 Early Estimates Survey.

For technical information, see the complete report:

McDowell, L.M. (1999). *Early Estimates of Public Elementary and Secondary Education Statistics: School Year 1998–99* (NCES 1999–347).

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To obtain the complete report (NCES 1999–347), call the toll-free ED Pubs number (877–433–7827) or visit the NCES Web Site *(http://nces.ed.gov)*.

Table 1.—Membership in public elementary and secondary schools, by state, for grades prekindergarten through 12: Fall 1994 to fall 1998

State	Reported fall 1994	Reported fall 1995	Reported fall 1996	Preliminary fall 1997	Estimated fall 1998
United States	[2]44,111,482	[2]44,840,481	[2]45,592,213	[2]46,127,186	[1]46,349,803
Alabama	[2]736,531	[2]746,149	[2]748,156	[2]749,187	758,816
Alaska	127,057	127,618	129,919	132,123	134,374
Arizona	737,424	743,566	799,250	814,113	[1]829,252
Arkansas	447,565	453,257	457,349	456,497	[1]455,647
California	[2]5,407,475	[2]5,536,406	[2]5,687,901	[2]5,803,734	5,828,938
Colorado	640,521	656,279	673,438	687,167	[3]699,135
Connecticut	506,824	517,935	527,129	535,164	544,690
Delaware	106,813	108,461	110,549	111,960	113,167
District of Columbia	80,450	79,802	78,648	77,111	[3]71,889
Florida	2,111,188	2,176,222	2,242,212	2,294,077	[3]2,335,124
Georgia	1,270,948	1,311,126	1,346,761	1,375,980	1,401,291
Hawaii	183,795	187,180	187,653	189,887	[3]187,395
Idaho	240,448	243,097	245,252	244,403	245,100
Illinois	1,916,172	1,943,623	1,973,040	1,998,289	2,022,108
Indiana	969,022	977,263	983,415	987,483	989,134
Iowa	500,440	502,343	502,941	501,054	502,571
Kansas	460,838	463,008	466,293	468,687	469,850
Kentucky	657,642	659,821	656,089	669,322	646,092
Louisiana	797,933	797,366	793,296	776,813	753,722
Maine	212,601	213,569	213,593	212,526	[3]219,741
Maryland	790,938	805,544	818,583	830,744	837,250
Massachusetts	893,727	915,007	933,898	949,006	[1]964,358
Michigan	1,614,784	1,641,456	1,684,386	[2]1,702,672	1,692,700
Minnesota	821,693	835,166	847,204	853,621	857,900
Mississippi	505,962	506,272	503,967	504,792	502,382
Missouri	878,541	889,881	900,042	910,654	[1]921,391
Montana	164,341	165,547	164,627	162,335	161,023
Nebraska	287,100	289,744	291,967	292,681	291,010
Nevada	250,747	265,041	282,131	296,621	[3]311,063
New Hampshire	189,319	194,171	198,308	201,629	[3]194,512
New Jersey	1,174,206	1,197,381	[1]1,208,179	1,250,276	[1]1,293,840
New Mexico	327,248	329,640	332,632	331,673	[3]328,753
New York	2,766,208	2,813,230	2,843,131	2,861,823	2,852,000
North Carolina	1,156,767	1,183,090	1,210,108	1,236,083	[3]1,245,608
North Dakota	119,288	119,100	120,123	118,572	[3]113,929
Ohio	1,814,290	1,836,015	1,844,389	1,847,035	[1]1,849,685
Oklahoma	609,718	616,393	620,695	623,673	626,674
Oregon	521,945	527,914	537,854	541,346	[3]543,176
Pennsylvania	1,764,946	1,787,533	1,804,256	1,815,151	1,818,090
Rhode Island	147,487	149,799	151,324	153,321	154,485
South Carolina	[2]648,725	[2]645,586	[2]653,011	[2]659,256	644,150
South Dakota	143,482	144,685	143,331	142,443	[1]141,561
Tennessee	[2]881,425	[2]893,770	[2]905,089	[2]893,020	908,885
Texas	3,677,171	3,748,167	3,828,975	3,891,877	3,900,488
Utah	474,675	477,121	481,812	482,957	477,061
Vermont	104,533	105,565	106,341	105,984	105,442
Virginia	1,060,809	1,079,854	1,096,093	1,110,815	[1]1,125,735
Washington	938,314	956,572	974,504	991,235	[3]999,628
West Virginia	310,511	307,112	304,052	301,419	296,332
Wisconsin	860,581	870,175	879,259	881,780	888,245
Wyoming	100,314	99,859	99,058	97,115	[3]94,411
Outlying areas					
American Samoa	14,445	14,576	14,766	15,214	[3]15,666
Guam	32,185	32,960	33,393	32,444	[3]32,821
Northern Marianas	8,429	8,809	9,041	9,246	[3]9,498
Puerto Rico	621,121	627,620	618,861	617,322	[1]615,787
Virgin Islands	23,126	22,737	22,385	22,136	21,983

[1]Data imputed by NCES based on previous year's data.

[2]Data include an imputation by NCES for prekindergarten students, based on current-year data.

[3]Actual count reported by state.

NOTE: All fall 1998 data are state estimates, except where noted. Estimates are as of December 1998. School year 1996–97 data are imputed for New Jersey.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "Early Estimates Survey," 1998–99, and "Public School Universe Survey," 1994–95 through 1996–97.

Table 2.—Number of teachers in public elementary and secondary schools, by state, for grades prekindergarten through 12: School years 1994–95 to 1998–99

State	Reported 1994–95	Reported 1995–96	Reported 1996–97	Preliminary 1997–98	Estimated 1998–99[4]
United States	[2]2,551,875	[2]2,598,220	[2]2,666,034	[2]2,744,466	[1]2,787,154
Alabama	[2]42,791	44,056	[2]45,040	[2]45,973	46,196
Alaska	7,205	7,379	7,418	7,625	7,858
Arizona	38,132	38,017	40,521	41,129	[1]42,032
Arkansas	26,181	26,449	[2]26,680	[2]26,932	[1]26,971
California	[2]225,016	[2]230,849	[2]248,857	[2]268,581	[1]270,639
Colorado	34,894	35,388	36,398	37,840	38,975
Connecticut	35,316	36,070	36,551	37,658	40,754
Delaware	6,416	6,463	6,642	6,850	6,701
District of Columbia	6,110	5,305	5,288	[2]4,399	[1]4,115
Florida	110,674	114,938	120,471	124,473	[3]128,791
Georgia	77,914	79,480	79,091	85,005	87,555
Hawaii	10,240	10,500	10,576	10,653	10,550
Idaho	12,582	12,784	13,078	13,207	14,100
Illinois	110,830	113,538	116,274	118,734	122,775
Indiana	55,496	55,821	56,708	57,371	57,927
Iowa	31,726	32,318	32,593	32,717	33,686
Kansas	30,579	30,729	30,875	31,527	31,493
Kentucky	38,784	39,120	39,331	40,488	40,381
Louisiana	47,599	46,980	47,334	48,599	48,928
Maine	15,404	15,392	15,551	15,700	16,877
Maryland	46,565	47,819	47,943	48,318	49,490
Massachusetts	60,489	62,710	64,574	67,170	[1]68,482
Michigan	80,522	83,179	88,051	90,529	90,200
Minnesota	46,958	46,971	48,245	51,998	52,700
Mississippi	28,866	28,997	29,293	29,441	29,840
Missouri	56,606	57,951	59,436	60,869	[1]61,790
Montana	10,079	10,076	10,268	10,228	10,200
Nebraska	19,774	20,028	20,174	20,139	[2]20,237
Nevada	13,414	13,878	14,805	16,053	16,835
New Hampshire	12,109	12,346	12,692	12,931	12,469
New Jersey	85,258	86,706	[1]88,903	89,671	[1]93,102
New Mexico	19,025	19,398	19,971	19,647	19,786
New York	182,273	181,559	185,104	190,874	201,000
North Carolina	71,592	73,201	75,239	77,785	77,486
North Dakota	7,796	7,501	7,892	8,070	[3]7,840
Ohio	109,085	107,347	108,602	110,757	[1]111,283
Oklahoma	39,406	39,364	39,491	40,188	40,943
Oregon	26,208	26,680	26,757	26,935	[3]27,289
Pennsylvania	102,988	104,921	106,432	108,014	108,350
Rhode Island	10,066	10,482	10,656	10,598	10,704
South Carolina	39,437	39,922	41,463	42,336	42,120
South Dakota	9,985	9,641	9,625	9,282	9,275
Tennessee	47,406	53,403	54,790	54,142	53,119
Texas	234,213	240,371	247,650	254,557	254,811
Utah	19,524	20,039	19,734	21,115	21,000
Vermont	7,566	7,676	7,751	7,909	8,069
Virginia	[2]72,505	[2]74,731	[2]74,523	[2]75,524	[1]76,791
Washington	46,439	46,907	48,307	49,074	49,316
West Virginia	21,024	21,073	20,888	20,947	20,856
Wisconsin	54,054	55,033	54,769	57,227	[1]57,837
Wyoming	6,754	6,734	6,729	6,677	6,630
Outlying areas					
American Samoa	698	728	734	762	[1]787
Guam	1,826	1,802	1,552	1,363	[3]1,383
Northern Marianas	406	422	441	483	[3]496
Puerto Rico	39,933	39,328	39,743	38,953	[1]38,985
Virgin Islands	1,528	1,622	1,580	1,559	1,556

[1]Data imputed by NCES based on previous year's data.

[2]Data include an imputation by NCES for prekindergarten teachers based on current-year data, except in the District of Columbia, where total teacher count for school year 1997–98 was imputed.

[3]Actual count reported by state.

[4]For Wisconsin and American Samoa, the school year 1998–99 values originally published in this report have been replaced by imputed values.

NOTE: All school year 1998–99 data are state estimates, except where noted. Estimates are as of December 1998. School year 1996–97 data are imputed for New Jersey.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "Early Estimates Survey," 1998–99, and "Public School Universe Survey," 1994–95 through 1996–97.

Table 3.—Number of public high school graduates, by state: School years 1994–95 to 1998–99

State	Reported 1994–95	Reported 1995–96	Preliminary 1996–97	Estimated 1997–98	Estimated 1998–99
United States	2,273,541	[1]2,281,317	2,341,468	[1]2,430,664	[1]2,500,312
Alabama	36,268	35,043	35,611	[2]38,018	35,820
Alaska	5,765	5,945	6,133	6,416	6,450
Arizona	30,989	30,008	34,082	[1]35,620	[1]36,556
Arkansas	24,636	25,094	25,146	[1]25,753	[1]25,898
California	255,200	259,071	269,071	269,071	297,533
Colorado	32,409	32,608	34,231	[2]35,794	37,390
Connecticut	26,445	26,319	27,009	29,889	33,382
Delaware	5,234	5,609	5,623	[2]6,107	6,701
District of Columbia	2,974	2,696	2,853	[2]2,777	[1]2,608
Florida	89,827	89,242	92,430	[2]95,514	100,806
Georgia	56,660	56,271	57,284	63,717	65,343
Hawaii	9,407	9,387	8,895	[1]9,235	9,989
Idaho	14,198	14,667	15,380	[2]15,512	15,600
Illinois	105,164	110,486	110,170	114,885	116,145
Indiana	56,058	56,368	57,477	59,268	58,837
Iowa	31,268	31,689	32,735	33,712	34,718
Kansas	26,125	25,786	26,648	28,214	28,996
Kentucky	37,626	36,641	36,941	38,696	38,077
Louisiana	36,480	36,467	36,495	38,030	[1]37,178
Maine	11,501	11,795	11,827	[2]12,610	12,700
Maryland	41,387	41,785	42,856	[2]45,033	46,750
Massachusetts	47,679	47,993	49,008	[1]51,098	[1]52,316
Michigan	84,628	85,530	87,457	92,000	95,500
Minnesota	49,354	50,481	48,193	[2]54,721	56,950
Mississippi	23,837	23,032	23,388	24,477	22,828
Missouri	48,862	48,870	50,354	[1]52,275	[1]53,289
Montana	10,134	10,139	10,322	10,609	10,859
Nebraska	17,969	18,014	18,601	19,672	[1]19,707
Nevada	10,038	10,374	11,299	[2]11,975	11,373
New Hampshire	10,145	10,094	9,581	9,736	9,775
New Jersey	67,403	[1]67,516	70,028	[1]74,355	[1]77,526
New Mexico	14,928	15,402	15,700	[2]16,529	16,921
New York	132,401	135,569	137,176	139,500	140,900
North Carolina	59,540	57,014	57,886	[2]59,049	60,586
North Dakota	7,817	8,027	8,025	[2]8,585	8,242
Ohio	109,418	103,435	105,424	[1]108,325	[1]109,297
Oklahoma	33,319	33,060	35,948	33,577	33,577
Oregon	26,713	26,570	27,720	[2]27,820	27,529
Pennsylvania	104,146	105,981	108,817	112,260	113,230
Rhode Island	7,826	7,689	7,840	8,075	7,161
South Carolina	30,680	30,313	30,829	33,500	34,100
South Dakota	8,355	8,532	9,126	9,484	9,496
Tennessee	43,556	43,792	39,866	[2]43,533	47,540
Texas	170,322	171,844	181,794	186,212	191,942
Utah	27,670	26,293	29,007	[2]31,416	32,000
Vermont	5,871	5,870	6,096	[2]6,096	6,334
Virginia	58,260	58,166	60,587	[1]63,000	[1]64,327
Washington	49,294	49,862	51,484	54,568	55,492
West Virginia	20,131	20,335	19,502	[2]20,127	19,742
Wisconsin	51,735	52,651	55,189	57,878	57,982
Wyoming	5,889	5,892	6,324	[2]6,341	6,314
Outlying areas					
American Samoa	695	719	710	[2]674	745
Guam	987	987	1,103	[2]1,165	1,196
Northern Marianas	319	325	309	[2]374	[1]336
Puerto Rico	29,747	29,499	26,692	[1]30,390	[1]30,542
Virgin Islands	995	713	937	[2]1,069	[1]951

[1]Data imputed by NCES based on previous year's data.

[2]Actual count reported by state.

NOTE: All school year 1997–98 and 1998–99 data are state estimates, except where noted. Estimates are as of December 1998. School year 1995–96 data are imputed for New Jersey.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "Early Estimates Survey," 1998–99, and "Agency Universe Survey," 1995–96 through 1997–98.

Table 4.—Revenues for public elementary and secondary education, by state, for grades prekindergarten through 12: Fiscal years 1995 to 1999 (School years 1994–95 to 1998–99)

(In thousands of dollars)

State	Reported FY 95	Reported FY 96	Preliminary FY 97	Estimated FY 98	Estimated FY 99
United States	[2] $273,149,449	[2] $287,702,846	[1] $305,045,833	[1] $321,088,672	[1] $342,122,322
Alabama	3,541,876	3,771,940	3,955,039	[1] 4,118,889	[1] 4,440,327
Alaska	1,207,000	1,183,127	1,219,017	1,255,588	1,293,255
Arizona	3,783,285	4,151,421	4,400,591	[1] 4,661,699	[1] 5,053,997
Arkansas	2,175,109	2,204,845	2,371,834	[1] 2,462,099	[1] 2,615,679
California	28,891,301	30,858,564	34,477,895	36,891,347	41,133,852
Colorado	3,679,162	3,804,992	4,045,015	4,287,716	4,557,893
Connecticut	[2] 4,431,603	[2] 4,786,247	[2] 4,899,851	5,101,000	5,568,000
Delaware	745,036	822,226	878,326	983,075	978,302
District of Columbia	701,300	675,409	711,504	[1] 725,500	[1] 719,900
Florida	12,805,853	13,214,948	13,861,434	[1] 14,749,274	[1] 15,979,428
Georgia	6,965,472	7,627,823	8,129,250	[1] 8,637,802	10,056,281
Hawaii	1,177,915	1,201,888	1,215,924	1,234,163	1,252,676
Idaho	1,088,596	1,179,927	1,245,135	1,421,900	1,547,300
Illinois	12,016,320	12,290,140	13,161,954	13,556,813	13,963,518
Indiana	6,362,528	6,191,534	7,638,406	[1] 7,976,763	[1] 8,504,345
Iowa	2,881,176	3,033,687	3,167,763	3,310,313	3,449,346
Kansas	2,883,345	2,948,036	3,040,600	3,131,818	3,225,772
Kentucky	3,240,926	3,492,890	3,794,129	4,047,188	4,181,790
Louisiana	[2] 3,837,863	[2] 3,934,998	[2] 4,154,494	4,442,982	4,618,036
Maine	1,400,439	1,451,987	1,499,504	1,551,986	1,614,066
Maryland	5,559,604	5,695,850	6,042,059	6,065,605	6,600,598
Massachusetts	6,549,468	6,772,855	7,229,486	7,433,136	7,825,606
Michigan	11,925,311	12,698,697	13,437,615	13,664,711	13,895,645
Minnesota	5,606,567	5,939,765	6,109,916	6,397,456	6,718,852
Mississippi	2,099,795	2,225,798	2,259,053	[2] 2,344,478	2,461,702
Missouri	4,891,384	5,263,003	5,571,655	[1] 5,862,813	[1] 6,313,720
Montana	915,392	941,538	991,653	1,041,000	1,051,000
Nebraska	1,797,785	1,876,494	1,954,789	2,017,343	2,109,535
Nevada	1,370,529	1,554,888	1,705,232	1,836,068	1,968,173
New Hampshire	1,149,673	1,217,104	1,282,509	1,407,523	1,472,322
New Jersey	11,485,382	11,882,657	12,376,750	[1] 13,320,251	[1] 14,671,538
New Mexico	1,695,358	1,783,804	1,829,725	[2] 1,903,795	2,067,234
New York	24,889,904	25,849,431	26,564,743	27,627,333	28,732,426
North Carolina	5,940,519	6,154,971	6,515,608	6,581,368	6,976,250
North Dakota	592,329	618,322	642,984	[2] 620,268	[1] 634,337
Ohio	11,024,539	11,794,089	12,587,117	[1] 13,109,316	[1] 13,973,052
Oklahoma	2,767,709	2,856,688	3,251,302	[2] 3,251,302	3,252,928
Oregon	3,294,014	3,366,831	3,472,609	3,504,000	3,602,000
Pennsylvania	13,271,164	14,047,905	14,441,126	15,100,000	15,900,000
Rhode Island	1,091,960	1,138,171	1,193,754	1,177,483	1,244,599
South Carolina	3,450,203	3,697,232	3,889,383	4,103,299	4,234,605
South Dakota	691,685	717,005	747,324	792,065	831,957
Tennessee	3,908,306	4,142,148	4,411,971	[1] 4,527,242	[1] 4,904,222
Texas	19,678,883	21,689,792	22,372,808	25,293,846	26,897,359
Utah	1,940,247	2,066,218	2,198,285	2,228,208	2,261,631
Vermont	753,905	773,448	812,166	832,272	[1] 881,307
Virginia	[2] 6,456,381	[2] 6,826,448	[2] 7,204,511	[1] 7,593,290	[1] 8,190,548
Washington	5,976,441	6,327,993	6,642,158	[2] 6,961,604	7,254,975
West Virginia	1,940,425	1,990,094	2,082,049	2,258,080	2,330,339
Wisconsin	5,985,761	6,304,318	6,701,115	6,983,016	7,360,099
Wyoming	632,720	662,660	656,713	[2] 702,585	750,000
Outlying areas					
American Samoa	45,151	45,987	47,430	51,550	54,287
Guam	171,866	171,464	168,835	166,000	[1] 178,737
Northern Marianas	44,122	44,418	56,010	[2] 58,300	[1] 63,743
Puerto Rico	1,641,580	1,821,858	1,832,790	[1] 1,901,352	[1] 2,018,690
Virgin Islands	142,961	142,016	141,786	[2] 142,620	142,620

[1] Data imputed by NCES based on previous year's data.

[2] Data include imputations by NCES for a few specific local revenues, based on current-year data.

NOTE: All FY 1998 and FY 1999 data are state estimates, except where noted. Estimates are as of December 1998. Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "Early Estimates Survey," 1998–99, and "National Public Education Financial Survey," 1994–95 through 1996–97.

Table 5.—Current expenditures for public elementary and secondary education, by state, for grades prekindergarten through 12: Fiscal years 1995 to 1999 (School years 1994–95 to 1998–99)

(In thousands of dollars)

State	Reported FY 1995	Reported FY 1996	Preliminary FY 1997	Estimated FY 1998	Estimated FY 1999
United States	[2]$243,877,582	[2]$255,079,738	[2]$270,100,789	[1]$284,506,269	[1]$296,975,536
Alabama	3,026,287	3,240,364	3,436,406	[1]3,581,323	[1]3,631,808
Alaska	1,020,675	1,045,022	1,069,379	1,101,461	1,156,534
Arizona	3,144,540	3,327,969	3,527,473	[1]3,739,441	[1]3,813,659
Arkansas	1,873,595	1,994,748	2,074,113	2,095,350	[1]2,094,015
California	25,949,033	27,334,639	29,909,168	32,002,810	34,132,515
Colorado	3,232,976	3,360,529	3,577,211	3,792,596	4,031,530
Connecticut	[2]4,247,328	[2]4,366,123	[2]4,522,717	4,704,000	5,135,000
Delaware	694,473	726,241	788,715	[1]831,322	[1]841,316
District of Columbia	[2]666,938	[2]679,106	[2]632,952	[1]645,863	[1]602,864
Florida	11,019,735	11,480,359	12,018,676	[1]12,797,613	[1]13,042,596
Georgia	6,136,689	6,629,646	7,230,405	[1]7,688,210	[1]7,839,251
Hawaii	1,028,729	1,040,682	1,057,069	1,028,160	1,043,583
Idaho	951,350	1,019,594	1,090,597	[1]1,131,095	[1]1,135,714
Illinois	10,640,279	10,727,091	11,720,249	[1]12,353,792	14,310,325
Indiana	5,243,761	5,493,653	6,055,055	6,148,000	6,517,000
Iowa	2,622,510	2,753,425	2,885,943	3,015,810	3,142,474
Kansas	2,406,580	2,488,077	2,568,525	2,645,581	2,724,948
Kentucky	2,988,892	3,171,495	3,382,062	3,707,439	3,790,115
Louisiana	[2]3,475,926	[2]3,545,832	[2]3,747,507	4,157,705	4,294,943
Maine	1,281,706	1,313,759	1,351,500	1,405,560	1,461,782
Maryland	5,083,380	5,311,207	5,529,309	5,548,105	5,837,401
Massachusetts	6,062,303	6,435,458	6,846,610	7,252,687	7,794,463
Michigan	10,440,206	11,137,877	11,686,124	11,883,619	12,084,452
Minnesota	4,622,930	4,844,879	5,087,353	5,664,354	5,948,704
Mississippi	1,921,480	2,000,321	2,035,675	[3]2,166,255	2,274,568
Missouri	4,275,217	4,531,192	4,775,931	[1]5,029,094	[1]5,094,640
Montana	844,257	868,892	902,252	936,537	945,000
Nebraska	1,594,928	1,648,104	1,707,455	1,762,094	1,842,621
Nevada	1,186,132	1,296,629	1,434,395	1,548,132	1,670,584
New Hampshire	1,053,966	1,114,540	1,173,958	1,309,171	1,370,542
New Jersey	10,776,982	11,208,558	11,771,941	[1]12,678,379	[1]13,136,251
New Mexico	1,441,078	1,517,517	1,557,376	[3]1,645,424	1,871,386
New York	22,989,629	23,522,461	24,237,291	25,206,782	26,215,053
North Carolina	5,440,426	5,582,994	5,964,939	6,535,801	6,862,591
North Dakota	534,632	557,043	577,498	[3]604,535	627,097
Ohio	10,030,956	10,408,022	10,948,074	[1]11,410,413	[1]11,440,817
Oklahoma	2,763,721	2,804,088	2,990,044	[3]2,990,044	3,237,898
Oregon	2,948,539	3,056,801	3,184,100	3,359,000	3,453,000
Pennsylvania	11,587,027	12,374,073	12,820,704	13,400,000	14,000,000
Rhode Island	1,050,969	1,094,185	1,151,888	1,171,605	1,236,044
South Carolina	2,920,230	3,085,495	[1]3,245,853	3,477,977	3,589,272
South Dakota	612,825	610,640	627,109	689,688	698,793
Tennessee	3,540,682	3,728,486	4,145,380	[1]4,256,722	[1]4,337,666
Texas	17,572,269	18,801,462	20,167,238	[1]21,333,594	[1]21,407,057
Utah	1,618,047	1,719,782	1,822,725	1,753,968	1,780,227
Vermont	665,559	684,864	718,092	707,083	[1]704,331
Virginia	[2]5,750,318	[2]5,969,608	[2]6,343,766	[1]6,690,869	[1]6,789,065
Washington	[2]5,138,928	[2]5,367,559	[2]5,587,817	6,170,489	6,349,230
West Virginia	1,758,557	1,806,004	1,847,560	1,865,466	2,067,886
Wisconsin	5,422,264	5,670,826	5,975,122	6,281,352	6,896,925
Wyoming	577,144	581,817	591,488	[3]603,901	670,000
Outlying areas					
American Samoa	28,643	30,382	33,780	38,367	[1]39,555
Guam	161,434	158,303	156,561	161,493	165,000
Northern Marianas	45,008	44,037	53,140	[3]55,033	[1]56,603
Puerto Rico	1,501,485	1,734,033	1,796,077	[1]1,864,596	[1]1,862,243
Virgin Islands	122,094	122,286	122,188	[3]122,188	122,188

[1]Data imputed by NCES based on previous year's data.

[2]Data include imputations by NCES for food services, enterprise operations, or both.

[3]Actual amount reported by state.

