

Section 4

Quality of Elementary and Secondary School Environments





Contents

Summary: Quality of Elementary and Secondary School Environments	56
<i>Coursetaking and Standards</i>	
33 Trends in English and Foreign Language Coursetaking	59
34 Coursetaking in English and Foreign Languages	60
35 Trends in High School Occupational Coursetaking	62
<i>Learning Opportunities</i>	
36 International Comparisons of Quality in 8 th -Grade Mathematics Lessons	63
37 Class Size of Kindergartens	64
38 Student/Teacher Ratios in Public Elementary and Secondary Schools	65
39 Teachers' Readiness to Use Computers and the Internet	66
<i>Special Programs</i>	
40 Inclusion of Students With Disabilities in Regular Education Classrooms	67
<i>School Choice</i>	
41 School Choice and Parental Satisfaction	68
<i>Teachers</i>	
42 Qualifications of College Graduates Who Enter Teaching	69
43 Teacher Preparation in 8 th -Grade Mathematics and Science	70
<i>School Climate and Discipline</i>	
44 School-Related Violence and Safety	71
45 Overcrowding in Schools	72

Summary: Quality of Elementary and Secondary School Environments

Elementary and secondary education is designed to provide children with the academic knowledge and skills they need to function successfully in society and to prepare them to pursue further education, enter the workforce, and be responsible, active citizens. This section explores why some schools may be better than others at helping students learn such knowledge and skills. Research indicates that the quality of school environments—specifically, what goes on in the classrooms, the training and talent of the teaching force, and the overall culture and atmosphere of the school—affects student learning (NCES 2001–030). This section is based on this research and examines the quality of elementary and secondary school environments by focusing on students’ coursetaking and learning opportunities, teachers’ qualifications and training, and administrators’ ability to provide a safe and disciplined school environment.

COURSETAKING AND STANDARDS

One of the most important factors shaping the education that students receive is the kind of courses they take. Recognizing this, the National Commission on Excellence in Education (NCEE) in 1983 proposed that all high school students should complete a “New Basics” curriculum. This curriculum requires them to complete, by the time they graduate from high school, more coursework in mathematics, science, English, social studies, and other areas than many students did at that time (National Commission on Excellence in Education 1983). Emphasis on raising the rigor of high school coursetaking also underlay much of the “standards” movement of the 1990s. Since 1983, there have been encouraging signs that high school graduates are completing more academic courses and more rigorous courses in general.

Between 1982 and 1998, the percentage of high school graduates who completed ad-

vanced coursework in mathematics, science, English, and foreign languages increased. In mathematics and science, the percentage who completed advanced academic level courses increased from 26 to 41 percent and from 31 to 60 percent, respectively (*supplemental table 40-1, The Condition of Education 2000*). In English and foreign languages, the percentage who completed advanced academic level courses increased from 13 to 29 percent and from 15 to 30 percent, respectively (*Indicator 33*).

Not all student groups completed advanced academic courses at the same rate in 1998. Among high school graduates, those who were Asian/Pacific Islander, white, and from private schools were usually more likely to have completed advanced levels of mathematics and science coursework than their peers (*Indicator 39, The Condition of Education 2000*). Females graduates were usually more likely to have completed advanced levels of English and foreign language courses than their peers (*Indicator 34*).

LEARNING OPPORTUNITIES

Many factors may influence learning opportunities in elementary and secondary schools, such as the number of students in a classroom, the quality of lessons, and teachers’ readiness to use technology in the school.

Small class sizes can bring increased opportunity for classroom contact between students and teachers and enhance students’ learning opportunities, especially for disadvantaged and minority students in early grades (Achilles 1996; Finn 1998; Robinson and Wittebols 1986). In 1998, kindergarten classes in public school averaged 20 students per teacher, whereas they averaged 18 students in private school (*Indicator 37*). Class size also varied by school size judging from the different average student/



Summary: Quality of Elementary and Secondary School Environments

Continued

teacher ratios (proxy measures of class size) for small, medium, and large public elementary and secondary schools in 1998 (*Indicator 38*).

Some evidence exists that the quality of U.S. instruction in mathematics may lag behind that of other countries. Data from the Third International Mathematics and Science Study (TIMSS) show that the content of mathematics lessons taught to 8th-graders in the United States was more likely to receive a “low”-quality rating than lessons taught to students in Japan and Germany. Thirty-nine and 28 percent of Japanese and German mathematics lessons, respectively, received a “high”-quality rating, whereas no lessons from the United States received such a rating (*Indicator 36*).

Computers and related technology provide new potential for teachers to enhance instruction and for students to learn and obtain information (President’s Committee of Advisors on Science and Technology 1997). Computers and the Internet are increasingly available as educational resources. In 1999, 95 percent of public elementary and secondary schools had Internet access (NCES 2000–086), and 78 percent of students in grades 1–12 reported using the Internet at school (*Indicator 45, The Condition of Education 2000*). Despite students’ apparent familiarity with computers, only one-third of teachers in 1999 reported feeling “well prepared” or “very well prepared” to use computers or the Internet for instruction (*Indicator 39*).

SCHOOL CHOICE

By choosing the school that their children attend, parents may perceive that they will be able to influence the quality of education they receive. Additionally, with parents choosing the school, schools may be prompted to compete for enrollments by improving the programs they offer (Viteritti 2000).

Recent data show that a decreasing proportion of parents report satisfaction with assigned public schools, especially at the secondary level. The percentage of children who attended an assigned public school whose parents were “very satisfied” with the child’s school, teachers, and the school’s academic standards decreased between 1993 and 1999. In 1999, private schools had the highest percentages of children with parents who were very satisfied with their child’s school, teachers, and the school’s academic standards and discipline, followed by chosen public schools and then by assigned public schools (*Indicator 41*).

TEACHERS AND TEACHER CHARACTERISTICS

Teachers need a thorough grounding in the subjects they teach to guide their students effectively through the material and respond knowledgeably to questions and comments. Their knowledge is generally measured (for lack of a better measure) by the degrees and certifications they have earned. In 1998, nearly all public school teachers had earned a bachelor’s degree; 45 percent had earned a master’s degree; and at least 90 percent had earned regular or standard state certificates or advanced professional certificates. Most teachers earned degrees in education; 38 percent of full-time public school teachers held academic rather than education degrees at the bachelor’s or graduate level (*Indicator 47, The Condition of Education 2000*). Many teachers also participate in professional development to increase their skills and knowledge. In 1998, the percentage of full-time public school teachers who participated in various professional development activities in the past 12 months ranged from 31 to 81 percent, depending on the type of activity (*Indicator 48, The Condition of Education 2000*).

Despite such levels of training, the academic skills of college graduates who prepare to be-

Summary: Quality of Elementary and Secondary School Environments

Continued

come teachers tend to be weaker than those of their peers. Among 1992–93 college graduates, those who had majored in education were much less likely to have had SAT or ACT scores in the top quartile (14 percent) than those who had majored in humanities (31 percent) or mathematics, computer, or natural sciences (37 percent). Graduates who did not prepare to teach