NOTE: All FY 98 and FY 99 data are state estimates, except where noted. Estimates are as of December 1998. Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "Early Estimates Survey," 1998–99, and "National Public Education Financial Survey," 1994–95 through 1996–97.

Table 6.—Preliminary student membership and number of teachers, and estimates of revenues, expenditures, and pupil/teacher ratio, for public elementary and secondary schools, by state, for grades prekindergarten through 12: School year 1997–98/Fiscal year 1998

State	Preliminary		Estimated				
	Membership	Number of teachers	Revenues (in thousands)	Current expenditures (in thousands)	Pupil/ teacher ratio	Per-pupil revenue	Per-pupil expenditure
United States	46,127,186	2,744,466	$321,088,672	[1]$284,506,270	16.8	$ 6,961	$ 6,168
Alabama	[2]749,187	[2]45,973	[1]4,118,889	[1]3,581,323	16.3	5,498	4,780
Alaska	132,123	7,625	1,255,588	1,101,461	17.3	9,503	8,337
Arizona	814,113	41,129	[1]4,661,699	[1]3,739,441	19.8	5,726	4,593
Arkansas	456,497	[2]26,932	[1]2,462,099	2,095,350	16.9	5,393	4,590
California	[2]5,803,734	[2]268,581	36,891,347	32,002,810	21.6	6,356	5,514
Colorado	687,167	37,840	4,287,716	3,792,596	18.2	6,240	5,519
Connecticut	535,164	37,658	5,101,000	4,704,000	14.2	9,532	8,790
Delaware	111,960	6,850	983,075	[1]831,322	16.3	8,781	7,425
District of Columbia	77,111	[2]4,399	[1]725,500	[1]645,863	17.5	9,409	8,376
Florida	2,294,077	124,473	[1]14,749,274	[1]12,797,613	18.4	6,429	5,579
Georgia	1,375,980	85,005	[1]8,637,802	[1]7,688,210	16.2	6,278	5,587
Hawaii	189,887	10,653	1,234,163	1,028,160	17.8	6,499	5,415
Idaho	244,403	13,207	1,421,900	[1]1,131,095	18.5	5,818	4,628
Illinois	1,998,289	118,734	13,556,813	[1]12,353,792	16.8	6,784	6,182
Indiana	987,483	57,371	[1]7,976,763	6,148,000	17.2	8,078	6,226
Iowa	501,054	32,717	3,310,313	3,015,810	15.3	6,607	6,019
Kansas	468,687	31,527	3,131,818	2,645,581	14.9	6,682	5,645
Kentucky	669,322	40,488	4,047,188	3,707,439	16.5	6,047	5,539
Louisiana	776,813	48,599	4,442,982	4,157,705	16.0	5,720	5,352
Maine	212,526	15,700	1,551,986	1,405,560	13.5	7,303	6,614
Maryland	830,744	48,318	6,065,605	5,548,105	17.2	7,301	6,678
Massachusetts	949,006	67,170	7,433,136	7,252,687	14.1	7,833	7,642
Michigan	[2]1,702,672	90,529	13,664,711	11,883,619	18.8	8,025	6,979
Minnesota	853,621	51,998	6,397,456	5,664,354	16.4	7,494	6,636
Mississippi	504,792	29,441	[2]2,344,478	[3]2,166,255	17.1	4,644	4,291
Missouri	910,654	60,869	[1]5,862,813	[1]5,029,094	15.0	6,438	5,523
Montana	162,335	10,228	1,041,000	936,537	15.9	6,413	5,769
Nebraska	292,681	20,139	2,017,343	1,762,094	14.5	6,893	6,021
Nevada	296,621	16,053	1,836,068	1,548,132	18.5	6,190	5,219
New Hampshire	201,629	12,931	1,407,523	1,309,171	15.6	6,981	6,493
New Jersey	1,250,276	89,671	[1]13,320,251	[1]12,678,379	13.9	10,654	10,140
New Mexico	331,673	19,647	[2]1,903,795	[3]1,645,424	16.9	5,740	4,961
New York	2,861,823	190,874	27,627,333	25,206,782	15.0	9,654	8,808
North Carolina	1,236,083	77,785	6,581,368	6,535,801	15.9	5,324	5,288
North Dakota	118,572	8,070	[2]620,268	[3]604,535	14.7	5,231	5,098
Ohio	1,847,035	110,757	[1]13,109,316	[1]11,410,413	16.7	7,097	6,178
Oklahoma	623,673	40,188	[2]3,251,302	[3]2,990,044	15.5	5,213	4,794
Oregon	541,346	26,935	3,504,000	3,359,000	20.1	6,473	6,205
Pennsylvania	1,815,151	108,014	15,100,000	13,400,000	16.8	8,319	7,382
Rhode Island	153,321	10,598	1,177,483	1,171,605	14.5	7,680	7,642
South Carolina	[2]659,256	42,336	4,103,299	3,477,977	15.6	6,224	5,276
South Dakota	142,443	9,282	792,065	689,688	15.3	5,561	4,842
Tennessee	[2]893,020	54,142	[1]4,527,242	[1]4,256,722	16.5	5,070	4,767
Texas	3,891,877	254,557	25,293,846	[1]21,333,594	15.3	6,499	5,482
Utah	482,957	21,115	2,228,208	1,753,968	22.9	4,614	3,632
Vermont	105,984	7,909	832,272	707,083	13.4	7,853	6,672
Virginia	1,110,815	[2]75,524	[1]7,593,290	[1]6,690,869	14.7	6,836	6,023
Washington	991,235	49,074	[2]6,961,604	6,170,489	20.2	7,023	6,225
West Virginia	301,419	20,947	2,258,080	1,865,466	14.4	7,491	6,189
Wisconsin	881,780	57,227	6,983,016	6,281,352	15.4	7,919	7,123
Wyoming	97,115	6,677	[2]702,585	[3]603,901	14.5	7,235	6,218
Outlying areas							
American Samoa	15,214	762	51,550	38,367	20.0	3,388	2,522
Guam	32,444	1,363	166,000	161,493	23.8	5,117	4,978
Northern Marianas	9,246	483	[2]58,300	[3]55,033	19.1	6,305	5,952
Puerto Rico	617,322	38,953	[1]1,901,352	[1]1,864,596	15.8	3,080	3,020
Virgin Islands	22,136	1,559	[2]142,620	[3]122,188	14.2	6,443	5,520

[1]Data imputed by NCES based on previous year's data.

[2]Data imputed by NCES based on current-year data.

[3]Actual amount reported by state.

NOTE: Data for membership and teachers are preliminary. Other data are state estimates, except where noted. Details may not sum to totals due to rounding. Estimates are as of December 1998.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "Early Estimates Survey," 1998–99.

Table 7.—Estimated membership, number of teachers, revenues, expenditures, and pupil/teacher ratio, for public elementary and secondary schools, by state, for grades prekindergarten through 12: School year 1998–99/Fiscal year 1999

State	Membership	Number of teachers	Revenues (in thousands)	Current expenditures (in thousands)	Pupil/ teacher ratio	Per-pupil revenue	Per-pupil expenditure
United States	[1]46,349,803	[1]2,787,154	[1]$342,122,322	$296,975,536	16.6	$ 7,381	$ 6,407
Alabama	758,816	46,196	[1]4,440,327	[1]3,631,808	16.4	5,852	4,786
Alaska	134,374	7,858	1,293,255	1,156,534	17.1	9,624	8,607
Arizona	[1]829,252	[1]42,032	[1]5,053,997	[1]3,813,659	19.7	6,095	4,599
Arkansas	[1]455,647	[1]26,971	[1]2,615,679	[1]2,094,015	16.9	5,741	4,596
California	5,828,938	[1]270,639	41,133,852	34,132,515	21.5	7,057	5,856
Colorado	[2]699,135	38,975	4,557,893	4,031,530	17.9	6,519	5,766
Connecticut	544,690	40,754	5,568,000	5,135,000	13.4	10,222	9,427
Delaware	113,167	6,701	978,302	[1]841,316	16.9	8,645	7,434
District of Columbia	[2]71,889	[1]4,115	[1]719,900	[1]602,864	17.5	10,014	8,386
Florida	[2]2,335,124	[2]128,791	[1]15,979,428	[1]13,042,596	18.1	6,843	5,585
Georgia	1,401,291	87,555	10,056,281	[1]7,839,251	16.0	7,176	5,594
Hawaii	[2]187,395	10,550	1,252,676	1,043,583	17.8	6,685	5,569
Idaho	245,100	14,100	1,547,300	[1]1,135,714	17.4	6,313	4,634
Illinois	2,022,108	122,775	13,963,518	14,310,325	16.5	6,905	7,077
Indiana	989,134	57,927	[1]8,504,345	6,517,000	17.1	8,598	6,589
Iowa	502,571	33,686	3,449,346	3,142,474	14.9	6,863	6,253
Kansas	469,850	31,493	3,225,772	2,724,948	14.9	6,866	5,800
Kentucky	646,092	40,381	4,181,790	3,790,115	16.0	6,472	5,866
Louisiana	753,722	48,928	4,618,036	4,294,943	15.4	6,127	5,698
Maine	[2]219,741	16,877	1,614,066	1,461,782	13.0	7,345	6,652
Maryland	837,250	49,490	6,600,598	5,837,401	16.9	7,884	6,972
Massachusetts	[1]964,358	[1]68,482	7,825,606	7,794,463	14.1	8,115	8,083
Michigan	1,692,700	90,200	13,895,645	12,084,452	18.8	8,209	7,139
Minnesota	857,900	52,700	6,718,852	5,948,704	16.3	7,832	6,934
Mississippi	502,382	29,840	2,461,702	2,274,568	16.8	4,900	4,528
Missouri	[1]921,391	[1]61,790	[1]6,313,720	[1]5,094,640	14.9	6,852	5,529
Montana	161,023	10,200	1,051,000	945,000	15.8	6,527	5,869
Nebraska	291,010	[2]20,237	2,109,535	1,842,621	14.4	7,249	6,332
Nevada	[2]311,063	16,835	1,968,173	1,670,584	18.5	6,327	5,371
New Hampshire	[2]194,512	12,469	1,472,322	1,370,542	15.6	7,569	7,046
New Jersey	[1]1,293,840	[1]93,102	[1]14,671,538	[1]13,136,251	13.9	11,340	10,153
New Mexico	[2]328,753	19,786	2,067,234	1,871,386	16.6	6,288	5,692
New York	2,852,000	201,000	28,732,426	26,215,053	14.2	10,074	9,192
North Carolina	[2]1,245,608	77,486	6,976,250	6,862,591	16.1	5,601	5,509
North Dakota	[2]113,929	[2]7,840	[1]634,337	627,097	14.5	5,568	5,504
Ohio	[1]1,849,685	[1]111,283	[1]13,973,052	[1]11,440,817	16.6	7,554	6,185
Oklahoma	626,674	40,943	3,252,928	3,237,898	15.3	5,191	5,167
Oregon	[2]543,176	[2]27,289	3,602,000	3,453,000	19.9	6,631	6,357
Pennsylvania	1,818,090	108,350	15,900,000	14,000,000	16.8	8,745	7,700
Rhode Island	154,485	10,704	1,244,599	1,236,044	14.4	8,056	8,001
South Carolina	644,150	42,120	4,234,605	3,589,272	15.3	6,574	5,572
South Dakota	[1]141,561	9,275	831,957	698,793	15.3	5,877	4,936
Tennessee	908,885	53,119	[1]4,904,222	[1]4,337,666	17.1	5,396	4,773
Texas	3,900,488	254,811	26,897,359	[1]21,407,057	15.3	6,896	5,488
Utah	477,061	21,000	2,261,631	1,780,227	22.7	4,741	3,732
Vermont	105,442	8,069	[1]881,307	[1]704,331	13.1	8,358	6,680
Virginia	[1]1,125,735	[1]76,791	[1]8,190,548	[1]6,789,065	14.7	7,276	6,031
Washington	[2]999,628	49,316	7,254,975	6,349,230	20.3	7,258	6,352
West Virginia	296,332	20,856	2,330,339	2,067,886	14.2	7,864	6,978
Wisconsin	888,245	[1]57,837	7,360,099	6,896,925	15.4	8,286	7,765
Wyoming	[2]94,411	6,630	750,000	670,000	14.2	7,944	7,097
Outlying areas							
American Samoa	[2]15,666	[1]787	54,287	[1]39,555	19.9	3,465	2,525
Guam	[2]32,821	[1]1,383	[1]178,737	165,000	23.7	5,446	5,027
Northern Marianas	[2]9,498	[2]496	[1]63,743	[1]56,603	19.1	6,711	5,959
Puerto Rico	[1]615,787	[1]38,985	[1]2,018,690	[1]1,862,243	15.8	3,278	3,024
Virgin Islands	21,983	1,556	142,620	122,188	14.1	6,488	5,558

[1]Data imputed by NCES based on previous year's data.

[2]Actual count or amount reported by state.

NOTE: All data are state estimates, except where noted. Estimates are as of December 1998. Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "Early Estimates Survey," 1998–99.

Postsecondary Education

Immediate Transition

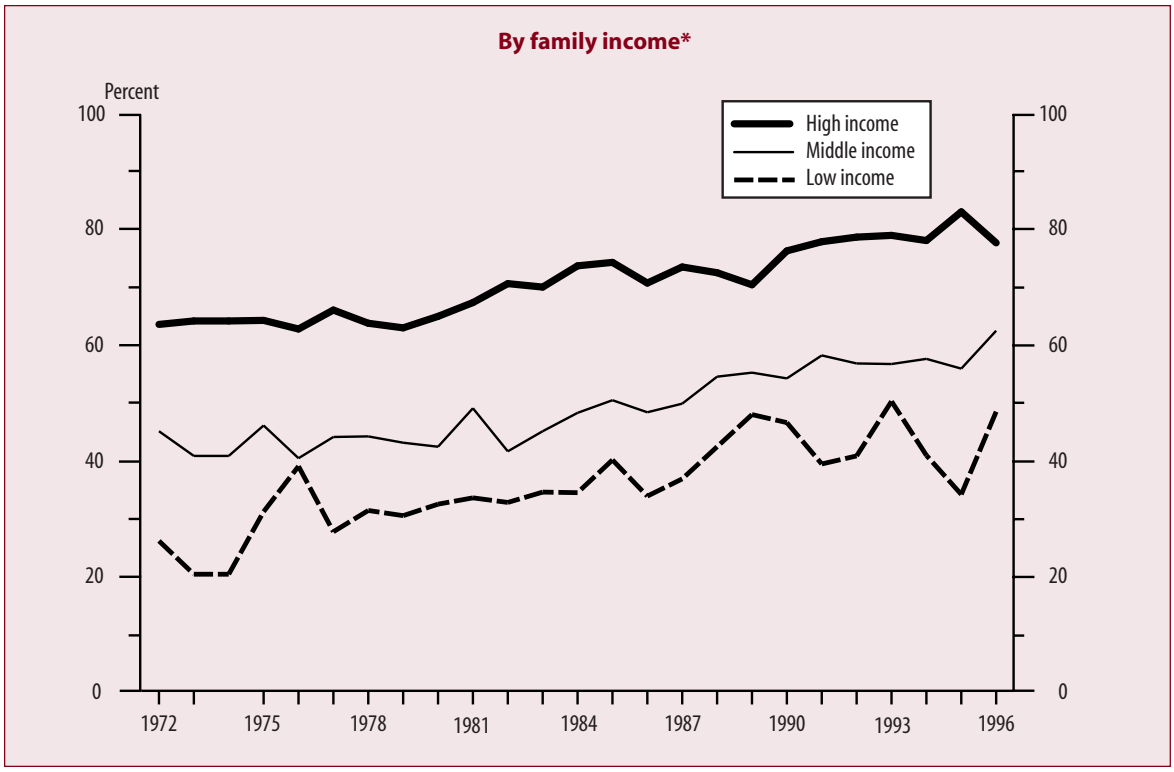
Immediate Transition From High School to College

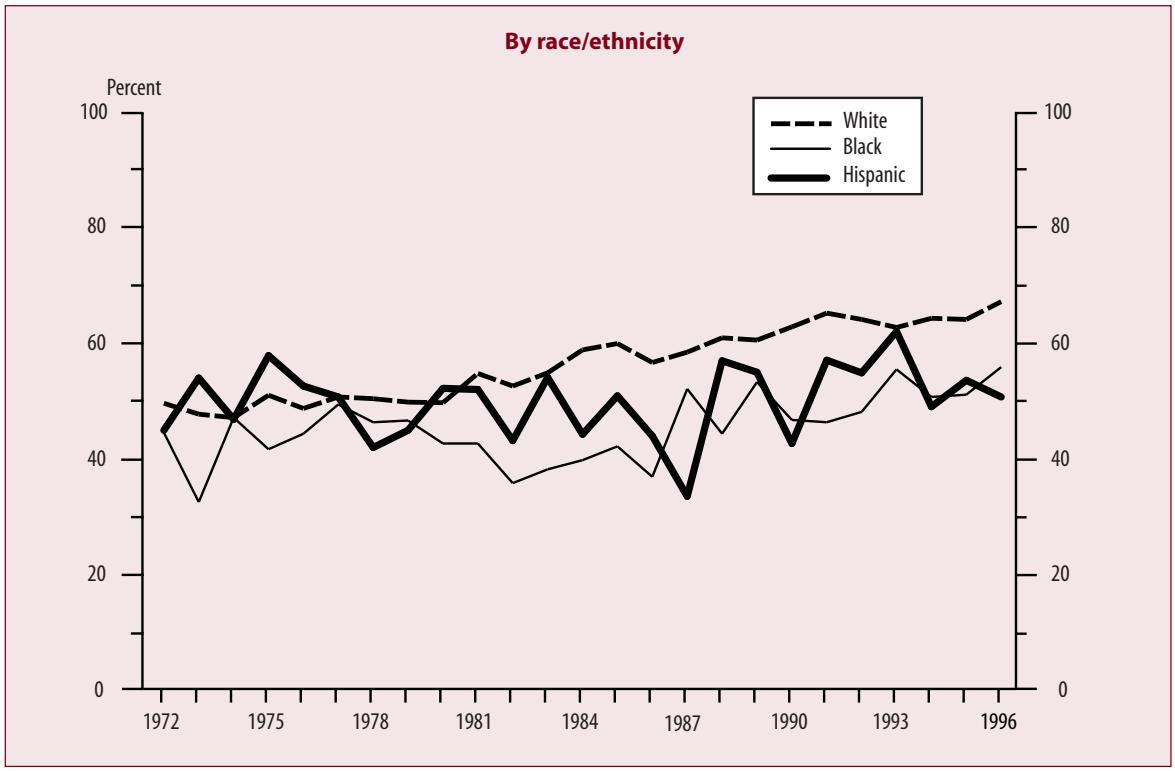
This article was originally published as an Indicator of the Month, taken from* The Condition of Education 1998. *The sample survey data are from the October Current Population Survey (CPS), conducted by the U.S. Census Bureau.

Since most college students enroll in college immediately after completing high school, the percentage of high school completers enrolled in college the October after finishing high school is an indicator of the total proportion of that year's high school completers who will ever enroll in college. The percentage enrolling not only reflects the accessibility of higher education to high school completers, but also shows the value completers place on attending college as compared to working, entering the military, starting families, or pursuing other interests.

- Between 1985 and 1996, the percentage of high school completers going directly to college increased from 58 to 65 percent.
- Between 1985 and 1996, high school completers from high-income families were more likely than their counterparts from low-income families to go directly to college after completing high school.
- Between 1990 and 1996, the higher the education level of a student's parents, the more likely the student was to enroll in college the year after completing high school.
- The percentage of black high school completers going directly to college increased substantially between 1973 and 1995.

Percentage of high school completers ages 16–24 who were enrolled in college the October after completing high school: October 1972–96





*Low income is the bottom 20 percent of all family incomes; high income is the top 20 percent of all family incomes; and middle income is the 60 percent in between. Data on family income were not available in 1974.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years).

Percentage of high school completers ages 16–24 who were enrolled in college the October after completing high school, by type of institution, family income, and race/ethnicity: October 1972–96

				Family income[1]				Race/ethnicity[2]				
				Low		Middle	High	White	Black		Hispanic	
October	Total	Type of institution: 2-year	Type of institution: 4-year	Annual	3-year average	Annual	Annual	Annual	Annual	3-year average	Annual	3-year average
1972	49.2	—	—	26.1	(3)	45.2	63.8	49.7	44.6	(3)	45.0	(3)
1973	46.6	14.9	31.7	20.3	(3)	40.9	64.4	47.8	32.5	41.4	54.1	48.7
1975	50.7	18.2	32.6	31.2	(3)	46.2	64.5	51.1	41.7	44.4	58.0	52.5
1977	50.6	17.5	33.1	27.7	32.8	44.2	66.3	50.8	49.5	46.8	50.8	48.5
1979	49.3	17.5	31.8	30.5	31.5	43.2	63.2	49.9	46.7	45.3	45.0	46.4
1981	53.9	20.5	33.5	33.6	33.0	49.2	67.6	54.9	42.7	40.4	52.1	49.2
1983	52.7	19.2	33.5	34.6	34.0	45.2	70.3	55.0	38.2	37.9	54.2	47.3
1985	57.7	19.6	38.1	40.2	36.2	50.6	74.6	60.1	42.2	39.6	51.0	46.5
1987	56.8	18.9	37.9	36.9	37.8	50.0	73.8	58.6	52.2	44.5	33.5	44.9
1989	59.6	20.7	38.9	48.1	45.8	55.4	70.7	60.7	53.4	48.2	55.1	51.6
1990	60.1	20.1	40.0	46.7	44.7	54.4	76.6	63.0	46.8	48.9	42.7	51.7
1991	62.5	24.9	37.7	39.5	42.3	58.4	78.2	65.4	46.4	47.2	57.2	51.6
1992	61.9	23.0	38.9	40.9	43.6	57.0	79.0	64.3	48.2	50.1	55.0	58.1
1993	61.5	22.4	39.1	50.4	44.1	56.9	79.3	62.9	55.6	51.5	62.2	55.4
1994	61.9	21.0	40.9	41.0	41.9	57.8	78.4	64.5	50.8	52.5	49.1	55.0
1995	61.9	21.5	40.4	34.2	41.3	56.1	83.4	64.3	51.2	52.6	53.7	51.2
1996	65.0	23.1	41.9	48.6	(3)	62.7	78.0	67.4	56.0	(3)	50.8	(3)

— Not available. Data for type of institution were not collected until 1973.

[1]Low income is the bottom 20 percent of all family incomes; high income is the top 20 percent of all family incomes; and middle income is the 60 percent in between.

[2]Included in the total but not shown separately are high school completers from other racial/ethnic groups.

[3]Due to small sample sizes for the low-income, black, and Hispanic categories, 3-year averages were also calculated for each category. For example, the 3-year average for blacks in 1973 is the average percentage of black high school completers ages 16–24 who were enrolled in college the October after completing high school in 1972, 1973, and 1974. Thus, 3-year averages cannot be calculated for 1972 and 1996, and for groups of 3 years in which some data are not available (e.g., 1973–75 for the low-income category).

NOTE: Details may not add to totals due to rounding.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years).

Data source: The U.S. Census Bureau's Current Population Survey (CPS), October (various years).

For technical information, see

Wirt, J., Snyder, T., Sable, J., Choy, S.P., Bae, Y., Stennett, J., Gruner, A., and Perie, M. (1998). *The Condition of Education 1998* (NCES 98–013).

For complete supplemental and standard error tables, see either

- the electronic version of *The Condition of Education 1998 (http://nces.ed.gov/pubs98/condition98/index.html)*, or
- volume 2 of the printed version (forthcoming): *The Condition of Education 1998 Supplemental and Standard Error Tables* (NCES 1999–025).

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College Access

College Access and Affordability

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Postsecondary education generates both individual and public benefits. College graduates with a bachelor's degree earn substantially more than those with only a high school education,[1] and attending college enriches students' lives in other ways that are long lasting and extend to the next generation (Pascarella and Terenzini 1991). Society benefits from an educated population as well. In recent years, there has been evidence that education requirements for all types of occupations are growing and that the fastest growing occupations are those that require postsecondary training.[2] Furthermore, many believe that increased participation in postsecondary education is crucial to maintaining a competitive position in the global economy.[3]

Federal and state governments encourage participation in postsecondary education and have tried to reduce price barriers so that postsecondary education is accessible. State subsidies to public institutions allow them to charge tuition that is substantially below the actual cost of education, while federal (and sometimes state) grant, loan, and work-study programs help provide financially needy students with the upfront money they need to invest in postsecondary education. Many institutions increase accessibility through their own financial aid and scholarship programs. The extent of public subsidies, the nature of the laws and regulations that determine who is eligible for financial aid, and the amount of funding provided for financial aid programs all greatly affect the affordability of postsecondary education for students from various income groups and, thus, their access to its benefits.

Reflecting the benefits of postsecondary education and the policies and programs that increase accessibility, high school completers are enrolling at record rates, and substantial numbers of older adults are enrolling as well.[4] Although interest in postsecondary education is growing, rising tuition and fees have generated considerable public concern.[5] This raises a series of important questions: to whom is postsecondary education accessible and to what extent is accessibility related to income? How much does attending postsecondary education cost students? How affordable is postsecondary education? How are students and their families coping with the price of attendance? What impact do their financing strategies have on their educational experiences? Some of the statistical evidence available to address these questions from a national perspective is summarized here.

This essay examines the extent to which the financial aid system promotes access to postsecondary education by equalizing income differences. It does not address the effects of other factors, such as low employment rates or a robust economy, on enrollment, nor does it examine the sensitivity of different income groups to price, the types of aid available, or differences in access by race/ethnicity. For information about trends of enrollment in higher education, see *The Condition of Education 1998* (Wirt et al. 1998).

Access to Postsecondary Education

Increasingly, high school students are being advised to go to college, and growing numbers are taking that advice. However, not all high school completers have the same access. Some of the characteristics associated with higher rates of enrollment are related to income, suggesting that the price of attending is a barrier. However, certain attitudes and behaviors appear to be factors as well.

Increasingly, high school students are being advised to go to college.

The proportions of high school sophomores whose teachers, counselors, and parents encouraged them to go to college increased dramatically between 1980 and 1990. High school sophomores in 1990 were twice as likely as their counterparts in 1980 to report that their teachers and guidance counselors recommended that they go to college (table 1). In 1990, more than half of even the lowest performing sophomores (those scoring in the lowest quartile on mathematics and reading tests) were advised to attend.

[1] In 1996, young adult workers ages 25–34 who had completed a bachelor's degree or higher earned substantially more than those who had only completed high school (males earned 54 percent more, and females earned 88 percent more) (Wirt et al. 1998, 104).

[2] For a review of the evidence, see Mumper (1996).

[3] See, for example, Reich (1991).

[4] In fall 1995, 37 percent of all undergraduates in institutions of higher education were 25 years or older (Snyder, Hoffman, and Geddes 1997).

[5] A national commission was established to study this problem and recently released its final report, *Straight Talk on the Cost of Higher Education* (National Commission on the Cost of Higher Education 1998).

Table 1.—Percentage of high school sophomores who reported being advised to attend college by various adults: 1980 and 1990

Recommended by	All students		Lowest test quartile*	
	1980	1990	1980	1990
Father	59	77	40	60
Mother	65	83	48	65
Guidance counselor	32	65	26	56
Teacher	32	66	28	57

*Composite mathematics, reading, and vocabulary performance.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *America's High School Sophomores: A Ten Year Comparison, 1980–1990* (NCES 93–087), p. 47.

Interest in postsecondary education among high school completers is almost universal.

Nearly all 1992 high school completers (97 percent) reported that they planned to continue their education at some time, and 71 percent expected to earn a bachelor's degree. Even among completers whose families had low incomes (less than $25,000) or whose parents had no more than a high school education, the vast majority (94 percent in each case) planned to continue their education at some time. Sixty-five percent of the 1992 high school completers enrolled in some type of postsecondary education immediately after high school. By 1994, 75 percent of this same group had enrolled (Berkner and Chavez 1997).

Enrollment in college immediately after high school has risen over the past 20 years.

The proportion of high school completers who enrolled in an institution of higher education (a 2- or 4-year college or university) immediately following high school increased from 49 to 65 percent between 1976 and 1996, with growth throughout the 20-year period (figure 1). Of the overall gain of 16 percentage points, about half of the increase (7 percentage points) was in 2-year institutions and about half (9 percentage points) was in 4-year institutions (Wirt et al. 1998, 46).

Another indicator of the interest in higher education is the percentage of young adult high school completers enrolled at any given time. This percentage reflects not only the number of high school completers who enroll immediately after high school, but also the number who delay entry but enter within the next few years, and the amount of time both groups are enrolled. Between the late 1960s and the mid-1980s, about one-third (29 to 35 percent) of high school completers ages 18–24 were enrolled in higher education in any given year. After that, the proportion enrolled increased gradually to 43 percent in 1996 (Snyder, Hoffman, and Geddes 1997).

While the enrollment rate in higher education has increased for high school completers in the aggregate, not all segments of this population participate at the same rate. Because issues of affordability are the focus in this essay, income differences are given the most attention. However, differential participation rates extend to other characteristics, and some of these are discussed as well.

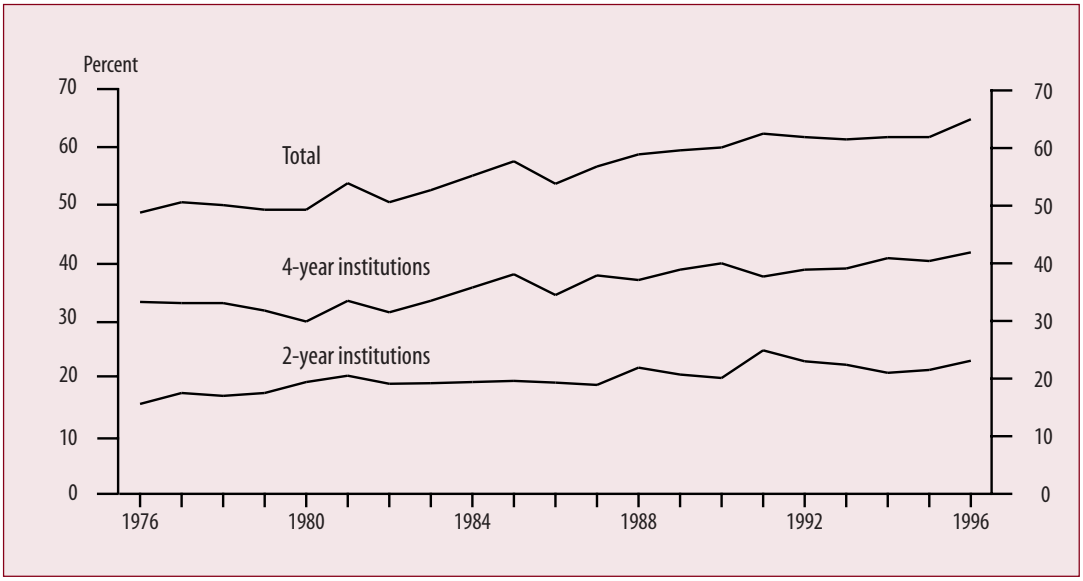
Enrollment rates increase with family income.

In 1996, high school completers from low-income families were less likely to go to a 2- or 4-year college or university immediately after high school (49 percent) than were their peers from middle-income families (63 percent), who, in turn, were less likely to enroll than completers from high-income families (78 percent) (figure 2).

Enrollment rates also increase with parents' education level.

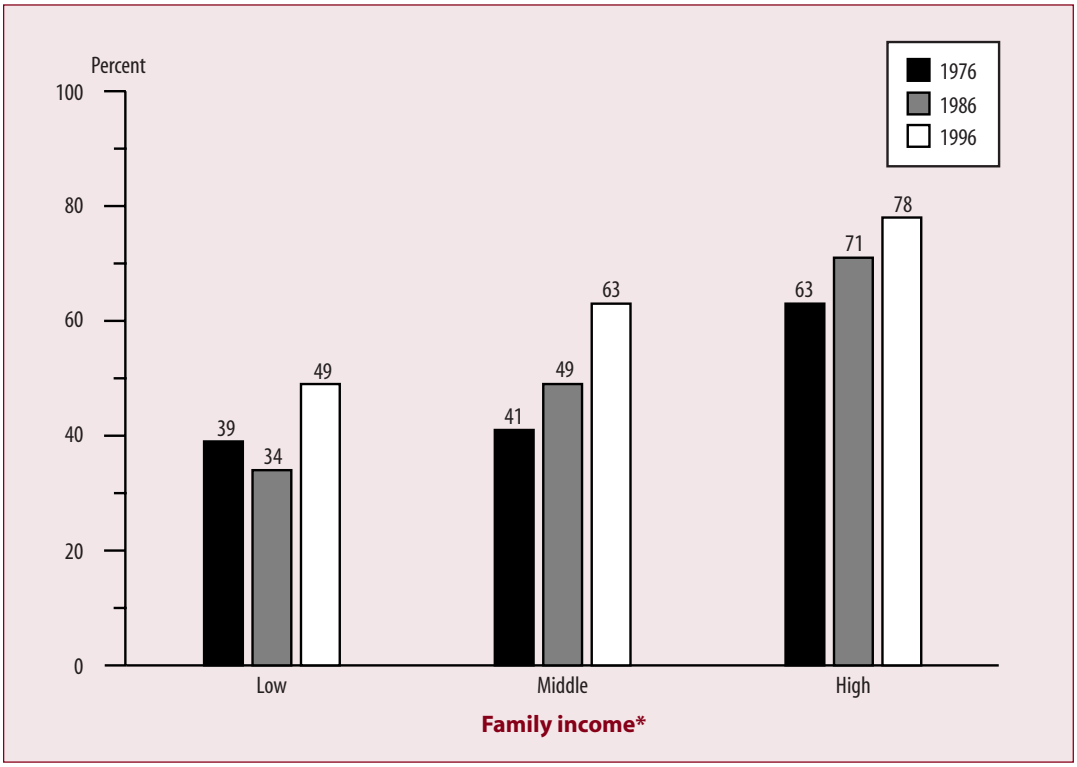
Students are much more likely to enroll in higher education immediately after high school if their parents have at least a bachelor's degree than if they have less education (Wirt et al. 1998, 46). Enrollment rates of 1996 high school completers immediately after high school ranged from 45 percent for those whose parents had less than a high school education to 85 percent for those whose parents had

Figure 1.—Percentage of high school completers who were enrolled in college the October after completing high school: 1976–96



SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years).

Figure 2.—Percentage of high school completers who were enrolled in college the October after completing high school, by family income: 1976, 1986, and 1996



*Low income is the bottom 20 percent of all families; high income is the top 20 percent; and middle income is the 60 percent in between.

SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years).

a bachelor's degree or higher (figure 3). These data provide evidence of the intergenerational effects of postsecondary education.

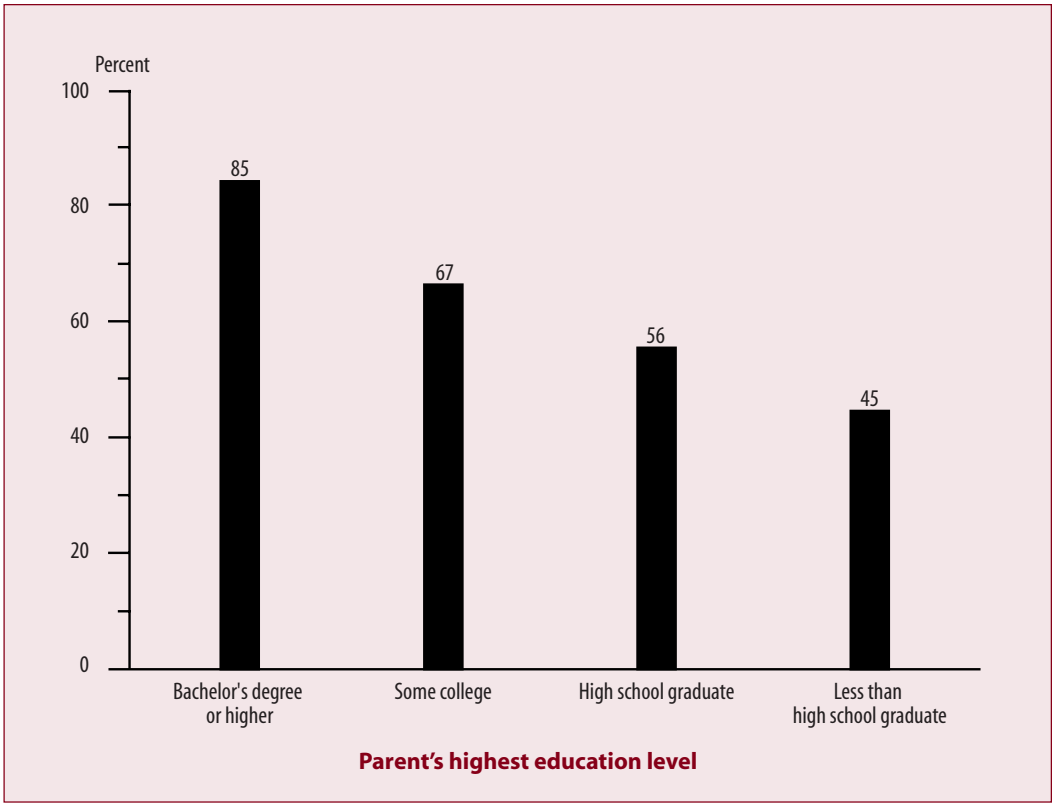
Where students enroll is related to family income.

Among financially dependent undergraduates (that is, most students under 24 years old) who enrolled in postsecondary education for the first time in 1995–96, students from families at all income levels were more likely to enroll in public 4-year institutions than they were to enroll in private, not-for-profit 4-year institutions (25 versus 15 percent) (Wirt et al. 1998, 52). Students from families with incomes of $60,000 or more were the most likely to enroll in private, not-for-profit 4-year institutions (25 percent did so, compared to 16 percent of students from families with incomes between $30,000 and $59,999 and 14 percent of students from families with incomes less than $30,000) (figure 4). Students from families with incomes of $60,000 or more were less likely than other students to enroll in public 2-year institutions (34 percent versus 47 percent of students from families with incomes between $30,000 and $59,999, and 43 percent of students from families with incomes less than $30,000).

The likelihood of being prepared to enter a 4-year institution and taking the necessary steps toward enrollment increases with income.

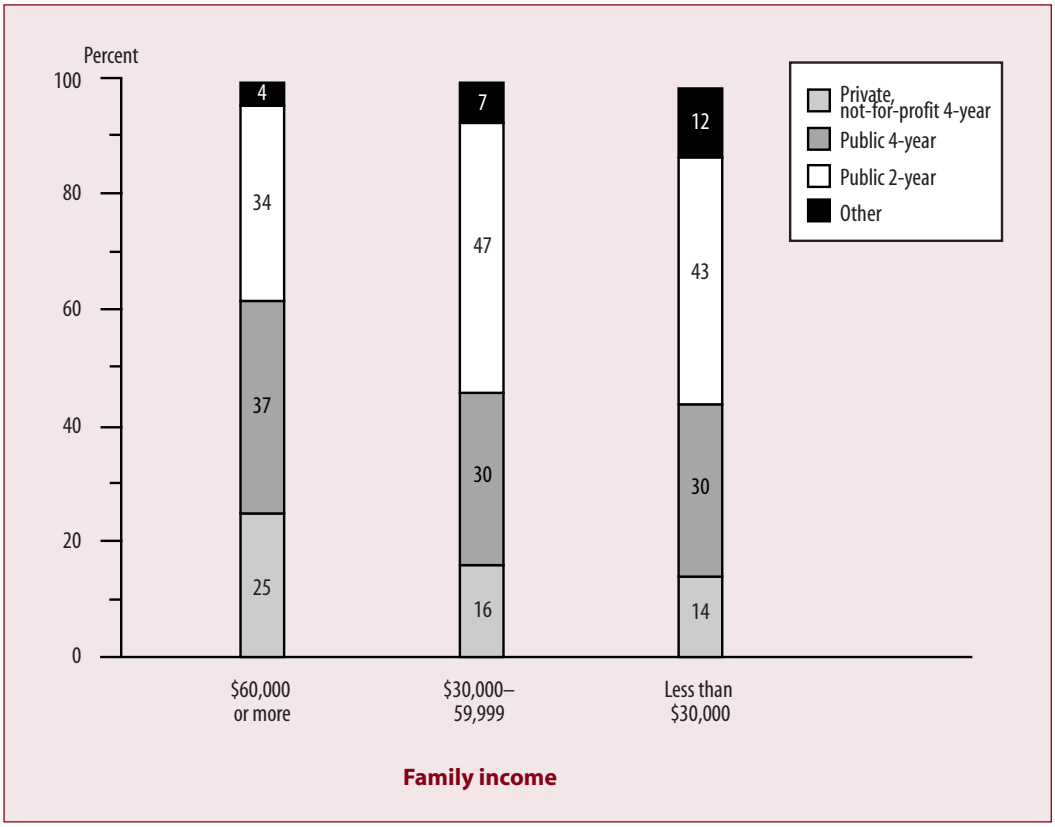
One reason that low-income high school graduates go to 4-year institutions at lower rates than graduates from higher income families is that they are less prepared academically. The likelihood of being prepared increased with income: 53 percent of 1992 low-income graduates (less than $25,000), 68 percent of middle-income graduates ($25,000–74,999), and 86 percent of high school graduates from high-income families ($75,000 or more) had sufficient academic qualifications for admission to a 4-year college (table 2). In addition, among college-qualified 1992 high school graduates, there was a positive relationship between income and each of the following attitudes and behaviors that normally precede enrolling in a 4-year institution: expecting to complete a bachelor's degree; planning to enroll at a 4-year institution; taking steps toward admission (taking an entrance examination and applying); and gaining admission.

Figure 3.—Percentage of high school completers who were enrolled in college the October after completing high school, by parent's highest education level: 1996



SOURCE: U.S. Department of Commerce, Bureau of the Census, Current Population Survey, October (various years).

Figure 4.—Percentage distribution of dependent, first-time beginning postsecondary students, by family income: 1995–96



SOURCE: U.S. Department of Education, National Center for Education Statistics, 1990 Beginning Postsecondary Students Longitudinal Study, second follow-up (1994); and 1995–96 National Postsecondary Student Aid Study.

Table 2.—Percentage of 1992 high school graduates who were college qualified* and who pursued plans to attend college, by family income

Qualifications, attitudes, and behaviors	Total	Family income		
		Low (Less than $25,000)	Middle ($25,000–74,999)	High ($75,000 or more)
College qualified*	65	53	68	86
Among college-qualified graduates:				
Expected bachelor's degree	83	74	84	96
Planned to attend 4-year college	76	69	76	91
Took steps toward admission to 4-year college	73	62	73	91
Accepted at 4-year college	69	59	69	89
Enrolled in 4-year college by 1994	62	52	62	83

*Four-year college qualification index based on high school GPA, senior class rank, National Education Longitudinal Study 1992 aptitude test, SAT and ACT scores, and curricular rigor.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988, third follow-up (1994).

Among high school graduates who have the academic qualifications and take the steps necessary for admission, low-income graduates are just as likely as middle-income graduates to enroll in a 4-year institution.

In 1992, even when low-income high school graduates not only had the academic qualifications for admission to a 4-year college but also took the necessary steps toward admission, they were less likely than high-income graduates to enroll in a 4-year institution by 1994 (83 versus 92 percent) (table 3). However, they were just as likely as middle-income students to be accepted at a 4-year institution (94 versus 93 percent) and to enroll (83 versus 82 percent).

The enrollment rates of low-SES, high-achieving high school students are lower than the enrollment rates for middle- and high-SES, high-achieving groups.

Among 1992 high school seniors in the highest achievement test quartile, students whose families were also in the highest socioeconomic status (SES) quartile were considerably more likely than those in the lowest SES quartile to attend a 4-year college within 2 years of their scheduled graduation (86 versus 58 percent) (table 4). In this sense, the access of low-SES students to 4-year colleges is less than the access of high-SES students. Among high school seniors in this same highest achievement quartile but in the lowest SES quartile, the likelihood of attending a 4-year college within 2 years of graduation increased from 48 percent in 1972 to 58 percent in 1992. Thus, the access of low-SES, high-achieving students has increased since 1972 (Smith 1997, 64).

Table 3.—Percentage of college-qualified 1992 high school graduates taking steps toward admission at a 4-year institution who were accepted, and percentage who were enrolled by 1994, by family income

Acceptance and enrollment by 1994	Total	Family income		
		Low (Less than $25,000)	Middle ($25,000–74,999)	High ($75,000 or more)
Accepted at a 4-year institution	93	94	93	98
Enrolled by 1994				
4-year institution	84	83	82	92
Any postsecondary institution	96	95	96	98

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988, third follow-up (1994).

Table 4.—Percentage of high school seniors who enrolled in a 4-year college within 2 years of scheduled graduation, by socioeconomic status: 1974, 1982, and 1994

Socioeconomic status	Highest achievement quartile		
	1972	1980	1992
Total	70	74	77
Low quartile	48	54	58
Middle quartiles	61	69	69
High quartile	85	85	86

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Longitudinal Study of the High School Class of 1972, first follow-up (1974); High School and Beyond Study, Senior Cohort, third follow-up (1986); and National Education Longitudinal Study of 1988, second follow-up (1992) and third follow-up (1994).

The Price of Attending a Postsecondary Institution

The price of attending a postsecondary institution is of great concern to most students and their families. The amounts they have to pay affect students' initial access to postsecondary education and also their ability to remain enrolled long enough to complete a degree or certificate. The public is extremely anxious about rising prices, and many parents worry that college will be beyond their children's reach (National Commission on the Cost of Higher Education 1998). In reality, however, students have a range of options with widely varying price tags.

The price of attending a higher education institution varies greatly depending on the type of institution.

Financially dependent undergraduates who attended a postsecondary institution full time for the full year in 1995–96 paid average tuition and fees that ranged from $1,300 if they attended a public 2-year institution, to $3,900 at a public 4-year institution, to $13,300 at a private, not-for-profit 4-year institution (table 5). Although the price to students and their families (including living expenses as well as tuition and fees) averaged $20,000 for those who attended a private, not-for-profit 4-year institution, the average total price was about half that ($10,800) for those attending a public 4-year institution and even less ($6,800) for those attending a public 2-year institution.

The amount of tuition and fees included in these prices varies widely, even among 4-year institutions. Although a small proportion (7 percent) of undergraduates (dependent and independent) who attended 4-year institutions full time, full year paid more than $18,000 in tuition and fees in 1995–96, about half (49 percent) paid less than $4,000 (figure 5).

The price of college attendance has escalated, even allowing for inflation.

The price of attending a 2- or 4-year college or university, adjusted for inflation, has risen substantially for both public and private institutions. Between 1986–87 and 1996–97, the average student charges (in 1997 constant dollars) for tuition, room, and board at higher education institutions increased by 20 percent at public institutions and 31 percent at private institutions (table 6).

Affordability

Regardless of the price of postsecondary education, the important issue for students and their families is whether they can afford to pay. The record high enrollments in higher education (14.4 million in fall 1995) (Snyder, Hoffman and Geddes 1997) show that today college is affordable to millions of students. Since increasing access to postsecondary education is an important goal at the national, state, and institutional levels, it is necessary to consider its affordability to students at all income levels. This issue can be examined from a number of perspectives, including growth in prices relative to family income, the resources families need to manage college prices on their own, and the extent to which financial aid reduces the price of attending.

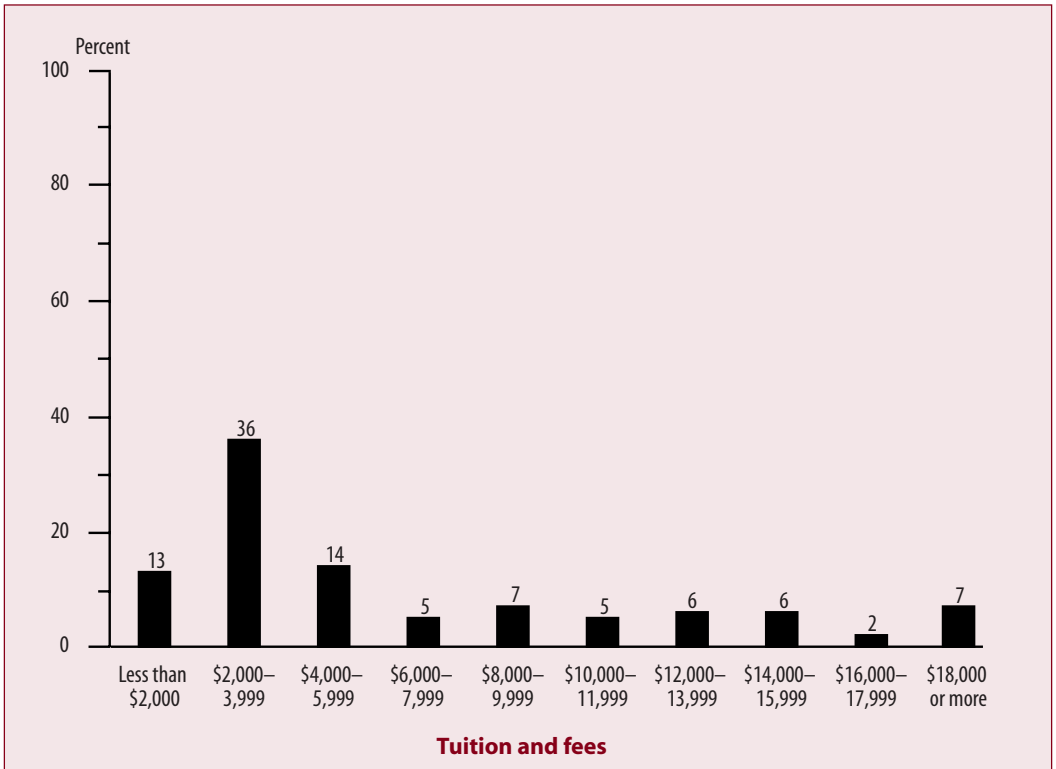
Table 5.—Average price of attending a postsecondary institution for dependent full-time, full-year undergraduates, by type of institution: 1995–96

Type of institution	Tuition and fees	Total price*
All students	$ 6,100	$12,600
Public 4-year	3,900	10,800
Private, not-for-profit 4-year	13,300	20,000
Public 2-year	1,300	6,800

*Total price includes tuition, room and board, transportation, books and supplies, and other costs.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 National Postsecondary Student Aid Study.

Figure 5.—Percentage distribution of full-time, full-year undergraduates at 4-year colleges, by tuition and fees: 1995–96



SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 National Postsecondary Student Aid Study.

Table 6.—Average prices for undergraduate higher education (in 1997 constant dollars), by type of institution: 1986–87 and 1996–97

Type of institution	1986–87	1996–97	Percent change
Average tuition, room, and board*			
Public	$ 5,500	$ 6,600	20
Private	14,000	18,300	31
Average tuition and fees*			
Public	1,600	2,300	44
Private	9,100	12,700	40

*Weighted by student enrollment.

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics: 1997* (NCES 98–015), tables 38 and 312; and U.S. Department of Commerce, Bureau of the Census, *Current Population Reports,* Series P–60, "Income, Poverty, and Valuation of Non-Cash Benefits" (various years).

The price of college attendance has increased faster than family incomes.

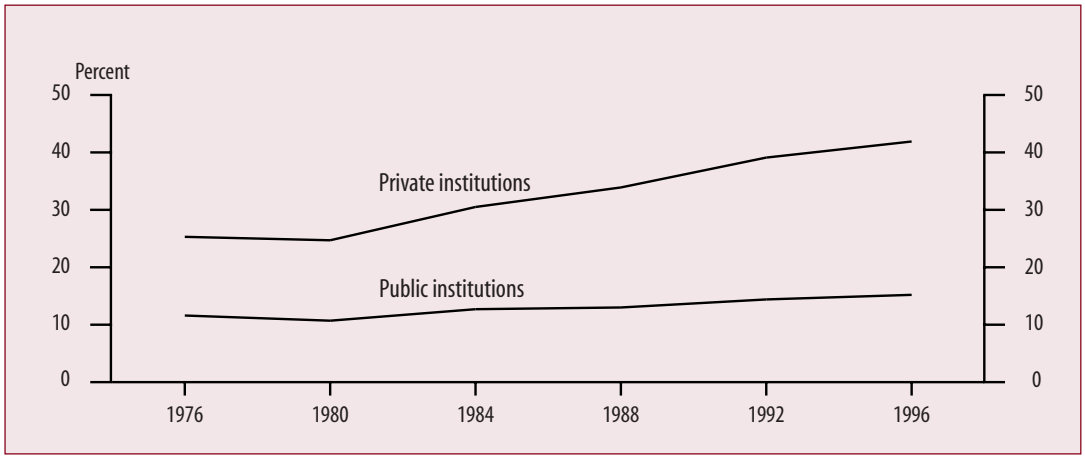
More important than the increase in inflation-adjusted prices is the fact that average charges for tuition, room, and board at 2- and 4-year colleges and universities have increased faster than family incomes, especially at private institutions (figure 6).

Average prices at public institutions increased from 13 percent of the median family income in 1986 to 15 percent in 1996, and at private institutions, from 32 to 42 percent during the same period (Smith 1997, 70). The increase was larger for low-income families than for high-income families. Between 1986 and 1996, charges at public institutions increased from 27 to 33 percent of family income for those at the 20th income percentile, compared to an increase from 7 to 9 percent for families at the 80th percentile. At private institutions, the corresponding increases in charges were from 69 to 90 percent of family income at the 20th percentile and from 19 to 24 percent at the 80th percentile (Smith 1997).

Student financial aid increases affordability for eligible students.

Postsecondary education would be beyond the reach of many families without financial assistance. Financial aid eligibility rules specify an expected family contribution (EFC) that is based on financial circumstances (mainly family income and assets). This amount is a rough measure of what families can afford on their own. Therefore, comparing the amounts families at different income levels are expected to pay toward the price of attending provides an

Figure 6.—Average undergraduate tuition, room, and board as a percentage of median family income: 1976–96

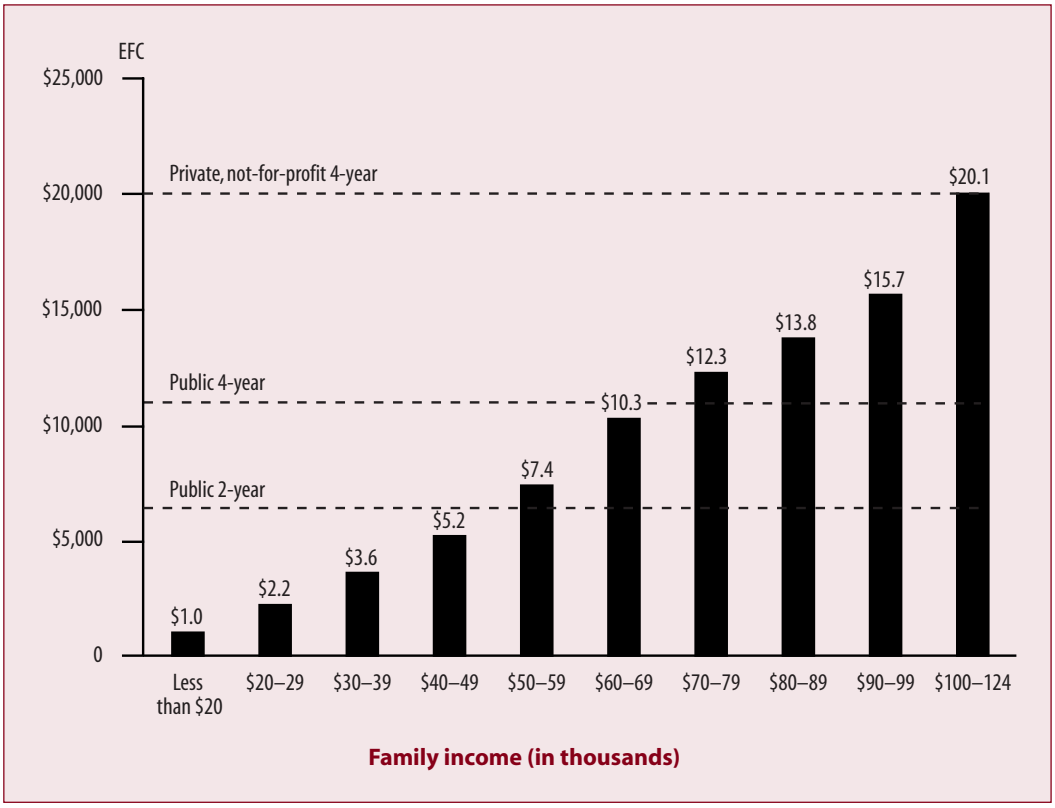


SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics: 1997* (NCES 98–015); and U.S. Department of Commerce, Bureau of the Census, *Current Population Reports*, Series P–60, "Income, Poverty, and Valuation of Non-Cash Benefits" (various years).

indicator of the affordability of various types of institutions. In 1995–96, for example, families with incomes of $50,000–59,999 had an average EFC of $7,400, enough to cover the average price of attending a public 2-year institution without financial aid. Families with incomes of $70,000–79,999 had an average EFC of $12,300, enough to cover the price of attending a public 4-year institution without aid. Families with incomes of $100,000–124,000 had an average EFC of $20,100, about equal to the average cost of attending a private, not-for-profit 4-year institution (figure 7).

Half of all undergraduates received some type of financial aid from federal, state, institutional, or other sources in 1995–96 (table 7). Thirty-nine percent received grants, and 26 percent took out loans. Among financially dependent students, about two-thirds (66 percent) of those from families with incomes less than $20,000 received grants, as did 51 percent of those with incomes between $20,000 and $39,999. As family income rises above $40,000, students are less likely to be eligible for need-based grants and scholarships. When grants are not sufficient, students qualifying for federal financial aid may take out low-interest, subsidized loans through the Stafford loan program. Students ineligible for subsidized loans because their incomes are too high can take out unsubsidized Stafford loans if they are otherwise eligible. Some states and institutions have their own loan programs, but most undergraduate borrowing is through the Stafford loan program (Berkner 1998).

Figure 7.—Average expected family contribution (EFC) for dependent students by family income: 1995–96



NOTE: The horizontal dotted lines on the figure represent the average student budgets for full-time, full-year students at the indicated type of institution.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 National Postsecondary Student Aid Study.

For undergraduates from families in the lowest income quartile, student aid covered, on average, more than half the price of attending a 4-year institution in 1995–96. It covered 54 percent at public institutions and 60 percent at private, not-for-profit institutions (table 8). Because of the criteria for awarding student aid, the percentage of total price covered by aid at public 4-year institutions declined as family income increased. The same was generally true at private, not-for-profit 4-year institutions, except that lower and lower-middle-income students had similar amounts covered (60 and 58 percent). At public 2-year institutions, aid covered an average of 38 percent of the total price for low-income students and smaller proportions for students with higher incomes.

Despite financial aid, many students have unmet need.

The net amount that students actually pay to attend college is the total price charged by the institution minus any financial aid they are awarded. This price includes tuition, fees, and a budgeted amount of living costs. In 1995–96, the average net price of attending college (price minus aid received) for a dependent, full-year undergraduate (including aided and unaided students in the average) was $7,300 at a public 4-year institution; $11,200 at a private, not-for-profit 4-year institution; and $5,700 at a public 2-year institution (table 9). Because financial aid reduces the net price for low-income students, it increases the affordability of postsecondary education for them.

Table 7.—Percentage of undergraduates with student financial aid from any source in 1995–96, by family income and type of aid

Family income	Any aid*	Grants	Loans
Total	50	39	26
Family income in 1994 (dependent students only)			
Less than $20,000	70	66	35
$20,000–39,999	60	51	38
$40,000–59,999	47	30	32
$60,000–79,999	43	25	27
$80,000–99,999	38	20	23
$100,000 or more	28	17	13

*Includes aid from federal, state, institutional, and other sources. Also includes other types of aid, such as work study.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 National Postsecondary Student Aid Study.

Table 8.—Total aid as a percentage of total price, for dependent full-time, full-year undergraduates, by family income quartile and type of institution attended: 1995–96

Family income quartile	Public 4-year	Private, not-for-profit 4-year	Public 2-year
Total	33	45	17
Low	54	60	38
Lower middle	41	58	14
Upper middle	26	46	9
High	17	25	4

NOTE: Total price includes tuition and fees, and an institutionally determined allowance for student living expenses.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1990 Beginning Postsecondary Students Longitudinal Study, second follow-up (1994).

For students from low-income families, the total unmet need remains a substantial proportion of family income.

The average unmet need (net price minus the EFC) for low-income full-time, full-year dependent undergraduates attending public 4-year institutions was about $3,800 (table 9). For those attending public 2-year institutions, the amount was similar ($3,200). Average unmet need for their counterparts at private, not-for-profit 4-year institutions was much higher ($6,200). These are the amounts above and beyond the EFC that must be covered by students and their families by borrowing more, working, reducing their living costs, or some other means.

In addition to the fact that lower income students have higher unmet need than higher income students, lower income students have also been found to be more sensitive to a given level of unmet need than high-income students. That is, for a certain level of unmet need, low-income students are more likely to be deterred from attending higher education than higher income students are (Kane 1994). Generally, it has been found that for each $150 increase in the net price of college attendance, the enrollments of students in the lowest income group decrease by about 1.8 percent (McPherson and Shapiro 1998).

Coping With the Price of Attending College

Students pay for their postsecondary education with a combination of savings, help from families and friends, financial aid, and work. Their use of work and borrowing are of particular interest because working may affect their academic opportunities and performance while enrolled, and borrowing may result in a substantial debt burden after they graduate.

Table 9.—Average net price and unmet need for dependent full-time, full-year undergraduates, by type of institution attended and family income quartile: 1995–96

Type of institution and family income quartile	Net price	Unmet need
Total	$ 8,100	$ 2,700
Public 4-year	7,300	2,000
Low	4,700	3,800
Lower middle	6,200	3,000
Upper middle	7,800	1,500
High	9,700	400
Private, not-for-profit 4-year	11,200	4,500
Low	7,200	6,200
Lower middle	7,800	4,900
Upper middle	10,900	4,500
High	16,400	3,000
Public 2-year	5,700	1,800
Low	4,200	3,200
Lower middle	6,000	2,700
Upper middle	6,400	600
High	6,600	100

NOTE: Averages include zero values.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 National Postsecondary Student Aid Study.

Students rely heavily on work to help pay for their education.

A large majority of undergraduates (79 percent, including both dependent and independent students) worked while enrolled during the 1995–96 academic year (figure 8). Among students who considered themselves primarily students working to pay their education expenses (50 percent of all students), the average number of hours worked per week was 25. Among students who considered themselves primarily employees taking classes (29 percent of all students), the average was 39 hours.

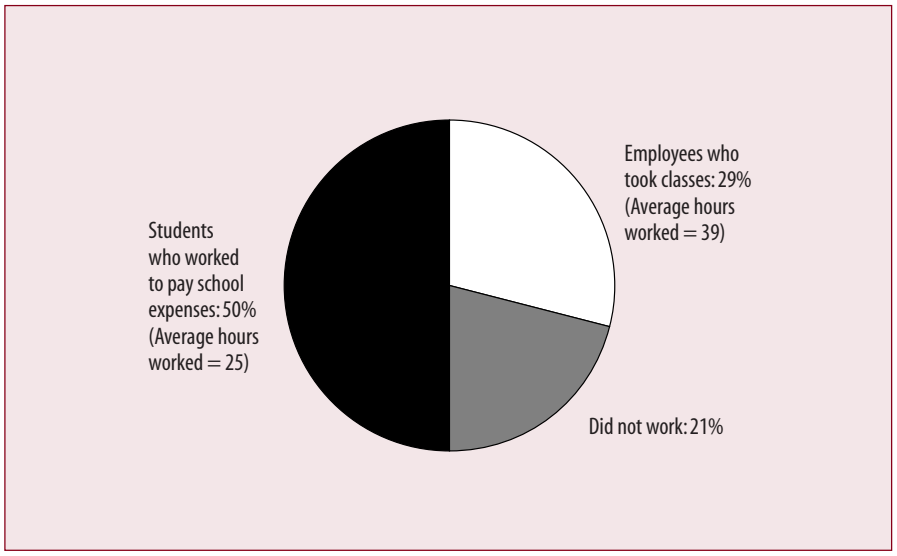
Working can have negative consequences on students' academic opportunities and performance.

In 1995–96, among undergraduates who considered themselves primarily students working to pay school expenses, the more they worked the more likely they were to report that their working limited their class schedule, reduced their choice of classes, and limited the number of classes they could take (table 10). Among those who worked full time while enrolled (35 or more hours per week), at least half reported each of these effects. In addition, 55 percent of dependent undergraduates who considered themselves primarily students and who worked full time reported that working negatively affected their grades.

Borrowing through federal loan programs increased considerably after income restrictions were removed.

Since unsubsidized Stafford loans were introduced in 1993–94, many students whose family income was too high to qualify for a subsidized loan have taken advantage of this opportunity to borrow to finance their education. In 1992–93, the last year before the eligibility rules changed, 41 percent of all seniors enrolled at public 4-year institutions had ever borrowed through a federal loan program; in 1995–96, 52 percent had done so (table 11). At private, not-for-profit 4-year institutions, the percentage of seniors who had ever borrowed increased from 49 to 56 percent.

Figure 8.—Percentage of undergraduate students who worked while enrolled: 1995–96



SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 National Postsecondary Student Aid Study.

Borrowing increased, particularly among middle and upper income families.

Among dependent undergraduates at both public and private, not-for-profit 4-year institutions, the increase in borrowing was concentrated among students from families with incomes greater than about $30,000 (figure 9). Although some have linked the increased borrowing to rising tuitions,[6] there is no way to verify whether the increased borrowing represents more investment in postsecondary education or if middle and upper income families have simply shifted from using savings or work to borrowing. Overall, 52 percent of the seniors at public 4-year colleges in 1995–96 had ever borrowed from federal loan programs, and they carried an average of $11,000 in debt. For seniors at private, not-for-profit 4-year colleges, about 56 percent had ever borrowed and their average debt was $13,200 (Wirt et al., 62).

Students from higher income families do not appear to have used the increased borrowing opportunities to shift from public institutions to private, not-for-profit 4-year institutions. The percentage of dependent beginning postsecondary students from families with incomes of $60,000 or more attending private, not-for-profit institutions was about the same in 1989–90 (24 percent) and 1995–96 (25 percent) (Wirt et al. forthcoming, table 10-1).

Working a modest amount was positively associated with persistence, as was borrowing.

An analysis of persistence and attainment by 1989–90 beginning postsecondary students that controlled for a variety of factors showed that working 1–14 hours per week while enrolled was positively associated with persistence and attainment 5 years later, but that working full

[6]See, for example, General Accounting Office (1998).

Table 10.—Percentage of undergraduates who worked to help pay for school expenses and various effects of work on their studies, by average hours worked: 1995–96

Average hours worked per week while enrolled	Limited class schedule	Reduced class choices	Limited number of classes	Negatively affected their grades*
Total	40	36	30	37
1–15	22	16	15	17
16–20	31	28	24	34
21–34	42	38	32	46
35 or more	61	60	51	55

*Asked only of dependent students.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 National Postsecondary Student Aid Study.

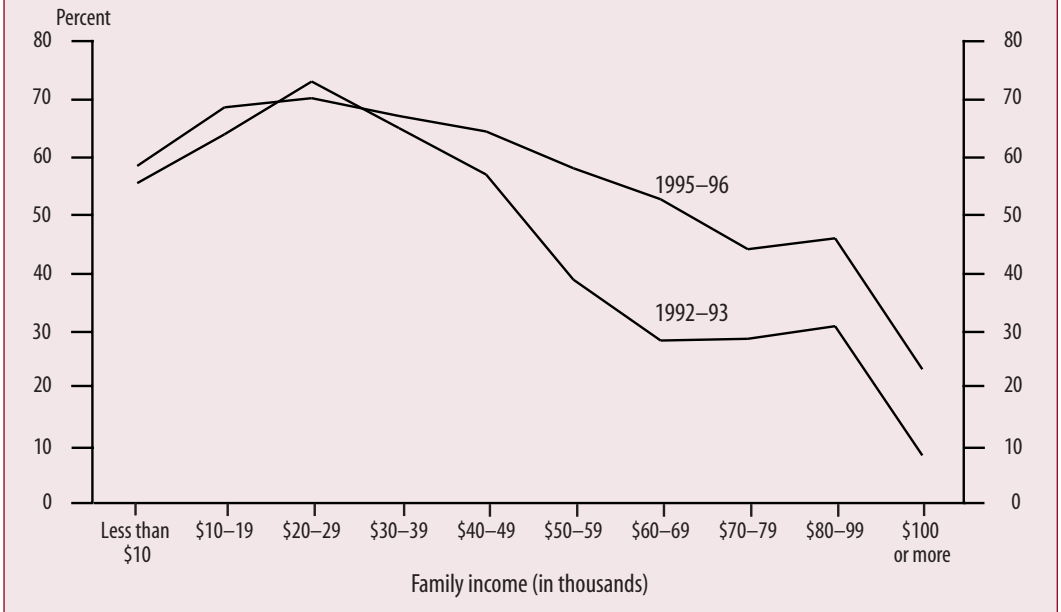
Table 11.—Percentage of students who borrowed during the academic year and who ever borrowed, by type of institution: 1992–93 and 1995–96

	1992–93		1995–96	
Type of institution	Borrowed in 1992–93	Ever borrowed	Borrowed in 1995–96	Ever borrowed
Public 4-year				
All students	25	36	35	47
Seniors	26	41	37	52
Private, not-for-profit 4-year				
All students	35	45	44	54
Seniors	35	49	43	56
Public 2-year	6	18	6	21

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1992–93 and 1995–96 National Postsecondary Student Aid Study.

Figure 9.—Percentage of dependent, undergraduate students who ever borrowed from federal loan programs: 1992–93 and 1995–96

Public 4-year institutions



Private, not-for-profit 4-year institutions

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1992–93 and 1995–96 National Postsecondary Student Aid Study.

time was negatively associated with it. Borrowing was positively associated with persistence and attainment as well (Cuccaro-Alamin and Choy 1998). Students who borrowed were more likely than those who did not borrow to persist or attain within 5 years at each level of work considered except 1–14 hours (figure 10).

Findings from an analysis of 1995–96 undergraduates were similar, although outcome data are available only for 1 year so far. Among those seeking a bachelor's or associate's degree who considered themselves primarily students working to pay their expenses, those who worked 15 or fewer hours were more likely than students who worked more to attend for the full year, suggesting that working more than 15 hours may negatively affect persistence.

The students who considered themselves primarily students and worked 15 hours or fewer were also more likely to borrow and to borrow larger amounts, suggesting that students may substitute working for borrowing (Horn and Berktold 1998).

Summary

Enrollment in postsecondary education continues to rise, with increasing proportions of high school graduates going directly to college, and almost all expecting to enroll at some time in their lives. Low-income high school graduates are less likely to attend postsecondary education than their higher income peers. One reason is that they tend to be less well prepared, but even among the highest achieving high school students, low-income students are less likely to enroll, suggesting that finances may be a barrier for some. However, aspirations and expectations are important factors. When college-qualified low-income students take the necessary steps toward admission to a 4-year institution, they are just as likely as middle-income students to be accepted and to enroll.

College prices are rising faster than median family income. However, about half of all full-time, full-year undergraduates at 4-year institutions face tuition and fees of less than $4,000 per year, largely because of the subsidies that are provided to public institutions. Although financial aid

Figure 10.—Percentage of 1989–90 first-time beginning postsecondary students who attained a degree or were still enrolled as of spring 1994

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1990 Beginning Postsecondary Students Longitudinal Study, second follow-up (1994).

reduces net prices for low-income students, substantial unmet need remains.

Students and their families cope with the price of attending college using savings, income, borrowing, and work. While some work experience while enrolled may complement students' academic experiences and improve their employment prospects after graduation, full-time work appears to have some negative consequences. In addition, there is some evidence that borrowing to reduce the number of hours a student needs to work to no more than 15 hours per week may increase a student's chance of completing a degree.

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Data sources:

NCES: Beginning Postsecondary Students Longitudinal Study (BPS), base year (1990) and second follow-up (1994); 1992–93 and 1995–96 National Postsecondary Student Aid Study (NPSAS); National Education Longitudinal Study of 1988 (NELS:88), second follow-up (1992) and third follow-up (1994); National Longitudinal Study of the High School Class of 1972 (NLS), first follow-up (1974); High School and Beyond Study (HS&B), Senior Cohort, third follow-up (1986); *Digest of Education Statistics 1997* (NCES 98–015), tables 38 and 312; and *America's High School Sophomores: A Ten Year Comparison, 1980–1990* (NCES 93–087).

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For technical information, see

Wirt, J., Snyder, T., Sable, J., Choy, S.P., Bae, Y., Stennett, J., Gruner, A., and Perie, M. (1998). *The Condition of Education 1998* (NCES 98–013).

For complete supplemental and standard error tables, see either

- the electronic version of *The Condition of Education 1998 (http://nces.ed.gov/pubs98/condition98/index.html),* or
- volume 2 of the printed version (forthcoming): *The Condition of Education 1998 Supplemental and Standard Error Tables* (NCES 1999–025).

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State Aid for Undergraduates in Postsecondary Education

John B. Lee and Suzanne B. Clery

This article was originally published as the Foreword and Highlights of a Statistical Analysis Report of the same name. The sample survey data are from the NCES National Postsecondary Student Aid Study (NPSAS).

Introduction

This report examines the differences among undergraduates who attended postsecondary institutions in states that provide different levels of state student financial aid. Specifically, the report describes students' aid types and sources, their price of attendance, and their personal characteristics. It examines the relationship between these variables and the undergraduates' probability of attending institutions in either a high or low state aid group.

The report uses data from the 1995–96 National Postsecondary Student Aid Study (NPSAS:96). NPSAS:96 is the fourth in a series of surveys conducted by the U.S. Department of Education, National Center for Education Statistics. NPSAS:96 represents students of all ages and backgrounds at all types of postsecondary institutions (from less-than-2-year institutions that provide short-term vocational training to 4-year colleges and universities) who were enrolled during the 1995–96 academic year. The NPSAS surveys provide information about the price of postsecondary education and how students pay that price.

The percentages and means presented in this report were produced using the NPSAS:96 Data Analysis System (DAS). The DAS is a microcomputer application that allows users to specify and generate their own tables from the NPSAS data. It produces the design-adjusted standard errors that are necessary for testing the statistical significance of differences shown in the tables.

Highlights

A major percentage of postsecondary education funding is contributed by states. States provide most of this support to institutions, but some is in the form of financial aid to students. Most (93 percent) of state student aid is in the form of grants. State funds may be awarded directly to students or used to reduce tuition in public institutions. The amount of student aid provided varies among states.

Even though similarities may exist among states, each represents a unique set of circumstances. State politics, demographics, and historical traditions result in various higher education policies. This report divides states into two groups based on level of aid provided, and compares the high state aid group, states that provided $400 or more in financial aid per undergraduate, to the low state aid group, those that provided $100 or less in financial aid per undergraduate.* The following states were included in the high state aid group: Georgia, Illinois, Indiana, Minnesota, New Jersey, New Mexico, New York, Pennsylvania, Vermont, and Virginia. The low state aid group consisted of Alabama, Alaska, Arizona, Delaware, the District of Columbia, Hawaii, Idaho, Montana, Nebraska, Nevada, New Hampshire, North Dakota, South Dakota, Texas, Utah, and Wyoming.

The results suggest that students attending institutions located in the high state aid group were charged a higher average tuition than those in the low state aid group (table A). Undergraduates attending any one of the three major institutional sectors (public 4-year; private, not-for-profit, 4-year; and public less-than-4-year) in the high state aid group also paid higher tuition than did those in the low state aid group. This comparison provides a chance to evaluate what other student characteristics might be associated with attending institutions in the high state aid group or the low state aid group.

Institutional type

Undergraduates in the high state aid group were more likely to attend private, not-for-profit, 4-year institutions than were those in the low state aid group (table B). They also were less likely to attend public less-than-4-year institutions than were those in the low state aid group.

*A third group, the middle state aid group, is not examined in this report.

Table A.—Average tuition and fees charged for undergraduates in the low and high state aid groups, by institutional type: 1996

	Low state aid group	High state aid group
Total	$ 2,099	$ 4,334
Institution type		
Public 4-year	2,622	3,415
Public less-than-4-year	498	921
Private, not-for-profit, 4-year	5,830	10,199
Private, not-for-profit, 2-year or less	2,308	4,032
Private, for-profit, 2-year or more	5,041	5,345
Private, for profit, less-than-2-year	5,599	6,804

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 National Postsecondary Student Aid Study (NPSAS:96), Undergraduate Data Analysis System. (Originally published as table 6 on p. 22 of the complete report from which this article is excerpted.)

Table B.—Percentage distribution of undergraduates in the low and high state aid groups, by institutional type: 1996

	Low state aid group*	High state aid group*
Total	100.0	100.0
Institution type		
Public 4-year	36.9	33.2
Public less-than-4-year	46.9	34.6
Private, not-for-profit, 4-year	9.3	22.8
Private, not-for-profit, 2-year or less	0.9	1.5
Private, for-profit, 2-year or more	2.6	5.6
Private, for-profit, less-than-2-year	3.5	2.4

*The columns sum to 100 vertically for each selected characteristic.

NOTE: Details may not sum to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1995–96 National Postsecondary Student Aid Study (NPSAS:96), Undergraduate Data Analysis System. (Originally published as table 14 on p. 29 of the complete report from which this article is excerpted.)

Student characteristics

Undergraduates attending institutions in the high state aid group were younger and more likely to be dependent than those in the low state aid group. Undergraduates in the high state aid group were also less likely to be married and have dependents compared with those attending institutions in the low state aid group.

In two instances, undergraduates attending institutions in the two state aid groups did not differ from one another statistically. The percentage of enrolled dependent undergraduates with family incomes of $20,000 or less is a good measure of the presence of low-income students in postsecondary education. There was no significant difference in the percentage of low-income undergraduates attending institutions in the high state aid group compared with those in the low state aid group. The percentage of low-income undergraduates who were white, non-Hispanic also did not differ significantly between the two state aid groups. In both cases, 73 percent of the undergraduates were white, non-Hispanic. The percentage of enrollment supplied by low-income students and the percentage of

enrollment represented by minority students both provide indicators of student access. The information from the high and low state aid groups suggests that state student aid along with the associated institutional characteristics did not have a direct effect on the enrollment of low-income students or minority students.

Financial aid

Undergraduates in the high state aid group were more likely to have received student aid than were those in the low state aid group. On average, aid recipients in the high state aid group received $5,810 and those in the low state aid group received $3,869. Those attending institutions in the high state aid group were more likely to have received loans, grants, and work-study awards. Undergraduates in the high state aid group were also more likely to have received federal aid than were those in the low state aid group. Those in the high state aid group who received federal aid also received larger awards on average than those in the low state aid group.

Net tuition

Subtracting grant aid from tuition and fees results in net tuition. Undergraduates attending institutions in the high state aid group were charged an average tuition of $4,334 compared with $2,099 paid by those in the low state aid group. When all grant aid was subtracted, undergraduates in the high state aid group paid a mean net tuition of $2,947 compared with $1,553 paid by those in the low state aid group.

The mean net tuition paid by undergraduates attending public less-than-4-year institutions in the high state aid group was $639 compared with $316 paid by those in the low state aid group. However, undergraduates in the high state aid group did not pay a significantly higher net tuition in private, not-for-profit, 4-year institutions or public 4-year institutions.

Dependent undergraduates in every income category paid a higher net tuition if they attended institutions in the high state aid group than if they attended in the low state aid group. On average, dependent undergraduates with family incomes of less than $20,000 paid a mean net tuition of $2,648 in the high state aid group compared with $1,616 paid by those in the low state aid group. The only institutional sector in which dependent undergraduates with incomes of less than $20,000 paid a significantly higher net tuition in the high state aid group than in the low state aid group was public less-than-4-year institutions, $644 compared with $261.

Data sources: The 1995–96 National Postsecondary Student Aid Study (NPSAS:96); and the Integrated Postsecondary Education Data System (IPEDS), Institutional Characteristics datafile (1996–97) and Enrollment datafile (1996).

For technical information, see the complete report:

Lee, J.B., and Clery, S.B. (1999). *State Aid for Undergraduates in Postsecondary Education* (NCES 1999–186).

For details about NPSAS:96 methodology, see

Riccobono, J.A., Whitmore, R.W., Gabel, T.J., Traccarella, M.A., Pratt, D.J., and Berkner, L.K. (1997). *National Postsecondary Student Aid Study, 1995–96 (NPSAS:96) Methodology Report* (NCES 98–073).

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Revenues & Expenditures

Current Funds Revenues and Expenditures of Degree-Granting Institutions: Fiscal Year 1996

Samuel Barbett and Roslyn A. Korb

This article was originally published as the Introduction and Summary Findings of an E.D. Tabs report of the same name. The universe data are from the NCES Integrated Postsecondary Education Data System (IPEDS).

Introduction

Since 1987, the Integrated Postsecondary Education Data System (IPEDS) Finance survey has collected information on the current funds revenues and expenditures of higher education institutions. Revenue data are collected by source of revenue, such as tuition and fees and state appropriations, while expenditure data are collected by purpose of expenditure, including instruction, research, and public service. Both revenues and expenditures are separable into two classes: education and general (E&G) and sales and services (i.e., auxiliary enterprises, hospitals, and independent operations). E&G revenues and expenditures are those that are intended for operating the educational, research, and public service missions[1] of the institution. Entities listed under sales and services are either ancillary to the mission of the institution or are essentially self-supporting operations, such as bookstores, dormitories, and hospitals (that is, the revenues of these entities support their operating expenditures). As part of current funds expenditures, total expenditures for salaries are also collected in each expenditure category that has associated personnel. Additionally, expenditures on scholarships and fellowships are collected by source in a separate schedule of the IPEDS Finance survey.

Change in universe definition between FY 1995 and FY 1996

This report presents data on revenues and expenditures of higher education institutions in the 50 states and the District of Columbia for fiscal year 1996. In FY 1996, higher education institutions were defined as postsecondary institutions that were eligible for Title IV[2] federal financial aid programs and that granted an associate's or higher degree. In FY 1995, higher education institutions were defined as those that were accredited at the college level by an agency recognized by the Secretary, U.S. Department of Education. This change in definition came about because the U.S. Department of Education no longer distinguishes postsecondary institutions based solely on their college accreditation status. The new definition resulted in an overall net gain of 7.5 percent in the number of institutions included in the higher education universe, with most of the additions being private, for-profit institutions. Altogether, the FY 1996 higher education universe consisted of 4,100 institutions.

Changes in aggregate financial statistics between FY 1995 and FY 1996

As table A indicates, the change in total current funds revenues between FY 1995 and FY 1996 for all higher education institutions in the nation was 4.68 percent. Of this percentage change, 0.30 percent was due to the change in universe. That is, if the universe definition had remained constant between FY 1995 and FY 1996, the change in current funds revenues would have been 4.38 percent. For current funds expenditures, the total change was 4.10 percent, of which 0.27 percent was due to the change in universe definition. While the change in universe definition had a negligible effect at the national level, it had a fairly large effect for some states and for some institutional sectors in some states. For example, almost half of the change in current funds revenues for all institutions in Arizona was due to the change in universe definition. In South Dakota, more than three-fourths of the change in current funds revenues was due to the change in universe definition. In Louisiana, all of the observed increase in current funds revenues was due to the change in the universe.

The change in universe definition did not seem to affect changes in the revenues or expenditures of public 4-year institutions at either the national or the state level, except in the District of Columbia. However, it did have an effect on changes in the aggregate financial statistics of both public 2-year institutions and private, non-profit 4-year institutions, particularly at the state level. Although the national increases in current funds revenues and expenditures of more than 5 percent in the public 2-year sector would have been about 4.5 percent had the universe not

[1]Education and general revenues include tuition and fees; federal, state, and local appropriations; federal, state, and local grants and contracts; private gifts, grants, and contracts; endowment income; and sales and services of educational activities. Education and general expenditures include expenditures for instruction, research, public service, academic support, student services, institutional support, operation and maintenance of plant, scholarships and fellowships, and mandatory transfers from current funds.

[2]For an institution to be eligible to participate in Title IV financial aid programs, it must offer a program of at least 300 clock hours in length, have accreditation recognized by the U.S. Department of Education, have been in business for at least 2 years, and have signed a participation agreement with the Department.

Table A.—Total current funds revenues and expenditures of accredited institutions for fiscal year 1995 and Title IV eligible, degree-granting institutions for fiscal year 1996 in current dollars, by state

State	Revenues in thousands				Expenditures in thousands			
	Accredited 1994–95	Title IV eligible, degree-granting 1995–96	Total percent change	Percent change due to change in universe[1]	Accredited 1994–95	Title IV eligible, degree-granting 1995–96	Total percent change	Percent change due to change in universe[1]
50 states and DC	$189,120,570	$197,973,236	4.68	0.30	$182,968,610	$190,476,163	4.10	0.27
Alabama	3,120,468	3,204,482	2.69	0.15	2,958,406	3,045,170	2.93	0.02
Alaska	367,284	377,095	2.67	-0.18	356,408	370,425	3.93	-0.21
Arizona	2,083,810	2,331,052	11.86	5.64	1,985,153	2,198,161	10.73	4.49
Arkansas	1,255,123	1,389,148	10.68	2.29	1,211,426	1,329,954	9.78	2.26
California	21,732,186	22,549,732	3.76	0.80	20,863,000	21,799,355	4.49	0.75
Colorado	2,595,725	2,821,720	8.71	0.53	2,521,707	2,743,619	8.80	0.42
Connecticut	2,802,543	2,953,192	5.38	0.03	2,790,668	2,922,867	4.74	0.04
Delaware	532,222	542,204	1.88	0	502,080	525,789	4.72	0
District of Columbia	2,785,573	2,809,305	0.85	0.11	2,641,467	2,687,014	1.72	0.11
Florida	5,370,149	5,746,849	7.01	0.75	5,222,430	5,550,396	6.28	0.68
Georgia	4,669,631	4,942,445	5.84	-2.37	4,527,066	4,752,342	4.98	-2.39
Hawaii	756,909	690,079	-8.83	0.35	753,898	753,579	-0.04	0.31
Idaho	600,710	666,570	10.96	1.38	571,744	614,957	7.56	1.46
Illinois	9,556,668	9,710,846	1.61	-0.88	9,396,560	9,373,744	-0.24	-0.89
Indiana	4,208,421	4,122,807	-2.03	0.52	4,040,786	3,950,212	-2.24	0.49
Iowa	2,825,664	2,997,687	6.09	0.43	2,752,690	2,903,046	5.46	0.47
Kansas	1,773,217	1,866,147	5.24	0.83	1,770,163	1,818,735	2.74	0.77
Kentucky	2,140,650	2,266,777	5.89	0.06	2,012,000	2,145,812	6.65	0.01
Louisiana	2,594,795	2,665,476	2.72	2.76	2,533,954	2,626,966	3.67	2.61
Maine	659,247	691,286	4.86	0.49	641,301	677,124	5.59	0.57
Maryland	4,215,706	4,469,431	6.02	0	4,106,305	4,329,446	5.43	0
Massachusetts	8,165,627	8,678,187	6.28	0.22	7,973,635	8,443,824	5.90	0.21
Michigan	6,686,146	7,010,227	4.85	0.10	6,251,727	6,567,453	5.05	0.08
Minnesota	3,558,038	3,826,517	7.55	1.07	3,483,852	3,634,408	4.32	1.06
Mississippi	1,571,106	1,628,420	3.65	-0.05	1,488,741	1,565,599	5.16	-0.16
Missouri	3,998,763	4,250,780	6.30	0.61	3,734,201	4,008,936	7.36	0.60
Montana	438,398	480,672	9.64	0.95	426,961	462,617	8.35	0.89
Nebraska	1,453,813	1,569,492	7.96	0.14	1,396,632	1,482,836	6.17	0.12
Nevada	492,959	506,947	2.84	0.85	456,094	519,581	13.92	0.94
New Hampshire	912,258	966,569	5.95	-0.21	878,781	924,324	5.18	-0.11
New Jersey	4,372,092	4,532,700	3.67	-0.03	4,234,720	4,368,381	3.16	-0.02
New Mexico	1,363,775	1,428,887	4.77	1.49	1,321,071	1,381,143	4.55	1.56
New York	18,229,875	18,958,738	4.00	0.02	17,945,119	18,189,101	1.36	0.07
North Carolina	5,984,337	6,234,324	4.18	-0.03	5,736,166	5,977,241	4.20	-0.02
North Dakota	505,810	499,430	-1.26	0.64	494,080	488,773	-1.07	0.64
Ohio	7,016,352	7,185,199	2.41	0.46	6,856,454	6,917,081	0.88	0.42
Oklahoma	1,619,242	1,703,797	5.22	—	1,561,277	1,656,486	6.10	0.01
Oregon	2,191,029	2,313,205	5.58	0.70	2,121,873	2,219,576	4.60	0.69
Pennsylvania	11,081,716	11,619,129	4.85	-0.58	10,753,383	11,261,060	4.72	-0.41
Rhode Island	1,039,371	1,098,888	5.73	0	1,012,358	1,060,051	4.71	0
South Carolina	2,335,526	2,337,547	0.09	0	2,150,909	2,261,207	5.13	0
South Dakota	329,386	371,077	12.66	9.42	322,309	365,085	13.27	8.97
Tennessee	3,545,476	3,722,258	4.99	-0.16	3,453,161	3,582,234	3.74	-0.17
Texas	10,127,690	10,974,963	8.37	0.20	9,773,408	10,377,360	6.18	0.18
Utah	1,970,243	2,106,120	6.90	0.36	1,846,316	1,975,876	7.02	0.33
Vermont	623,906	667,869	7.05	2.54	604,678	639,878	5.82	0.85
Virginia	4,395,858	4,606,784	4.80	0.26	4,289,126	4,415,688	2.95	0.13
Washington	3,416,879	3,621,817	6.00	1.26	3,320,950	3,492,612	5.17	1.28
West Virginia	883,545	925,722	4.77	0.86	847,589	897,763	5.92	0.81
Wisconsin	3,859,473	4,020,558	4.17	0.07	3,768,350	3,916,369	3.93	0.07
Wyoming	305,181	312,080	2.26	0	305,475	304,908	-0.19	0

— Percent change within plus or minus 0.005 percent.

[1]The portion of the total percent change that can be attributed to the change from a higher education universe as defined by accreditation status to a higher education universe as defined by degree-granting status and Title IV eligibility.

NOTE: Pell Grants are excluded from revenues and expenditures.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, "Finance" survey, 1994–95 and 1995–96. (Originally published as table 14 on p. 14 of the complete report from which this article is excerpted.)

changed, the effect of the change was quite profound in several states, such as Arkansas, Georgia, Louisiana, and South Dakota. The change in universe also had a significant effect on the aggregate financial statistics of private, non-profit 4-year institutions in such states as Alaska, Colorado, Illinois, Mississippi, and Oregon.

Current Funds Revenues in FY 1996

Revenues of public institutions

In FY 1996, public institutions received total current funds revenues of about $123.5 billion (table B). The largest source of revenues of public institutions was state appropriations, which accounted for about one-third of their total operating revenues. Tuition and fees, the second largest source of E&G revenues of public institutions, accounted for almost 19 percent of total current funds revenues. The relative shares of revenues accounted for by these two major sources of income tend to confirm public institutions' reliance on state funding. Additionally, public 2-year institutions rely heavily on local funding as well as state funding, with local appropriations accounting for more than 18 percent of their operating revenues.

Table B.—Total current funds revenues of Title IV eligible, degree-granting institutions, by level and control of institution: Fiscal year 1996
(In thousands)

Control	Total	4-year	2-year
Public	$123,501,152	$101,033,907	$22,467,245
Private	74,472,083	72,325,013	2,147,070
Non-profit	72,149,338	71,366,089	783,249
For-profit	2,322,745	958,924	1,363,821

NOTE: Data includes the 50 states and the District of Columbia.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Integrated Postsecondary Education Data System, "Finance" survey, 1995–96.

Revenues of private institutions

Private institutions, in contrast, are not, for the most part, state supported, and they rely heavily on revenues from students. In FY 1996, private institutions had total operating revenues of almost $74.5 billion (table B); tuition and fees constituted the largest source of these revenues. Private, non-profit institutions obtained more than 40 percent of their total operating revenues—and more than half of their E&G revenues—from tuition and fees. Among private, non-profit 2-year institutions, this reliance on tuition and fees was even greater, accounting for more than 60 percent of their operating revenues. This reliance was greater still among private, for-profit institutions, with tuition and fees accounting for 84 percent of the operating revenues of all for-profit institutions and almost 90 percent of the operating revenues of for-profit 4-year institutions.

While income from the federal government made up more than 14 percent of private, non-profit 4-year institutions' revenues, most of this (11.6 percent) was from restricted grants and contracts and from independent operations. Private gifts, grants, and contracts were another significant source of income for private, non-profit institutions, constituting more than 9 percent of their operating revenues. In private, non-profit 2-year institutions, this share rose to almost 12 percent, most of which (10 percent) was in the form of unrestricted revenues. Surprisingly, revenues from state grants and contracts accounted for about 4 percent of the operating revenues of private, non-profit 2-year institutions, and revenues from state and local governments constituted 7 percent of the revenues of private, for-profit 2-year institutions. These percentages might reflect state student financial aid, which would be reported in these revenue categories.

Current Funds Expenditures in FY 1996

Expenditures of 2- and 4-year public and private, non-profit institutions

While sources of revenue seem to be related to the control of the institution, expenditures seem to be more related to the level of the institution, at least among public and private, non-profit institutions. For example, 2-year public and private, non-profit institutions allocated a higher percentage of their total current funds expenditures to instruction in FY 1996 than did their 4-year counterparts. Two-year public institutions spent more than 45 percent of their total current funds expenditures on instruction, compared with the slightly less than 30 percent spent by 4-year public institutions. Two-year private, non-profit institutions spent almost one-third of their operating expenditures on instruction, compared with the almost 27 percent spent by 4-year private, non-profit institutions.

Similarly, 2-year public and private, non-profit institutions allocated significantly higher percentages of their operating expenditures to student services, institutional support, and plant operations and maintenance than did 4-year public and private, non-profit institutions. For example, two-year public and private, non-profit institutions spent more than 10 percent and 12 percent, respectively, of their total current funds expenditures on student services, compared with expenditures of about 4 percent in public and 5 percent in private, non-profit 4-year institutions. Two-year public and private, non-profit institutions also spent about 15 percent and 18 percent, respectively, on institutional support, compared with 8 percent and 10 percent spent by their 4-year counterparts.

The one expenditure category in which control seemed to be a major factor was scholarships and fellowships. Public institutions, regardless of level, spent only about 4 percent of their total current funds expenditures on scholarships and fellowships, while private, non-profit institutions spent about 11 percent on activities in this category.

Expenditures of private, for-profit institutions

Private, for-profit 2-year and 4-year institutions spent about the same percentage of their total expenditures on instruction (27 percent and 29 percent, respectively). However, private, for-profit 2-year institutions spent a much higher percentage of their total expenditures on scholarships and fellowships than did private, for-profit 4-year institutions (12 percent and 7 percent, respectively).

Salary expenditures

It is interesting to note that, as different as the expenditure patterns are between 2- and 4-year institutions, the percentage of expenditures going to salaries and wages falls within a fairly narrow range for a given expenditure function. Overall, salaries and wages constituted between 47 percent and 62 percent of total current funds expenditures, with 2-year public institutions at the high end and 4-year private, for-profit institutions at the low end. Of the major expenditure categories, salaries and wages constituted 65 to 73 percent of instructional expenditures, 49 to 63 percent of student services expenditures, and 35 to 57 percent of expenditures on institutional support.

Revenues by State

Revenues of public institutions by state

Examining differences by state in the relative importance of sources of revenues and in the allocation of expenditures can shed light on the support for, and the priorities of, higher education, particularly in the public sector.[3] In public institutions, for example, the percentage of total revenues from tuition and fees varied substantially across states. For instance, public 4-year institutions in Vermont received 42.9 percent of their total revenues from tuition and fees. Not only is this figure much higher than the average percentage of operating revenues that public 4-year institutions received from tuition and fees nationwide (18 percent), but it also exceeds the national average for private, non-profit 4-year institutions (41.4 percent). In New Mexico, on the other hand, public 4-year institutions received less than 10 percent of their total revenues from tuition and fees, and in California, public 2-year institutions received less than 10 percent of their total revenues from tuition and fees.

In general, public institutions in states that have a relatively high level of state and local funding tended to have a lower percentage of revenues from tuition and fees. There are some clear exceptions, however. Public 4-year institutions in Arizona, Maine, Massachusetts, New York, South Dakota, and West Virginia had higher-than-average shares of revenues both from tuition and fees and from state and local sources. Public 4-year institutions in Alabama, California, Iowa, Minnesota, Nebraska, New Mexico, South Carolina, Utah, and Washington all had lower-than-average shares of revenues from tuition and fees and from state and local sources as well. Among public 2-year institutions, only those in Arizona had higher-than-average shares of revenues from tuition and fees and also from state and local appropriations. Public 2-year institutions in Idaho, Illinois, Montana, Oklahoma, Oregon, and Texas had lower-than-average shares of revenues from tuition and fees as well as from state and local sources.

Revenues of private institutions by state

While it seems reasonable that the distribution of revenues by source in public institutions would vary by state, less anticipated is that the distribution of revenues by source in private, non-profit 4-year institutions would also vary by state. This does, however, appear to be the case. The percentage of revenues from tuition and fees in private, non-profit 4-year institutions ranged from a low of about 21 percent in Utah to a high of more than 78 percent in Arizona. In general, the percentage of revenues from state and local sources was low, with little variability among private, non-profit 4-year institutions, suggesting little state or local support for these institutions. In Florida, New Jersey, New York, and Texas, private, non-profit 4-year institutions received 5 percent or more of their total revenues from state and local sources, compared with a national average of 2.6 percent.

When looking at private, for-profit institutions by state, one of the most interesting aspects is the large variation in the size of this institutional sector. In many states, there are very few private, for-profit institutions and, as a result, their aggregated revenues and expenditures are very small. For example, in 29 states (including 4 states that do not have any degree-granting private, for-profit institutions), total revenues of private, for-profit institutions were less than

[3]Interstate comparisons must be treated with caution, however. In some states, for example, certain costs of public institutions (e.g., faculty retirement costs) are paid through state sources rather than through institutional expenditures, while revenues from tuition and fees may go into a general fund rather than to the institution.

$15 million in each state. In 7 states, however, revenues in this sector totaled more than $100 million in each state. Among private, for-profit institutions, the percentage of revenues from tuition and fees ranged from 71 percent in Louisiana to 100 percent in Maryland and North Dakota. On average, private, for-profit institutions received about 5.1 percent of their total operating revenues from state and local sources, but in Connecticut, Minnesota, New Jersey, New York, and Pennsylvania, they received about 10 percent or more of their total revenues from state and local sources. In fact, private, for-profit institutions in New York received more than 20 percent of their total revenues from state and local sources.

Expenditures by State

Expenditures of public institutions by state

The distribution of expenditures by purpose in public 4-year institutions does not appear to be a function of their state location. The percentage of total expenditures that public 4-year institutions allocated to instruction ranged from a low of almost 20 percent in New Mexico to a high of 41 percent in Delaware. However, expenditures on instruction in public 4-year institutions were within 5 percent of the national average of 29.5 percent in 41 states. Expenditures on scholarships and fellowships in public 4-year institutions accounted for between 0.9 and 8.9 percent of total expenditures. In 27 states, expenditures on scholarships and fellowships were within 1 percent of the national average of 4.4 percent, and they were within 2 percent of the national average in 42 states. With some exceptions, public 4-year institutions with a relatively high share of expenditures on scholarships and fellowships tended to be in states in which public institutions received a high percentage of their total revenues from tuition and fees.

The percentage of total expenditures that public 2-year institutions allocated to instruction seemed to vary more across states than did the expenditures of public 4-year institutions for this purpose. This percentage ranged from a low of 24 percent in Vermont to a high of 61 percent in Wisconsin. Even among public 2-year institutions, however, expenditures on instruction were within 5 percent of the national average of 45.2 percent in 35 states. The percentage of total expenditures that public 2-year institutions allocated to scholarships and fellowships averaged 3.6 percent nationwide and did not exceed 8 percent except in the states of New York and Vermont.[4]

Expenditures of private institutions by state

Although expenditures on instruction among private, non-profit 4-year institutions ranged from a low of about 20 percent in Alaska to a high of 43 percent in Nebraska, these institutions allocated between 25 percent and 30 percent of their total expenditures to instruction in 25 states. The range of allocations to scholarships and fellowships among private, non-profit 4-year institutions was fairly broad, from a low of about 4 percent in Utah to a high of more than 30 percent in North Dakota. In addition, private, non-profit 4-year institutions in 22 states allocated 15 percent or more of their total expenditures to scholarships and fellowships. This compares with a national average of 11.5 percent for private, non-profit 4-year institutions.

Nationally, private, for-profit institutions allocated about 28 percent of their total expenditures to instruction and about 10 percent to scholarships and fellowships. Among these institutions, expenditures on instruction varied widely from state to state, ranging from about 16 percent of total current funds expenditures in Wyoming to more than 50 percent in Nebraska and Maryland. Again, however, private, for-profit institutions in 27 states allocated within 5 percent of the national average of 27.6 percent of their total expenditures to instruction. Significant variation in the percentage of total expenditures allocated to scholarships and fellowships in private, for-profit institutions is fairly evident. In only six states did for-profit institutions allocate within 2 percent of the national average of 9.6 percent for scholarships and fellowships. As might be expected, expenditures on scholarships and fellowships seem to be related to the level of revenues from state and local sources, with some exceptions, such as in Georgia, Louisiana, South Dakota, and Tennessee.

Data source: The 1994–95 and 1995–96 NCES Integrated Postsecondary Education Data System (IPEDS) Finance survey.

For technical information, see the complete report:

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To obtain the complete report (NCES 1999–161), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov),* or contact GPO (202–512–1800).

[4]Vermont has only one degree-granting 2-year public institution.

Public, State, and Federal Libraries

Public Libraries

Public Libraries in the United States: Fiscal Year 1996

Adrienne Chute and P. Elaine Kroe

The information in this article was originally published in the Introduction and Highlights of the E.D. Tabs report of the same name. The universe data are from the Public Libraries Survey.

Introduction

The 40 tables in this report summarize information about public libraries in the 50 states and the District of Columbia for state fiscal year 1996.[1] These data were collected through the ninth Public Libraries Survey (PLS). The survey is conducted annually by the National Center for Education Statistics (NCES) through the Federal-State Cooperative System (FSCS) for Public Library Data. FSCS is a cooperative system through which states and outlying areas submit individual public library data to NCES on a voluntary basis. NCES aggregates the data to provide the state and national totals presented in this report. Data are imputed for nonresponding libraries.

This report includes information about public library service measures, such as reference transactions, public service hours, interlibrary loans, circulation, library visits, children's program attendance, and circulation of children's materials. It also includes information about the number, type, legal basis, administrative structure, operating income and expenditures, staffing, and collections of public libraries, as well as summary information about the number and type of public library service outlets.

Number of Public Libraries and Their Service Outlets and Legal Basis

Number and population served

There were 8,946 public libraries (administrative entities) in the 50 states and the District of Columbia in FY 1996. Eleven percent of the public libraries served nearly 71 percent of the population of legally served areas in the United States; each of these public libraries had a legal service area population of 50,000 or more.

Administrative structure and service outlets

Over 80 percent of public libraries had one single direct service outlet (an outlet that provides service directly to the public). Just under 20 percent had more than one

[1]However, some public libraries in seven states (Illinois, Maine, Michigan, Nebraska, Pennsylvania, Texas, and Vermont) reported data for FY 1994 or FY 1995.

direct service outlet. This report includes information about three types of public library service outlets: branch library outlets, central library outlets,[2] and bookmobile outlets. A total of 1,480 public libraries (over 16 percent) had one or more branch library outlets, with a total of 7,124 branches. The total number of central library outlets was 8,923. Thus, the total number of stationary outlets (central library outlets plus branch library outlets) was 16,047. Nine percent of public libraries had one or more bookmobile outlets, with a total of 966 bookmobiles.

Legal basis and interlibrary relationships

Nearly 54 percent of public libraries were part of a municipal government, almost 12 percent were part of a county or parish, and nearly 6 percent had multijurisdictional legal basis under an intergovernmental agreement. Almost 11 percent were nonprofit association or agency libraries, over 3 percent were part of a school district, and 8 percent were separate government units known as library districts. Over 1 percent were combinations of academic and public libraries or of school and public libraries. About 6 percent reported their legal basis as "other."

Nearly 70 percent of public libraries were members of a system, federation, or cooperative service, while over 28 percent were not. Over 2 percent served as the headquarters of a system, federation, or cooperative service.

Operating Income and Expenditures

Operating income

In FY 1996, over 78 percent of public libraries' total operating income of about $5.9 billion came from local sources, over 12 percent from the state, 1 percent from federal sources, and close to 9 percent from other sources, such as gifts and donations, service fees, and fines.

Nationwide, total per capita[3] operating income for public libraries was $23.37. Of that, $18.26 was from local sources, $2.84 from state sources, $.23 from federal sources, and $2.03 from other sources. Per capita operating income from local sources was under $3.00 for close to 12 percent of public libraries, $3.00 to $14.99 for over 48 percent of libraries, $15.00 to $29.99 for over 27 percent, and $30.00 or more for 13 percent.

Operating expenditures

Total operating expenditures for public libraries were over $5.5 billion in FY 1996. Of this, over 64 percent was expended for paid staff and just over 15 percent for the library collection.

Close to 38 percent of public libraries had operating expenditures of less than $50,000, over 38 percent expended between $50,000 and $399,999, and close to 24 percent expended $400,000 or more. The average U.S. per capita operating expenditure for public libraries was $21.98. The highest average per capita operating expenditure in the 50 states was $38.19 and the lowest was $9.42.

Staffing and Collections

Staffing

Public libraries had a total of 117,812 paid full-time-equivalent (FTE) staff. Of these, over 23 percent were librarians with the ALA-MLS,[4] and nearly 10 percent were librarians by title but did not have the ALA-MLS. Close to 67 percent of staff were reported as "other."

Collections

Nationwide, public libraries had over 711 million books and serial volumes in their collections, or 2.8 volumes per capita. By state, the number of volumes per capita ranged from 1.5 to 5.2. In addition to printed materials, public libraries nationwide had collections of over 25 million audio materials and over 13 million video materials.

Services

Circulation

In FY 1996, total nationwide circulation of public library materials was over 1.6 billion, or 6.5 per capita. The highest statewide circulation per capita was 12.4 and the lowest was 2.8.

Other service measures

Nationwide,

- over 10.5 million library materials were loaned by public libraries to other libraries;
- reference transactions in public libraries totaled over 284 million, or 1.1 per capita; and

[2] A central library outlet is either a single-outlet library or a library that is the operational center of a multiple-outlet library.

[3] Per capita figures are based on the total unduplicated population of legal service areas in the states, not on the total population of the states.

[4] ALA-MLS is defined as a master's degree from a graduate library education program accredited by the American Library Association (ALA).

- library visits in public libraries totaled over 1 billion, or 4 per capita.

Children's Services

Nationwide, circulation of children's materials was nearly 571 million, or close to 35 percent of total circulation. Attendance at children's programs was over 42 million.

Data source: The FY 1996 Public Libraries Survey (PLS).

For technical information, see the complete report:

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Measuring Inflation

Measuring Inflation in Public Libraries: A Comparison of Two Approaches, the Input Cost Index and the Cost of Services Index

Jay C. Chambers and Robert Vergun

This article was originally published as the Executive Summary of the Statistical Analysis Report of the same name. The sample survey data are from the American Library Association (ALA) Survey of Librarian Salaries and the U.S. Census Bureau's County and City Data Book, *and the universe data are from the NCES Public Libraries Survey (PLS).*

In an age of tight federal, state, and local government budgets, it is essential for officials in public agencies to have full and accurate information about the cost of providing public services. Public libraries are among those agencies that purchase a wide range of goods and services, and like other public agencies, they need to understand their costs of operation and justify requests for increases in funding. Over time, increases in costs result, at least in part, from inflationary pressures that affect the economy in general. Therefore, to allow meaningful comparisons of library revenue and expenditures over time, it is important to adjust reported dollars by an appropriate inflation index. However, use of the standard Consumer Price Index (CPI) for this purpose is insufficient because libraries purchase different goods from those purchased by typical households.

One source of information on public library expenditures is the Public Libraries Survey, conducted annually by the National Center for Education Statistics (NCES). This survey utilizes data collected from each state through the Federal-State Cooperative System (FSCS) for Public Library Data. However, because these data are not indexed for inflation, the true impact of inflation on public libraries cannot be assessed. For example, one cannot determine whether the increases in total library revenue that have been shown by FSCS data in recent years led to increases in services or were consumed by inflation.

Two Approaches to Developing an Index of Inflation for Public Libraries

This report presents two approaches to measuring inflation faced by public libraries:

- an approach based on a fixed market basket (FMB) of the prices of library inputs (i.e., prices of goods and services purchased by libraries, including personnel), which yields a public library *input cost index* (PLICI); and
- an approach based on an econometric model of library services and costs, which yields a public library *cost of services index* (PLCSI).

The PLICI represents essentially a weighted average of the series of public library input prices, while the PLCSI places emphasis on the cost of producing library services. The report presents estimates of public library inflation derived from each approach and compares each in terms of its advantages and disadvantages.

Fixed-market-basket approach

The FMB approach produces an index that is a weighted average of the indexes of the prices of library inputs. This approach uses a methodology similar to that employed in the development of the standard CPI. The standard CPI is essentially an index of the differences in the prices of consumer goods and services between two points in time, weighted by the typical basket of goods and services consumed by households during a base time period. Similarly, the input cost index developed in this report, using the FMB approach, is an index of the differences in the price of library inputs between two points in time, weighted by the typical basket of inputs purchased by libraries. This approach relies on a variety of data sources for the various price data that make up the PLICI. Using this methodology, one can determine a weighted average rate of inflation in the prices of these library inputs, where the weights used to aggregate these individual inputs are the average proportions of public library budgets (i.e., the budget shares) allocated to each input category. These weights or budget shares simply measure the importance of each input in the overall budget for public library operations. This report refers to the inflation index derived using the FMB as the PLICI.

Public library cost of services model

This approach is based on a model of public library services similar to models used by economists to analyze the costs of production in any goods or service industry.[1] It is represented by an econometric model of the systematic patterns of variation in library expenditures over time. In addition, the model controls for cost variations associated with changes in the level of library services such as circulation,

[1] See, for example, Mansfield (1975), pp. 118–232.

reference transactions, and library visits, as well as differences in geographic location. By controlling for variations in various types and levels of services rather than holding input levels fixed, this econometric model permits the inflation rates to take into account the effects of input substitutions and technological changes in the cost of doing business for libraries. The phrase "input substitutions" refers to the notion that those in charge of library operations will substitute away from utilizing relatively more expensive inputs toward the use of less expensive inputs over time to maintain service levels at the minimum possible cost. The phrase "technological changes" involves improvements in service levels (or reductions in costs with no diminution in services) that may arise, for example, from the use of computer technology or other time-saving procedures or devices. This cost of services model primarily uses a single data source—the NCES FSCS data on public libraries. This report refers to the inflation index derived using this cost of services model as the PLCSI.

Comparing the Fixed-Market-Basket Approach and the Cost of Services Model

Each approach involves certain assumptions about the way public libraries operate, and each contains limitations in the way cost data may be interpreted. In addition, the data requirements for using each model differ significantly, and the quality of the data used in calculating each varies considerably. A major difference between the two approaches is the clarity of what underlies the two indexes. Using the FMB model to derive the PLICI, one can see and more easily understand the data components, such as the cost indexes of the various inputs and the budget shares used to aggregate them into a single index. Moreover, this methodology may be familiar to those who are aware of the CPI, which has been published by the U.S. Bureau of Labor Statistics for decades. In contrast, deriving the PLCSI relies on the analytical tools of the economist, which may appear to the noneconomist as a bit of a black box. Yet economists have used the cost model for decades to analyze production and costs in many industries, including library services (e.g., see Chressanthis 1995 and DeBoer 1992).

Another major difference between the two indexes is that the PLICI represents essentially a weighted average of the series of public library input prices, while the PLCSI places emphasis on the cost of producing library services. As such, the PLCSI attempts to account for the patterns of variation in changes (e.g., improvements) in the level of library services, as well as differences in geographic location. By focusing on the types and levels of library services, the inflation rates produced by the PLCSI reflect input substitutions in response to relative price changes or changes in technology over time, which affect the way library inputs are combined to produce services. The inflation rates produced by the PLICI do not account for these factors.

It is worth noting that the PLCSI, by controlling for various types and levels of services in the way that it does, addresses at least some of the problems that economists have contended create bias in the CPI and other fixed-basket price indexes. A recent paper by Moulton (1996) addresses some of these problems with regard to the construction of the CPI.

A Comparison of Public Library Inflation Rates Using Each Approach

During the period from 1989–90 to 1992–93, the PLICI created by the American Institutes for Research (PLICIa)[2] shows an average annual rate of inflation of 4.3 percent in the prices of library inputs. In marked contrast, the cost-based PLCSI exhibits an average annual inflation rate of 3.9 percent during that same period. For comparison purposes, household consumer prices rose at an average annual rate of 3.9 percent, while producer prices rose at 2.4 percent over this same period.[3]

The PLICIa estimates of annual inflation rates based upon the FMB approach show roughly similar patterns of decline from 1989–90 to 1992–93 as annual inflation rates based upon the CPI. This is not surprising since several components of the CPI were used to calculate the input cost index of various library expenditure categories using the FMB approach. For example, the input cost index of the major library expenditure category, books and periodicals, is based upon the CPI data.

Inflation rates derived from the cost of services model show lower rates of inflation than those derived using the FMB approach. This is consistent with the expectation that the cost of services model should control better for increases in

[2]The full report examines two FMB-based indexes: one (PLICIa) was developed by the American Institutes for Research specifically for the purposes of this report; the other (PLICIb) was developed earlier by Research Associates of Washington (Halstead 1995).

[3]U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index, 1989–93; and Producer Price Index (PPI), 1989–93. The CPI is a weighted average of a series of price indexes corresponding to the goods and services purchased by the typical urban household. The PPI includes a series of the goods and services typically purchased by producers involved in the production of final goods and services for consumers.

the costs of library services due to improvements in the level of services or technological change.[4]

Implications for Further Research

This report provides suggestions about further data collection and research that would be useful in exploring alternative ways of developing a PLICI. The kinds of econometric models used in the development of the PLCSI have the potential to address the factors underlying differences in available library services. This can be accomplished by examining the systematic relationship between library outcomes or services in local communities in relation to variations in local community characteristics (e.g., income and education levels of the local community) and the federal and state grants on library spending and service levels.

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For technical information, see the complete report:

Chambers, J.C., and Vergun, R. (1999). *Measuring Inflation in Public Libraries: A Comparison of Two Approaches, the Input Cost Index and the Cost of Services Index* (NCES 1999–326).

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To obtain the complete report (NCES 1999–326), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov)*, or contact GPO (202–512–1800).

[4]For example, as in the rest of the economy, the demand for skilled workers might have increased relative to unskilled workers. Therefore, total employment of library personnel might have fallen, but those who remain might command higher salaries. These remaining librarians might have the necessary skills (e.g., computer skills) that are required to run a modern library. The FMB approach would not adjust for the increase in the skill level of librarians, and increases in library salaries might in part result from higher quality library personnel. This would upwardly bias the FMB measure of inflation for libraries.

State Library Agencies: Fiscal Year 1997

P. Elaine Kroe

This article was originally published as the Introduction and Highlights of an E.D. Tabs report of the same name. The universe data are from the State Library Agencies (STLA) Survey.

Introduction

This report contains data on state library agencies in the 50 states and the District of Columbia for state fiscal year 1997. The data were collected through the State Library Agencies (STLA) Survey, the product of a cooperative effort between the Chief Officers of State Library Agencies (COSLA), the U.S. National Commission on Libraries and Information Science (NCLIS), and the National Center for Education Statistics (NCES). The FY 1997 STLA Survey is the fourth in the series.

Background

A state library agency is the official agency of a state charged by the law of that state with the extension and development of public library services throughout the state, which has adequate authority under law of the state to administer state plans in accordance with the provisions of the Library Services and Construction Act (LSCA) (P.L. 101–254, as amended). Beyond these two essential roles, these agencies vary greatly. They are located in various departments of state government and report to different authorities. They are involved in various ways in the development and operation of electronic information networks. They provide different types of services to different types of libraries.

STLAs are increasingly receiving broader legislative mandates affecting libraries of all types in the states (i.e., public, academic, school, special, and library systems). For example, their administrative and developmental responsibilities under LSCA Title III (Interlibrary Cooperation and Resource Sharing) affect the operation of thousands of public, academic, school, and special libraries in the nation. STLAs provide important reference and information services to state government and administer the state library and special operations such as state archives, libraries for the blind and physically handicapped, and the State Center for the Book. The STLA may also function as the state's public library at large, providing service to the general public and state government employees. This report provides information on the variety of roles being played by such agencies and the various combinations of fiscal, human, and informational resources invested in such work.

Purpose of survey

The STLA Survey provides state and federal policymakers, researchers, and other interested users with descriptive information about STLAs in the 50 states and the District of Columbia. The survey also collects data on STLA services and financial assistance to local public libraries which, when added to the data collected by the NCES Public Libraries Survey, will help complete the national picture of public library service. NCES also conducts surveys of academic, school, and federal libraries, and of library cooperatives. Together, these data collections will contribute to a comprehensive national profile of libraries and information services.

Congressional authorization

The STLA Survey is conducted in compliance with the NCES mission "to collect, analyze, and disseminate statistics and other information related to education in the United States…," P.L. 103–382, Title IV, National Education Statistics Act of 1994, Sec. 404 (a).

Highlights

Governance

Nearly all state library agencies (48 states and the District of Columbia) are located in the executive branch of government. Of these, over 65 percent are part of a larger agency, the most common being the state department of education. In two states, Arizona and Michigan, the agency reports to the legislature.

Allied and other special operations

A total of 16 state library agencies reported having one or more allied operations. Allied operations most frequently linked with a state library agency are the state archives (10 states) and the state records management service (11 states). Fifteen state agencies contract with public or academic libraries in their states to serve as resource or reference/information service centers. Eighteen state agencies operate a State Center for the Book.[1]

[1]The State Center for the Book, which is part of the Center for the Book program sponsored by the Library of Congress, promotes books, reading, and literacy, and is hosted or funded by the state.

Electronic network development

All state library agencies plan or monitor electronic network development; 42 states and the District of Columbia operate such networks; and 46 states and the District of Columbia develop network content. All 50 states are involved in facilitating library access to the Internet in one or more of the following ways: training library staff or consulting in the use of the Internet; providing a subsidy for Internet participation; providing equipment needed to access the Internet; providing access to directories, databases, or online catalogs; or managing gopher/Web sites, file servers, bulletin boards, or listservs.

Library development services

Services to public libraries. Every state library agency provides these types of services to public libraries: administration of LSCA (Library Services and Construction Act) grants, collection of library statistics, and library planning, evaluation, and research. Nearly every state library agency provides consulting services and continuing education programs. Services to public libraries provided by at least three-quarters of state agencies include administration of state aid, interlibrary loan referral services, library legislation preparation or review, literacy program support, reference referral services, state standards or guidelines, summer reading program support, and union list development. Over three-fifths of state agencies provide Online Computer Library Center (OCLC) Group Access Capability (GAC) to public libraries and statewide public relations or library promotion campaigns. Less common services to public libraries include accreditation of libraries, certification of librarians, cooperative purchasing of library materials, preservation/conservation services, and retrospective conversion of bibliographic records.

Services to academic libraries. At least two-thirds of state library agencies report the following services to the academic library sector: administration of LSCA Title III grants, continuing education, interlibrary loan referral services, reference referral services, and union list development. Less common services to academic libraries include cooperative purchasing of library materials, literacy program support, preservation/conservation, retrospective conversion, and state standards or guidelines. No state library agency accredits academic libraries; only Washington State certifies academic librarians.

Services to school library media centers. At least two-thirds of all state library agencies provide continuing education, interlibrary loan referral services, and reference referral services to school library media centers (LMCs). Services to LMCs provided by at least half of all state agencies include administration of LSCA Title III grants, consulting services, and union list development. Less common services to LMCs include administration of state aid, cooperative purchasing of library materials, and retrospective conversion. No state library agency accredits LMCs or certifies LMC librarians.

Services to special libraries. Over two-thirds of state agencies serve special libraries[2] through administration of LSCA grants, consulting services, continuing education, interlibrary loan referral, reference referral, and union list development. Less common services to special libraries include administration of state aid, cooperative purchasing of library materials, and summer reading program support. Only Nebraska accredits special libraries and only Washington State certifies librarians of special libraries.

Services to systems. At least three-fifths of state agencies serve library systems[3] through administration of LSCA grants, consulting services, continuing education, interlibrary loan referral, library legislation preparation or review, reference referral, and library planning, evaluation, and research. Accreditation of systems is provided by only six states, and certification of librarians by only seven states.

Service outlets

State library agencies reported a total of 153 service outlets. Main or central outlets and other outlets (excluding bookmobiles) each accounted for 47.1 percent of the total, and bookmobiles represented 5.9 percent of the total.

Collections

The number of books and serial volumes held by state library agencies totaled 22.4 million, with New York accounting for the largest collection (2.4 million). Five state agencies had book and serial volumes of over one million. In other states, these collections ranged from 500,000 to one million (12 states); 200,000 to 499,999 (10 states); 100,000 to 199,999 (10 states); 50,000 to 99,999 (6 states); and under 50,000 (6 states). The state library agency in

[2]A special library is a library in a business firm, professional association, government agency, or other organized group; a library that is maintained by a parent organization to serve a specialized clientele; or an independent library that may provide materials or services, or both, to the public, a segment of the public, or other libraries. Scope of collections and services are limited to the subject interests of the host or parent institution. Special libraries include libraries in state institutions.

[3]A system is a group of autonomous libraries joined together by formal or informal agreements to perform various services cooperatively, such as resource sharing, communications, etc. Systems include multitype library systems and public library systems, but not multiple outlets under the same administration.

Maryland does not maintain a collection, and the District of Columbia does not maintain a collection in its function as a state library agency.

The number of serial subscriptions held by state library agencies totaled over 84,000, with New York holding the largest number (over 14,300). Ten state agencies reported serial subscriptions of over 2,000. In other states, these collections ranged from 1,000 to 1,999 (6 states), 500 to 999 (18 states), 100 to 499 (13 states), and under 100 (one state). The state library agencies in Maryland and the District of Columbia do not maintain collections.

Staff

The total number of budgeted full-time-equivalent (FTE) positions in state library agencies was 3,762. Librarians with ALA-MLS degrees[4] accounted for 1,206 of these positions, or 32.1 percent of total FTE positions. Rhode Island reported the largest percentage (57.1) of ALA-MLS librarians, and Virginia reported the lowest (16.3 percent).

Income

State library agencies reported a total income of $847.1 million in FY 1997 (83.1 percent from state sources, 15.4 percent from federal, and 1.5 percent from other sources). Of state library agency income received from state sources, over $477 million (67.8 percent) was designated for state aid to libraries. Seven states had over 75 percent of their income from state sources set aside for state aid. Georgia had the largest percentage of state library agency income set aside for state aid (97.4 percent). Six states and the District of Columbia targeted no state funds for aid to libraries. Hawaii, Iowa, South Dakota, Vermont, Washington, and the District of Columbia had all of their state income set aside for operation of the state agency.[5]

Expenditures

State library agencies reported total expenditures of $822.2 million. The largest percentage (83.6 percent) was from state funds, followed by federal funds (15.3 percent) and other funds (1.1 percent). In five states, over 90 percent of total expenditures were from state sources. These states were Georgia (94.7 percent), Massachusetts (93.5 percent), Illinois (92.4 percent), New York (92.0 percent), and Maryland (91.9 percent). Utah had the lowest percentage of expenditures from state sources (59.2 percent).

Almost 70 percent of total state library expenditures were for financial assistance to libraries, with the largest percentages expended on individual public libraries (53.1 percent) and public library systems (16.4 percent). Most of the expenditures for financial assistance to libraries were from state sources (86.2 percent), while 13.6 percent were from federal sources.

Fifteen state library agencies reported expenditures for allied operations. These expenditures totaled over $24.0 million and represented 2.9 percent of total expenditures by state library agencies. Of states reporting such expenditures, Texas had the highest expenditure ($3.3 million) and Vermont the lowest ($398,000).[6]

Twenty-seven state library agencies reported a total of over $16.7 million in grants and contracts expenditures to assist public libraries with state education reform initiatives or the National Education Goals. The area of adult literacy accounted for the largest proportion of such expenditures (47.7 percent), followed by the areas of lifelong learning (34.9 percent) and readiness for school (17.4 percent). Three state agencies (Nebraska, Oregon, and Pennsylvania) focused such expenditures exclusively on readiness for school projects, and five state agencies (Georgia, Kansas, New Jersey, Oklahoma, and Utah) focused their expenditures exclusively on adult literacy projects. In four state agencies (Connecticut, Indiana, Michigan, and South Carolina), over two-thirds of such expenditures were for lifelong learning projects.

Data source: The FY 1997 State Library Agencies (STLA) Survey.

For technical information, see the complete report:

Kroe, P.E. (1999). *State Library Agencies: Fiscal Year 1997* (NCES 1999–304).

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[4]These are paid librarians with Master of Library Science degrees from programs accredited by the American Library Association.

[5]The District of Columbia Public Library functions as a state library agency and is eligible for federal LSCA funds in this capacity. The state library agency in Hawaii is associated with the Hawaii State Public Library System and operates all public libraries within its jurisdiction. The state funds for aid to libraries for these two agencies are reported on the NCES Public Libraries Survey, rather than on the STLA Survey, because of the unique situation of these two state agencies and in order to eliminate duplicative reporting of these data.

[6]Although Alaska reported allied operations, the expenditures for such operations are not from the state library agency budget.

TIMSS Videotape Study

The TIMSS Videotape Classroom Study: Methods and Findings From an Exploratory Research Project on Eighth-Grade Mathematics Instruction in Germany, Japan, and the United States

James W. Stigler, Patrick Gonzales, Takako Kawanaka, Steffen Knoll, and Ana Serrano

This article was originally published as the Executive Summary of the Research and Development Report of the same name. The sample survey data are from the Videotape Classroom Study, part of the 1994–95 Third International Mathematics and Science Study (TIMSS).

Important Note

Research and Development Reports are intended to

- Share studies and research that are developmental in nature.
- Share results of studies that are on the cutting edge of methodological developments.
- Participate in discussions of emerging issues of interest to researchers.

These reports present results or discussion that do not reach definitive conclusions at this point in time, either because the data are tentative, the methodology is new and developing, or the topic is one on which there are divergent views. Therefore, the techniques and inferences made from the data are tentative and are subject to revision.

This report presents the methods and preliminary findings of the Videotape Classroom Study, a video survey of eighth-grade mathematics lessons in Germany, Japan, and the United States. Part of the Third International Mathematics and Science Study (TIMSS), this exploratory research project is the first study to collect videotaped records of classroom instruction—in any subject—from national probability samples.

Objectives

The Videotape Classroom Study had four goals:

- Provide a rich source of information regarding what goes on inside eighth-grade mathematics classes in the three countries.
- Develop objective observational measures of classroom instruction to serve as valid quantitative indicators, at a national level, of teaching practices in the three countries.
- Compare actual mathematics teaching methods in the United States and the other countries with those recommended in current reform documents and with teachers' perceptions of those recommendations.
- Assess the feasibility of applying videotape methodology in future wider scale national and international surveys of classroom instructional practices.

Scope and Methods

The study sample included 231 eighth-grade mathematics classrooms: 100 in Germany, 50 in Japan, and 81 in the United States. The three samples were selected from among the schools and classrooms participating in the 1994–95 TIMSS assessments. They were designed as nationally representative samples of eighth-grade students in the three countries, although some minor deviations arose. In the United States, the TIMSS sample consisted of 109 schools,

each of which was paired with a school that had similar characteristics. Forty of the sampled schools refused to participate. Twelve of these schools were replaced with schools from the "paired" sample. Thus, the final video sample in the United States consisted of 81 schools. The high refusal rate among originally sampled U.S. schools should be kept in mind as a potential source of sampling bias. In the Japanese sample, when there was more than one eighth-grade class in a school, the principal exercised discretion in the choice of classrooms to be videotaped.

One lesson was videotaped in each classroom at some point during the school year. The specific date for videotaping was determined in consultation with the school and the teacher in order to minimize conflicts with special events, such as field trips or school holidays, and to minimize the videographers' travel expenses. Tapes were encoded and stored digitally on CD-ROM and were accessed and analyzed using multimedia database software developed especially for this project. All lessons were transcribed and then analyzed on a number of dimensions by teams of coders who were native speakers of the three languages. Analyses presented here are based on weighted data. The analyses focused on the content and organization of the lessons, as well as on the instructional practices used by teachers during the lessons.

Findings

The video data are vast and will continue to provide rich analysis opportunities for researchers. The findings reported here, while preliminary, reveal a number of differences in instructional practices across the three cultures. These differences fall into four broad categories: (1) how lessons are structured and delivered; (2) what kind of mathematics is presented in the lessons; (3) what kind of mathematical thinking students are engaged in during the lessons; and (4) how teachers view reform.

How lessons are structured and delivered

To understand how lessons are structured, it is important first to know what teachers intend students to learn from the lessons. Information gathered from teachers in the video study indicates an important cross-cultural difference in lesson goals. Solving problems is the end goal for the U.S. and German teachers: how well students solve problems is the metric by which success is judged. In Japan, problem solving is assumed to play a different role. Understanding mathematics is the overarching goal; problem solving is merely the context in which understanding can best grow.

Following this difference in goals, we can begin to identify cultural differences in the scripts teachers in each country use to generate their lessons. These different scripts are probably based on different assumptions about the role of problem solving in the lessons, about the way students learn from instruction, and about the proper role of the teacher.

Although the analyses are preliminary, there appears to be a clear distinction between the U.S. and German scripts, on the one hand, and the Japanese script, on the other. U.S. and German lessons tend to have two phases: an initial acquisition phase and a subsequent application phase. In the acquisition phase, the teacher demonstrates or explains how to solve an example problem. The explanation might be purely procedural (as most often happens in the United States) or may include development of concepts (more often the case in Germany). Yet the goal in both countries is to teach students a method for solving the example problem(s). In the application phase, students practice solving examples on their own while the teacher helps individual students who are experiencing difficulty.

Japanese lessons appear to follow a different script. Whereas in U.S. and German lessons instruction comes first, followed by application, in Japanese lessons the order of activity is generally reversed. Problem solving comes first, followed by a time in which students reflect on the problem, share the solution methods they have generated, and jointly work to develop explicit understandings of the underlying mathematical concepts. While students in U.S. and German classrooms must follow their teachers as they lead students through the solution of example problems, Japanese students have a different job: to invent their own solutions, then reflect on those solutions in an attempt to increase understanding.

In addition to these differences in goals and scripts, we also find differences in the coherence of lessons in the three countries. The greatest differences are between U.S. lessons and Japanese lessons. U.S. lessons are less coherent than Japanese lessons if coherence is defined by several criteria: U.S. lessons are more frequently interrupted, both from outside the classroom and within; U.S. lessons contain more topics—within the same lesson—than Japanese lessons; and Japanese teachers are more likely to provide explicit links or connections between different parts of the same lesson.

What kind of mathematics is presented

Looking beyond the flow of the lessons, we also find cross-cultural differences in the kind of mathematical content that is presented in the lessons. When viewed in comparison to the content of lessons in the 41 TIMSS countries, the average eighth-grade U.S. lesson in the video sample deals with mathematics at the seventh-grade level by international standards, whereas in Japan the average level is ninth grade. The content of German lessons averages at the eighth-grade level.

The quality of the content also differs across countries. For example, most mathematics lessons include some mixture of concepts and applications of those concepts to solving problems. How concepts are presented, however, varies a great deal across countries. Concepts might simply be stated, as in "the Pythagorean theorem states that $a^2 + b^2 = c^2$," or they might be developed and derived over the course of the lesson. More than three-fourths of German and Japanese teachers develop concepts when they include them in their lessons, compared with about one-fifth of U.S. teachers. None of the U.S. lessons include proofs, whereas 10 percent of German lessons and 53 percent of Japanese lessons include proofs.

Finally, as part of the video study, an independent group of U.S. college mathematics teachers evaluated the quality of mathematical content in a sample of the video lessons. They based their judgments on a detailed written description of the content that was altered for each lesson to disguise the country of origin (e.g., by deleting references to currency). They completed a number of in-depth analyses, the simplest of which involved making global judgments of the quality of each lesson's content on a three-point scale (low, medium, and high). (Quality was judged according to several criteria, including the coherence of the mathematical concepts across different parts of the lesson and the degree to which deductive reasoning was included.) Whereas 39 percent of the Japanese lessons and 28 percent of the German ones received the highest rating, none of the U.S. lessons received the highest rating. Eighty-nine percent of U.S. lessons received the lowest rating, compared with 11 percent of Japanese lessons.

What kind of mathematical thinking students use

When we examine the kind of work students engage in during the lessons, we find a strong resemblance between Germany and the United States, with Japan looking distinctly different. Three types of work were coded in the video study: practicing routine procedures, applying concepts to novel situations, and inventing new solution methods or thinking. Ninety-six percent of student working time in Germany and 90 percent in the United States is spent practicing routine procedures, compared with 41 percent in Japan. Japanese students spend the majority of their time inventing new solutions that require conceptual thinking about mathematics.

How teachers view and implement reform ideas

A great deal of effort has been put into the reform of mathematics teaching in the United States in recent years. Numerous documents—such as the National Council of Teachers of Mathematics' *Curriculum and Evaluation Standards for School Mathematics* (1989) and *Professional Standards for Teaching Mathematics* (1991)—encourage teachers to change the way they teach. There is great agreement, at least among mathematics educators, as to what desirable instruction should look like. Although most of the current ideas stated in such documents are not operationalized to the extent that they could be directly coded, it is possible to view some of the indicators developed in the video study in relation to these current ideas.

When the video data are viewed in this way, Japanese teachers, in certain respects, come closer to implementing the spirit of current ideas advanced by U.S. reformers than do U.S. teachers. For example, Japanese lessons include high-level mathematics, a clear focus on thinking and problem solving, and an emphasis on students deriving alternative solution methods and explaining their thinking. In other respects, though, Japanese lessons do not follow such reform guidelines. They include more lecturing and demonstration than even the more traditional U.S. lessons, and we never observed calculators being used in a Japanese classroom.

Regardless of whether or not Japanese classrooms share features of "reform" classrooms, it is quite clear that the typical U.S. classroom does not. Furthermore, the U.S. teachers, when asked if they were aware of current ideas about the best ways to teach mathematics, responded overwhelmingly in the affirmative. Seventy percent of the teachers claimed to be implementing such ideas in the very lesson that we videotaped. When asked to justify these claims, the U.S. teachers referred most often to surface features, such as the use of manipulatives or cooperative

groups, rather than to the key point of the reform recommendations, which is to focus lessons on high-level mathematical thought. Although some teachers appear to have changed these surface-level characteristics of their teaching, the data collected for this study suggest that these changes have not affected the deeper cultural scripts from which teachers work.

Key points

Bearing in mind the preliminary nature of these findings, as well as the interpretations of the findings, we can, nevertheless, identify four key points:

- The content of U.S. mathematics classes requires less high-level thought than classes in Germany and Japan.
- U.S. mathematics teachers' typical goal is to teach students how to do something, while Japanese teachers' goal is to help them understand mathematical concepts.
- Japanese classes share many features called for by U.S. mathematics reforms, while U.S. classes are less likely to exhibit these features.
- Although most U.S. math teachers report familiarity with reform recommendations, relatively few apply the key points in their classrooms.

These initial findings suggest a need for continued analysis of these data on eighth-grade mathematics practices. Caution should be exercised in generalizing to other subjects or grade levels.

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Data source: The 1994–95 Third International Mathematics and Science Study (TIMSS) Videotape Classroom Study.

For technical information, see the complete report:

Stigler, J.W., Gonzales, P., Kawanaka, T., Knoll, S., and Serrano, A. *The TIMSS Videotape Classroom Study: Methods and Findings From an Exploratory Research Project on Eighth-Grade Mathematics Instruction in Germany, Japan, and the United States* (NCES 1999–074).

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To obtain the complete report (NCES 1999–074), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov)*, or contact GPO (202–512–1800).

Digest

Digest of Education Statistics: 1998

Thomas D. Snyder

This article was excerpted from the Foreword and Introduction to the Compendium of the same name. The sample survey and universe data are from numerous sources, both government and private, and draw especially on the results of surveys and activities carried out by NCES.

The 1998 edition of the *Digest of Education Statistics* is the 34th in a series of publications initiated in 1962. (The *Digest* has been issued annually except for combined editions for the years 1977–78, 1983–84, and 1985–86.) Its primary purpose is to provide a compilation of statistical information covering the broad field of American education from kindergarten through graduate school.

The publication contains information on a variety of subjects in the field of education statistics, including the number of schools and colleges, teachers, enrollments, and graduates, in addition to educational attainment, finances, federal funds for education, employment and income of graduates, libraries, and international education. Supplemental information on population trends, attitudes on education, education characteristics of the labor force, government finances, and economic trends provides background for evaluating education data.

In addition to updating many of the statistics that have appeared in previous years, this edition contains a significant amount of new material, including

- parental involvement in education-related activities;
- number of hours young children spend in day-care programs;
- performance of 8th-grade students in music, theatre, and visual arts;
- finances of nonprofit institutions of higher education;
- international comparisons of the performance of 12th-grade students in mathematics and science; and
- percentage of home computer users using specific applications.

Participation in Formal Education

In the fall of 1998, about 67.3 million persons were enrolled in American schools and colleges (table A). About 3.8 million were employed as elementary and secondary school teachers and as college faculty. Other professional, administrative, and support staff of educational institutions numbered 4.2 million. Thus, about 75 million people were involved, directly or indirectly, in providing or receiving formal education. In a nation with a population of about 270 million, more than 1 out of every 4 persons participated in formal education.

Elementary/Secondary Education

Enrollment

Since the enrollment rates of kindergarten and elementary school age children have not changed much in recent years,

Table A.—Estimated number of participants in elementary and secondary education and in higher education: Fall 1998
(In millions)

Participants	All levels (elementary, secondary, and higher education)	Elementary and secondary schools			Institutions of higher education		
		Total	Public	Private	Total	Public	Private
Total	75.4	58.6	52.0	6.6	16.8	12.9	3.9
Enrollment*	67.3	52.7	46.8	5.9	14.6	11.4	3.2
Teachers and faculty	3.8	3.1	2.7	0.4	0.7	0.5	0.2
Other professional, administrative, and support staff	4.2	2.8	2.5	0.2	1.5	1.0	0.5

*Includes enrollments in local public school systems and in most private schools (religiously affiliated and nonsectarian). Excludes subcollegiate departments of institutions of higher education, residential schools for exceptional children, and federal schools. Elementary and secondary includes most kindergarten and some nursery school enrollment. Excludes preprimary enrollment in schools that do not offer first grade or above. Higher education comprises full-time and part-time students enrolled in degree-credit and non-degree-credit programs in universities, other 4-year colleges, and 2-year colleges.

NOTE: The enrollment figures include all students in elementary and secondary schools and colleges and universities. However, the data for teachers and other staff in public and private elementary and secondary schools and colleges and universities are reported in terms of full-time equivalents. Because of rounding, details may not add to totals.

SOURCE: U.S. Department of Education, National Center for Education Statistics, unpublished projections and estimates. (This table was prepared July 1998.) (Originally published as table 1 on p. 11 of the complete report from which this article is excerpted.)

increases in elementary school enrollment have been driven primarily by increases in the number of young people. Enrollment in public elementary and secondary schools rose 19 percent between 1985 and 1998. The fastest growth occurred in the elementary grades, where enrollment rose 24 percent over the same period, from 27.0 million in 1985 to a record high of 33.5 million in 1998. Secondary enrollments declined 8 percent from 1985 to 1990, but then rose by 17 percent from 1990 to 1998, for a net increase of 7 percent. Private school enrollment grew more slowly than public school enrollment over this period, rising 7 percent, from 5.6 million in 1985 to 5.9 million in 1998. As a result, the percentage of students enrolled in private schools declined slightly, from 12 percent in 1985 to 11 percent in 1998.

NCES forecasts record levels of enrollment during the late 1990s. The fall 1998 public school enrollment marks a new record, and new records are expected every year through the early 2000s. Public elementary enrollment is projected to grow slowly over the next few years and then decline slightly, so that the fall 2008 projection is almost the same as the 1998 enrollment. In contrast, public secondary school enrollment is expected to have a substantial increase of 11 percent between 1998 and 2008.

Teachers

An estimated 3.1 million elementary and secondary school teachers were engaged in classroom instruction in the fall of 1998. This number has risen in recent years, up about 7 percent since 1988. The number of public school teachers in 1998 was about 2.7 million and the number of private school teachers was about 0.4 million. About 1.9 million teachers taught in elementary schools, while about 1.2 million were teaching at the secondary level.

The number of public school teachers has risen at about the same rate as the number of students over the past 10 years, resulting in very small changes in the pupil/teacher ratio. In the fall of 1998, there were 17.2 public school pupils per teacher, compared with 17.3 public school pupils per teacher 10 years earlier. During the same time period, the pupil/teacher ratio in private schools fell from 15.2 to 14.9. Despite the historical trend toward lower pupil/teacher ratios, the fluctuations since 1990 suggest stability in the pupil/teacher ratio.

The salaries of public school teachers, which lost purchasing power to inflation during the 1970s, rose faster than the inflation rate in the 1980s. The rising salaries reflected an interest by state and local education agencies in boosting teacher salary schedules and, to some extent, an increase in teachers' experience and education levels. Since 1990–91,

salaries for teachers have fallen slightly after adjusting for inflation. The average salary for teachers in 1997–98 was $39,385.

Student performance

Reading. Overall, the reading achievement scores for the country's 9-, 13-, and 17-year-old students are mixed. Reading performance scores for 9- and 13-year-olds were somewhat higher in 1996 than they were in 1971. However, there has been little change since the mid-1980s. The reading performance of 17-year-olds was about the same in 1996 as it was in 1971. Black 13- and 17-year-olds exhibited higher reading performance in 1996 than in 1971. Black 9-year-olds' performance improved significantly between 1971 and 1980, but it has not improved further. The performance levels of white 9- and 13-year-olds also rose between 1971 and 1996. Separate data for Hispanics were not gathered in 1971, but changes between 1975 and 1996 indicate an increase among 9-year-olds. There was no significant difference between the 1975 and 1996 reading performance of 13- and 17-year-old Hispanics.

Mathematics. Results from assessments of mathematics proficiency indicate that 9- and 13-year-old students improved their performance between 1973 and 1996. However, there has been very little change for 9-year-olds since 1990, and the performance of older students on advanced mathematical operations has been stable. The proportion of 17-year-olds who demonstrated skill with moderately complex procedures and reasoning rose from 52 percent in 1978 to 60 percent in 1996. During the same time period, the proportion of 17-year-olds with skill in multistep problem solving and algebra remained unchanged.

White, black, and Hispanic students improved their mathematics performance between 1973 and 1996, among all three age groups. Mathematics scores for white, black, and Hispanic 9-, 13-, and 17-year-olds improved between 1986 and 1996.

A 1996 voluntary assessment of the states found that mathematics proficiency varied widely among eighth-graders in the 42 jurisdictions (40 states, Guam, and the District of Columbia) that participated in the program. Overall, 62 percent of eighth-grade students performed at or above the basic level in mathematics. Only four states, the District of Columbia, and Guam had fewer than 50 percent of students performing at least at the basic level in math. Ten states had 70 percent or more of their students performing at or above the basic level.

Science. Long-term changes in science performance have been mixed, though changes over the past 10 years have been generally positive. In 1996, science performance among 17-year-olds was lower than in 1970, but higher than in 1986. The science performance level of 13-year-olds was higher in 1996 than in 1986, recouping earlier declines. The science performance of 9-year-olds increased between 1986 and 1996, after showing no significant change between 1970 and 1986.

The science performance of white 9- and 13-year-olds was about the same in 1996 as it was in 1970, and the performance of 17-year-olds was lower in 1996. However, the performance at each of the three age groups was higher in 1996 than in 1986. Black and Hispanic 9- and 13-year-olds had higher science performance in 1996 than in the 1970s. Black 17-year-olds showed a decline through 1982 but an increase by 1996. Despite significant gains by younger black and Hispanic students, their average performance remains lower than for white students. Although the performance gap between black and white students has narrowed, the science performance for black 13-year-olds was slightly lower than the average for white 9-year-olds in 1996.

International comparisons. The results of a 1995 international assessment in math and science show that U.S. fourth- and eighth-graders compare more favorably with other countries in science than in mathematics. In mathematics, U.S. eighth-graders scored below the international average, falling below 20 of the 41 countries tested. Fourth-graders performed above the international average, scoring below 7 of the 26 countries tested, including Singapore, Korea, and Japan. Students at both the fourth- and eighth-grade levels scored above the international average in science. Eighth-grade students in the United States were outperformed by 4 out of 41 countries. Fourth-grade students once again compared more favorably with their international counterparts than eighth-grade students. Out of 26 countries that participated in the fourth-grade assessment, only 1 country outperformed the U.S. students in science.

The international standing of U.S. students was stronger at the 8th grade than at the 12th grade in both mathematics and science among the countries that participated in the assessments at both grade levels. U.S. 12th-graders performed below the international average and among the lowest of the 21 countries on the assessment of mathematics general knowledge. U.S. students were outperformed by those in 14 countries and outperformed those in 2

countries. U.S. 12th-graders also performed below the international average and among the lowest of the 21 countries on the assessment of science general knowledge. U.S. students were outperformed by students in 11 countries, and they outperformed students in 2 countries. U.S. students' scores were not significantly different from those of seven countries, including France, Germany, Italy, and the Russian Federation (Takahira et al., 17 and 18).

Public perception

Public perception about problems facing the local public schools has shifted in the past several years. Between 1985 and 1990, an increasing proportion of people believed that drug use was a major problem facing schools. Then, the proportion of people who felt drug use was a major problem facing schools fell, from 38 percent in 1990 to 10 percent in 1998. In the latest survey, lack of discipline was cited as a major problem by 14 percent of the population; fighting, gangs, and violence was cited by 15 percent; and the lack of financial support was cited by 12 percent.

Higher Education

Enrollment

College enrollment hit a record level of 14.5 million in fall 1992 and was expected to reach a new high in 1998, after falling slightly between 1993 and 1995. Despite decreases in the traditional college-age population during the 1980s and early 1990s, total enrollment has increased because of the high enrollment rate of older women and a rising rate of college attendance for recent high school graduates. Since 1980, the number of part-time students has generally increased at a faster rate than full-time students.

Faculty and staff

During the fall of 1995, there were 932,000 faculty members in higher education institutions. Making up this figure were 551,000 full-time and 381,000 part-time faculty. In 1992, full-time instructors generally taught more hours and more students than part-time instructors, with 61 percent of full-time instructors teaching 8 or more hours per week and two-thirds teaching 50 or more students. About 30 percent of part-time instructors taught 8 or more hours per week and 30 percent taught 50 or more students.

White males constituted a disproportionate share of full-time college faculty in 1995. Overall, about 57 percent of full-time faculty were white males. However, this distribution varied substantially by rank of faculty. Among full professors, the proportion of white males was 75 percent. The proportion was somewhat lower among the lower ranked faculty, with white males making up 39 percent of the lecturers.

Graduates, Degrees, and Attainment

The number of high school graduates in 1997–98 totaled about 2.7 million. Approximately 2.4 million graduated from public schools and less than 0.3 million graduated from private schools. The number of high school graduates has declined from its peak in 1976–77, when 3.2 million people earned their diplomas. The dropout rate declined over this period, from 14 percent of all 16- to 24-year-olds in 1977 to 11 percent in 1997. The number of degrees conferred by institutions of higher education during the 1997–98 school year by degree level has been projected: 520,000 associate degrees; 1,172,000 bachelor's degrees; 406,000 master's degrees; 78,400 first-professional degrees; and 45,200 doctor's degrees.

The Bureau of the Census has collected annual statistics on the educational attainment of the population in terms of years of school completed. Between 1980 and 1997, the proportion of the adult population 25 years of age and over with 4 years of high school or more rose from 69 percent to 82 percent, and the proportion of adults with at least 4 years of college increased from 17 percent to 24 percent. In contrast, the proportion of young adults (25- to 29-year-olds) completing high school showed a small increase of about 2 percentage points.

Education Expenditures

Expenditures for public and private education, from preprimary through graduate school, are estimated at $584 billion for 1997–98. The expenditures of elementary and secondary schools are expected to total about $351 billion for 1997–98, while those of institutions of higher education will be about $233 billion. Viewed in another context, the total expenditures for education are expected to amount to about 7.2 percent of the gross domestic product in 1997–98, about the same percentage as in the recent past.

Summary

The statistical highlights presented here provide a quantitative description of the current American education scene. Clearly, from the large number of participants, the number of years that people spend in school, and the large sums expended by educational institutions, it is evident that the American people have a high regard for education. Assessment data indicate that there have been improvements in

mathematics and science performance between 1986 and 1996. A high proportion of high school graduates are going on to college. Yet, wide variations in student proficiency from state to state and mediocre mathematics scores of American students in international assessments pose challenges.

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Data sources: The *Digest* draws on over 50 sources of data, including most NCES studies.

For technical information, see the complete report:

Snyder, T.D. (1999). *Digest of Education Statistics: 1998* (NCES 1999–036).

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To obtain the complete report (NCES 1999–036), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov)*, or contact GPO (202–512–1800).

Common Core of Data

Classification Evaluation of the 1994–95 Common Core of Data: Public Elementary/Secondary Education Agency Universe Survey

Stephen Owens

This article was originally published as the Introduction to the technical report of the same name. The evaluation focuses on the Public Elementary/Secondary Education Agency Universe Survey, part of the 1994–95 Common Core of Data (CCD).

Introduction

This report is the second in a series that will provide a comprehensive assessment of data quality in the Common Core of Data (CCD) as it relates to coverage, classification, reliability, validity, survey design, and estimation.[1] The purpose of this evaluation is to analyze and document classification issues. The results can be used for ongoing process improvement of the CCD statistical program. This evaluation also explores such issues as school district geography, enrollment, governance, history, and service delivery and relates each to agency and school classification.

During the reference frame of this evaluation, the CCD statistical program consisted of four separate surveys. These were the Public Elementary/Secondary Education Agency Universe Survey (hereafter referred to as the agency survey), the Public Elementary/Secondary School Universe Survey (hereafter referred to as the school survey), the State Non-Fiscal Survey (hereafter referred to as the state aggregate survey), and the National Public Education Fiscal Survey (NPEFS).

This evaluation was undertaken primarily to examine the agency portion of the survey, but it does integrate the school portion for certain purposes. Agencies are authorized under state law to perform certain services and to operate certain types of schools. A comparison of school types reported by various agencies can be found in the complete report.

A detailed analysis of CCD definitions contained in both the glossary and field description portions of the instructions for completing the survey is also included. The purpose of this analysis is to describe potential definitional inconsistencies, omissions, and redundancies. The analysis is not intended to serve as a framework for a new set of definitions, but it describes possible validity and reliability problems as they relate to survey definitions.

The evaluation process was initiated by researching state statutes and administrative codes to determine the powers, governance, service area, and services provided by agencies existing in each state. This research was based on existing research done by the Bureau of the Census in connection with the 1992 Census of Governments and updated based on state legislation passed after the reference date of that census. These findings are included in the complete report.

Summary of Major Findings and Recommendations

- The CCD survey is used as a basis for many other surveys within the Department of Education. It would be an ideal platform on which to unify public elementary/secondary education definitions for all related surveys.

[1] The first report in the series (Owens 1997) compared the CCD Agency Universe Survey with other sources in order to identify potential coverage problems.

- The full potential of the CCD survey has yet to be realized. An improved CCD survey could take on several important roles.
- CCD definitions are generally inadequate. Many are neither exhaustive nor exclusive and present obvious problems for respondents. The inadequacy of and misinterpretation of survey definitions lead to unreliable and invalid data.
- Schools and agencies are canvassed in separate surveys, but CCD definitions do not provide a clear distinction between the two components.
- To reduce reporting errors, refinements in survey methodology should be explored. Possibilities include assigning a central reference person to interpret survey definitions, establishing state-to-federal definitional crosswalks, directly canvassing local education agencies, and restructuring the survey to meet state reporting capabilities.
- CCD definitions should be revised so that they are both flexible and exhaustive. If individual arrangements in states differ from conventional approaches, and cannot be made to fit into the definitional framework, they must be clearly documented and explained.
- In order to prevent duplication of effort and unnecessary respondent burden, all education surveys that use the CCD as their sampling frame should be coordinated. Definitions should be unified where possible, and information should be shared among surveys where possible.
- Enrollments from the school, agency, and state aggregate surveys are not comparable. Enrollment figures represent different things in different states on different surveys. The basis for enrollment must be adequately defined.
- Certain geographic coding schemes in the CCD survey may produce misleading results. With the completion of the school district mapping project,[2] the utility of these codes may be in question.
- The advent of a new period of education reform makes this an opportune time to revisit the structure and content of the CCD survey.

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For technical information, see the complete report:

Owens, S. (1999). *Classification Evaluation of the 1994–95 Common Core of Data: Public Elementary/Secondary Education Agency Universe Survey* (NCES 1999–316).

For additional information on methodology, see

Documentation for the 1994–95 Common Core of Data Public Agency Universe Survey Data. Available: *http://nces.ed.gov/ccd/pubagency.html*

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To obtain the report (NCES 1999–316), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov)*, or contact GPO (202–512–1800).

[2]The school district mapping project integrated school district boundaries into the Census Bureau's mapping system. Data sets that have detail down to the census block can now be used for school district analysis (Drews 1994; U.S. Department of Education 1996).

Indirect State-Level Estimation for the Private School Survey

Beverly D. Causey, Leroy Bailey, and Steven Kaufman

This article is excerpted from the Technical Report of the same name. The universe data are from the NCES Private School Universe Survey (PSS).

Introduction

The Private School Universe Survey (PSS) is conducted by the Bureau of the Census, under the sponsorship of the National Center for Education Statistics. It is a mail survey, designed to provide data relating to all private schools in the 50 states and the District of Columbia. The survey is a census of private schools. It is conducted biannually and attempts to achieve a complete count of private schools and accompanying counts of their students, teachers, and graduates. During each administration of the survey, the PSS private school register is updated prior to survey mailout. Two sources are used to update the register: (1) the *list frame*, a synthesis of association, state, and commercial listings of private schools; and (2) an *area sample*, an independent listing of private schools included in a sample of geographical areas.

Despite ongoing efforts to update the PSS register, the private schools' list frame remains incomplete. The most recent estimate of the undercoverage rate for private schools was about 8 percent (Jackson and Frazier 1995); that is, about 8 percent of the private schools were not included on the register after the update from the list frame. The list enumeration is therefore supplemented by an area sample designed to identify and represent unlisted private schools in the PSS estimates.

A nationally representative sample of primary sampling units (PSUs)—each PSU consisting of a single county or a group of counties—is chosen for the area sample. Therefore, our area frame consists of the list of PSUs of which the nation is composed. The sample facilitates the identification of private schools not included in the list frame. Within each selected PSU, a list of private schools is compiled from such sources as telephone books, yellow pages, local government offices, chambers of commerce, and religious institutions. This list is merged with the list frame, and therefore represents an expansion of the survey frame to the extent that unlisted schools were detected.

The PSS sample design can readily support the computation of direct survey estimates of the number of private schools and their numbers of students, teachers, and graduates at the national and regional levels. These direct survey estimates are obtained in the conventional manner in survey analysis, where sampled schools are weighted up to represent unsampled and nonresponding schools.

While direct estimation produces estimates of adequate precision for the four geographical regions, the national-level design of the area sample can result in less reliable estimates for individual states. In order to address this problem, the use of indirect estimation methods is recommended. This report describes the development and evaluation of the statistical models used to produce indirect state estimates from the PSS for the 1991–92 and 1993–94 school years.

The statistical models are based on the data obtained from the area sample PSUs. Within these PSUs, data are available for both the private schools listed in the list frame and those identified through the area frame. From these data, models can be developed to predict the probability that a school of a given type is included in the list frame. Then for nonsampled PSUs, the listed schools of the designated school type can be weighted up by the inverse of this probability, in order to represent the corresponding unlisted schools in those PSUs.

A problem that arises with the use of indirect estimates for relatively small geographical areas is that when the estimates from such areas are added together, the sum will not be consistent with the direct estimate for the combined area. Consequently, the sum of the indirect estimates for the states in a region generally will not equal the direct estimate for the region. This problem is handled by a constrained estimation procedure that adjusts the indirect state estimates so that the resultant estimates for the states in a region sum to the direct regional estimate.

Current Methodology—Direct Estimation

This section describes the PSS sample design and direct estimation procedures currently used to produce national and regional survey estimates. For direct estimation, each unlisted school added to the list frame's total through the area sample is weighted by the reciprocal of its PSU's selection probability. All list frame schools are included in the PSS, and therefore receive a sampling weight of 1.0. Consequently, the overall weight adjustment for those schools reflects only a noninterview adjustment. An

estimated 8 percent of the targeted private schools did not respond for the 1993–94 survey period (Broughman 1996). The corresponding rate for 1991–92 was 2 percent. Within each sampled PSU, the weighted estimate of the number of unlisted schools from the area sample is added to the list frame count. This sum is aggregated over PSUs within the individual states to obtain state totals, and over states to obtain the four regional totals for the number of private schools. Estimates are obtained similarly for the number of students, teachers, and graduates.

This approach is readily extended to produce estimates for subgroups, such as regions or type of school, by confining the summations to schools in a specified subgroup. While this procedure can be used to provide unbiased estimates for states, the estimates produced in this manner are subject to considerable sampling error. The reason for this lack of precision is that the sample of PSUs for the area frame was not stratified geographically by state but only by region. As a result, the number of PSUs sampled in a state is random. The percentage of sampled PSUs in a given region, from a particular state, can differ considerably from the percentage of the total population of the region ascribed to the state. If the number of PSUs sampled in the state is larger than expected, the state estimates will be too large, and if smaller than expected, they will be too small. As a result, we have developed a model-based procedure for state estimation in an effort to improve upon estimates derived from direct estimation.

Proposed Indirect Estimation

An indirect or synthetic estimator is generally defined as a nontraditional estimator which "borrows strength" from a domain or time period, other than those of interest, in deriving desired predictions or estimates. With indirect estimation, as with direct estimation, the PSS sample is treated as being composed of schools from both the list and area frames. However, the indirect procedure uses the area sample to identify schools not included in the list frame, and to establish a basis for data adjustment in nonsampled PSUs to account for the missing schools. The unweighted counts from these unlisted (missed) schools are added to the list frame counts, providing a complete count in sampled PSUs. For nonsampled PSUs, noncoverage adjustment factors derived from the area sample are applied to the list frame sample to compensate for the unlisted schools.

Derivation of an overall adjustment

The application of the suggested indirect approach requires the specification of a model for noncoverage. The simplest of such models assumes that the unlisted schools are missing completely at random (MCAR). Under this model, the probability that a school is missed or unlisted is the same for every school. This probability may be estimated from the PSS to yield an undercoverage adjustment that is multiplied by each school's nonresponse adjustment factor to give its final weight.

Logistic regression

The MCAR assumption is a stringent one that is unlikely to hold in practice. Coverage can be very different for different domains of the PSS population. Consequently, it seemed desirable to consider the application of undercoverage adjustments for several subgroups of the private school population (where the MCAR assumption may be more plausible) before computing state estimates. Moreover, Jackson and Frazier (1995) provide evidence of a significant relationship between school size, as measured by student enrollment, and the probability of the school's inclusion in the original list frame. This led to the fitting of logistic regression models to the 1991–92 and 1993–94 PSS data in the nine domains or subgroups defined by school type.*

The model relates the "undercoverage proportion" (or the probability that a given school is not listed) to the regressor variable (school size). It can be estimated for area sample schools. The undercoverage adjustments were determined and applied to the listed schools and students in the nonsampled PSUs. Estimates of the regression coefficients of the model were obtained from the SAS iterative reweighted least squares logistic procedure.

The model was assessed using Hosmer-Lemeshow goodness of fit statistics to evaluate the error term of the model. For six of the nine school types there was a reasonably good fit. However, for the other three school types—the conservative Christian and unaffiliated subgroups of the "other religious" category, and the special emphasis subgroup of the nonsectarian category—the p-values suggested a lack of fit of the model.

Adjustments to regional totals

In an effort to achieve greater precision and consistency, the regional totals based on the indirect estimation method were adjusted to those based on direct estimation.

*The nine domains or subgroups consist of three types of Catholic schools (parochial, diocesan, and private order); three types of "other religious" schools (conservative Christian, affiliated, and unaffiliated); and three types of nonsectarian schools (regular, special emphasis, and special education).

Empirical Results

Table A presents the original list frame counts (Listed), the direct estimates, the indirect estimates from the logistic regression model (Logistic), and the final indirect estimates adjusted to unbiased regional counts (Final) of the number of private schools by state. In addition, for comparison, corresponding indirect estimates were produced by adjusting list frame schools in nonsampled PSUs by an undercoverage adjustment. This was done for the nine school types (Ratio 1) and for quartiles of the school enrollment variable (Ratio 2) within school type. The assumption associated with the use of the latter adjustment is that within a given range of the school enrollment variable, the coverage probability is fairly stable. Obviously the four indirect estimates are reasonably close for the individual states, especially the first (Logistic) and the fourth (Ratio 2). Comparison of the third and fourth indirect estimates (Ratio 1 and Ratio 2) permits an assessment of the effect of introducing school enrollment as an additional stratifying variable for the adjustment process. The second indirect estimate (Final) shows the impact of the adjustments to unbiased regional counts and provides the published state numbers for 1993–94.

While the indirect estimates seem quite similar, a comparison between these estimates and the direct estimates shows disparity reflecting the underrepresentation (or overrepresentation) of sampled PSUs in the area sample. For example, there are states such as Indiana and Wisconsin for which there were no sampled PSUs in the area sample, while other states, such as Missouri and Ohio, may have been "overrepresented."

Conclusions and Recommendations

An indirect estimation approach is recommended as an alternative to the current procedure for the production of state estimates of the number of private schools in the nation and the associated numbers of students, teachers, and graduates. This procedure borrows strength from the area frame estimates of coverage in deriving "acceptable" and more equitable state estimates. Unless the list frame is complete for a given state, the current estimation procedure necessarily results in biased and highly variable state estimates. However, indirect estimation methods attempt to produce a distribution among the states of the unlisted schools (and therefore of all schools) that is "close" to the actual distribution of the target population.

Empirical results of this study suggest that undercoverage rates can be successfully modeled from the area sample and used to adjust list frame estimates for survey items. This is very evident from the review of the goodness of fit statistics for six of the selected subgroups. Moreover, relative to the total error associated with state estimates, the indirect procedure showed considerable improvement over the current direct estimation method. The overall estimate of the error of the logistic regression estimator, as measured by mean absolute error, was 40 percent lower than the error for the direct estimator.

While the indirect estimates based on simple ratio adjustments for undercoverage compared favorably with those based on the logistic regression model, there is a clear potential for improvement in the model. For example, a geographic variable could possibly be added as a regressor variable. Moreover, school-level or program emphasis could be considered as an alternative undercoverage adjustment variable.

The appropriateness of the state estimation methodology under consideration should be evaluated over several survey collection cycles. Moreover, it is suggested that an effort be exerted to identify and ensure the collection of additional data that could define other explanatory variables that might be effective in the modeling of coverage.

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Data source: The 1991–92 and 1993–94 Private School Universe Survey (PSS).

For technical information, see the complete report:

Causey, B.D., Bailey, L., and Kaufman, S. (1999). *Indirect State-Level Estimation for the Private School Survey* (NCES 1999–351).

For additional information about PSS methodology, see

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Table A.—Comparison of list frame counts of the number of private schools with alternative adjusted estimates: 1993–94

State	Listed	Direct	Logistic	Final	Ratio 1	Ratio 2
Total	24,177	26,093	26,166	26,093	26,162	26,207
Alabama	308	410	340	354	347	339
Alaska	66	66	75	72	73	75
Arizona	263	263	295	282	295	296
Arkansas	149	179	165	174	165	167
California	3,009	3,145	3,224	3,082	3,220	3,229
Colorado	279	391	310	368	309	311
Connecticut	339	360	358	350	360	358
Delaware	90	90	99	97	99	99
District of Columbia	80	80	86	86	88	87
Florida	1,123	1,262	1,242	1,306	1,246	1,245
Georgia	457	580	509	536	514	510
Hawaii	121	121	130	130	133	130
Idaho	78	78	85	85	85	85
Illinois	1,333	1,347	1,379	1,341	1,374	1,380
Indiana	619	619	686	667	677	685
Iowa	260	290	276	268	275	276
Kansas	206	206	219	235	217	218
Kentucky	296	296	317	332	315	318
Louisiana	439	458	462	485	469	463
Maine	140	140	159	156	157	160
Maryland	522	522	560	589	566	562
Massachusetts	606	648	638	625	639	640
Michigan	1,073	1,075	1,150	1,118	1,148	1,150
Minnesota	542	542	588	572	586	587
Mississippi	191	221	201	198	209	202
Missouri	568	719	603	594	605	602
Montana	82	82	93	90	90	94
Nebraska	223	223	240	233	237	239
Nevada	58	58	61	60	61	61
New Hampshire	130	130	145	142	144	145
New Jersey	878	878	918	899	926	920
New Mexico	166	166	188	181	184	188
New York	1,865	1,985	1,974	1,933	1,977	1,977
North Carolina	444	463	495	521	493	496
North Dakota	59	59	62	61	62	62
Ohio	912	1,016	957	950	961	958
Oklahoma	128	190	147	152	146	147
Oregon	250	250	278	266	277	280
Pennsylvania	1,739	1,846	1,901	1,867	1,881	1,907
Rhode Island	112	112	117	115	117	118
South Carolina	275	297	304	320	307	305
South Dakota	96	96	106	107	104	107
Tennessee	400	496	443	466	442	444
Texas	1,025	1,353	1,178	1,239	1,185	1,181
Utah	66	66	75	72	74	76
Vermont	85	85	99	97	97	100
Virginia	459	515	510	532	513	512
Washington	433	486	485	480	484	485
West Virginia	145	145	164	172	159	165
Wisconsin	954	954	1,029	1,001	1,030	1,027
Wyoming	35	35	41	40	39	42

NOTE: Details may not add to totals due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, Private School Survey, 1993–94. (Originally published as table 6.1 on p. 14 of the complete report from which this article is excerpted.)

Data Products, Other Publications, and Funding Opportunities

Data Products

The 1997 NAEP Arts Report Card—CD-ROM

Hilary R. Persky, Brent A. Sandene, and Janice M. Askew

In 1997, the National Assessment of Educational Progress (NAEP) conducted a national assessment in the arts at grade 8, covering music, theatre, and the visual arts. The assessment measured students' ability to create and perform as well as to respond to existing works. NAEP used nationally representative samples of public and nonpublic eighth-grade students for assessing music and the visual arts, and a targeted sample for assessing theatre, because so few schools offer significant instruction in theatre. No assessment was conducted for dance, because of the difficulty of obtaining a statistically valid sample.

The *Report Card* provides information on student achievement by population subgroup and also analyzes data according to instructional and school variables. This CD-ROM features the complete text of the paper report (NCES 1999–486), plus assessment prompts and extensive examples of student work, accompanied by an analysis of the scoring of each example.

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To obtain this CD-ROM (NCES 1999–485), call the toll-free ED Pubs number (877–433–7827) or contact GPO (202–512–1800).

Data File: Public Libraries Survey: Fiscal Year 1996

The Public Libraries Survey (PLS) is conducted annually by NCES through the Federal-State Cooperative System (FSCS) for Public Library Data. The data are collected by a network of state data coordinators appointed by the Chief Officers of State Library Agencies (COSLA) in the 50 states and the District of Columbia. The PLS for fiscal year 1996 collected data items from 8,946 public libraries. Data collected include population of legal service area, staff, outlets, library materials, operating income and expenditures, circulation, reference transactions, library visits, public service hours, circulation of children's materials, and electronic technology information.

Five database files, in Microsoft Access format, were generated from the FY 1996 PLS:

- Public Library Data File;
- Public Library State Summary/State Characteristics File;
- Public Library Outlet File;
- Administrative Entities Only/State Library File; and
- State Library Outlet File.

These database files and related documentation are available on diskette as well as on the NCES Web Site.

For questions about this data product, contact P. Elaine Kroe *(Patricia_Kroe@ed.gov).*

To obtain this data product (NCES 1999–305), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov),* or contact GPO (202–512–1800).

Data File: State Library Agencies Survey: Fiscal Year 1997

The State Library Agencies (STLA) Survey is conducted annually by NCES as a cooperative effort with the Chief Officers of State Library Agencies (COSLA) and the U.S. National Commission on Libraries and Information Science (NCLIS). The STLA Survey provides state and federal policymakers, researchers, and other interested users with descriptive information about state library agencies in the 50 states and the District of Columbia. The STLA Survey for fiscal year 1997 collected data on 506 items, including governance, income, operating expenditures, financial assistance to libraries, services to libraries and systems, electronic information networks, staff, public service hours, service outlets, service and development transactions, collections, and allied operations.

The STLA Survey file consists of three tables in Microsoft Access format. This database file and related documentation are available on diskette as well as on the NCES Web Site.

For questions about this data product, contact P. Elaine Kroe *(Patricia_Kroe@ed.gov).*

To obtain this data product (NCES 1999–305), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov),* or contact GPO (202–512–1800).

Other Publications

The NAEP 1998 Reading Report Card: National and State Highlights

Sheida White

In 1998, NCES administered the National Assessment of Educational Progress (NAEP) reading assessment to a national sample of students at grades 4, 8, and 12, and to state samples of students at grades 4 and 8. The results of this assessment present a broad view of how America's students are achieving in reading—one of the most important sets of skills that young people acquire and develop throughout their lives. Because the assessment administered in 1998 shared a common set of reading passages and comprehension questions with assessments given in 1992 and 1994, it is possible to use NAEP results to chart the progress American students have made in reading since 1992.

This publication provides highlights from the 1998 NAEP reading assessment, describing its content, its major findings at the national and state levels, and students' experiences at school and at home that support achievement in reading.

Author affiliation: S. White, NCES.

For questions about this publication, contact Sheida White *(Sheida_White@ed.gov).*

To obtain this publication (NCES 1999–479), call the toll-free ED Pubs number (877–433–7827) or visit the NCES Web Site *(http://nces.ed.gov).*

NAEP 1998 Reading State Reports

Nada Ballator and Laura Jerry

The National Assessment of Educational Progress (NAEP) assessments are administered to representative samples of students at the national level as well as at the state level for those states that participate. The NAEP reading assessment has been administered at the state level three times: in public schools at grade 4 in 1992, in public and nonpublic schools at grade 4 in 1994, and in public and nonpublic schools at grades 4 and 8 in 1998.

The customized report for each participating state or jurisdiction presents results for that state, along with national and regional results for comparison. (*The NAEP 1998 Reading Report Card for the Nation and States* [NCES 1999–500] is the companion to the state reports; it offers data for all states and additional national data.)

The state reports have two sections: The first section provides basic information on NAEP and overall state-level results for public schools in graphic form. The second section reports findings for the entire public school population at grades 4 and 8 as well as for the population broken out by major demographic characteristics and school type.

Author affiliations: N. Ballator and L. Jerry, Educational Testing Service.

For questions about the state reports, contact Sheida White *(Sheida_White@ed.gov).*

To obtain a state report (NCES 1999–460), visit the NCES Web Site *(http://nces.ed.gov).*

Directory of NAEP Publications

Sahar Akhtar, Alicia Darensbourg, Munira Mwalimu, Kelly Weddel, and Sheida White

The National Assessment of Educational Progress (NAEP), known as "the Nation's Report Card," is the only ongoing nationally representative assessment of what America's students know and can do. A congressionally mandated project directed by NCES, NAEP has been conducted periodically since 1969 in reading, mathematics, science, writing, history, geography, and other subject areas.

The *Directory of NAEP Publications* is a comprehensive listing of government-funded NAEP publications dating back to the project's inception. The *Directory* groups NAEP's many compendia, reports, brochures, and other informational documents into eight main categories: national reports; state reports; abbreviated documents; technical reports; focused reports and special studies; conference proceedings and commissioned papers; NAEP evaluation studies and grant publications; and subject area objectives, frameworks, and achievement levels. A brief description of content, purposes, and intended audiences introduces the listings in each category. Within categories, publications are listed chronologically. Each listing includes a source from which the publication can be obtained.

Author affiliations: S. Akhtar, K. Weddel, and S. White, NCES; A. Darensbourg and M. Mwalimu, Aspen Systems Corporation.

For questions about this directory, contact Sheida White *(Sheida_White@ed.gov).*

To obtain this directory (NCES 1999–489), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov),* or contact GPO (202–512–1800).

Highlights From TIMSS

Chris Calsyn, Patrick Gonzales, and Mary Frase

With information on a half-million students worldwide, including more than 33,000 U.S. students in more than 500 U.S. public and private schools, the Third International Mathematics and Science Study (TIMSS) is the largest, most comprehensive, and most rigorous international study of schools and students ever conducted. During the 1995 school year, students from 41 nations were assessed at three different grade levels (fourth grade, eighth grade, and the final year of secondary school) to compare their mathematics and science achievement. TIMSS researchers also looked at schools, curricula, lessons, textbooks, policy issues, and the roles of teachers and students to understand the educational context in which mathematics and science learning take place. This 12-page brochure provides a summary of the main findings of TIMSS for each grade level, as well as overall comparative results.

Author affiliations: C. Calsyn, American Institutes for Research; P. Gonzales and M. Frase, NCES.

For questions about this brochure, contact Patrick Gonzales *(Patrick_Gonzales@ed.gov).*

To obtain this brochure (NCES 1999–081), call the toll-free ED Pubs number (877–433–7827) or visit the NCES Web Site *(http://nces.ed.gov).*

Learning About Education Through Statistics

Claire Geddes

NCES gathers data on all aspects of education from across the country, organizes the data in useful forms, and releases the resulting surveys and studies as survey reports, information compendia, and special reports that focus on specific educational topics. NCES studies provide the facts and figures needed to help policymakers understand the condition of education in the nation today, to give researchers a foundation of data to build on, and to help teachers and administrators decide the best practices for their schools. The current edition of this booklet provides general information about NCES surveys and studies, as well as guidance on how to access information from NCES.

Author affiliation: C. Geddes, NCES.

For questions about this booklet, contact Thomas D. Snyder *(Tom_Snyder@ed.gov)*.

To obtain this booklet (NCES 1999–028), call the toll-free ED Pubs number (877–433–7827) or visit the NCES Web Site *(http://nces.ed.gov)*.

Programs and Plans of the National Center for Education Statistics: 1999 Edition

Celestine J. Davis

NCES has the congressionally mandated responsibility to collect and disseminate information on the condition of education in the United States and other countries, to analyze and report on the meaning and significance of these statistics, and to assist states and local education agencies in improving their own education statistics systems.

This report summarizes current NCES statistical programs, including major publications and plans for future work. In addition to updating the descriptions of long-standing NCES data collections, such as the Common Core of Data (CCD), the Integrated Postsecondary Education Data System (IPEDS), and the National Assessment of Educational Progress (NAEP), this edition focuses on some new and innovative work, such as the Third International Mathematics and Science Study (TIMSS) and the Early Childhood Longitudinal Study–Kindergarten cohort (ECLS–K).

Author affiliation: C. J. Davis, NCES.

For questions about this report, contact Celestine J. Davis *(Celestine_Davis@ed.gov)*.

To obtain this report (NCES 1999–027), call the toll-free ED Pubs number (877–433–7827), visit the NCES Web Site *(http://nces.ed.gov)*, or contact GPO (202–512–1800).

Funding Opportunities

Training

NCES is planning to conduct seminars on the following topics this year: (1) the analysis of National Assessment of Educational Progress (NAEP) databases, (2) the National Education Longitudinal Study of 1988 (NELS:88) and Early Childhood Longitudinal Study (ECLS) databases, and (3) the use of NCES analysis tools. In these seminars, participants will learn how to access and analyze the selected databases and gain further understanding about the nature and potential of the databases.

These seminars are open to faculty members and graduate students, as well as researchers and analysts from state and local education agencies and professional associations. Seminar dates and application procedures will be posted on the NCES Web Site. Applicants who are selected to participate will receive travel expenses from NCES.

For more information, contact Samuel Peng (*Samuel_Peng@ed.gov*).

Grants

The AERA Grants Program

Jointly funded by the National Science Foundation (NSF), NCES, and the Office of Educational Research and Improvement (OERI), this training and research program is administered by the American Educational Research Association (AERA). The program has four major elements: a research grants program, a dissertation grants program, a fellows program, and a training

institute. The program is intended to enhance the capability of the U.S. research community to use large-scale data sets, specifically those of the NSF and NCES, to conduct studies that are relevant to educational policy and practice, and to strengthen communications between the educational research community and government staff.

Applications for this program may be submitted at any time. The application review board meets three times per year.

For more information, contact Edith McArthur (*Edith_McArthur@ed.gov*) or visit the AERA Grants Program Web Site *(http://aera.ucsb.edu)*.

The NAEP Secondary Analysis Grant Program

The NAEP Secondary Analysis Grant Program was developed to encourage educational researchers to conduct secondary analysis studies using data from the National Assessment of Educational Progress (NAEP) and the NAEP High School Transcript Studies. This program is open to all public or private organizations and consortia of organizations. The program is typically announced annually, in the late fall, in the *Federal Register*. Grants awarded under this program run from 12 to 18 months and awards range from $15,000 to $100,000.

For more information, contact Alex Sedlacek (*Alex_Sedlacek@ed.gov*).

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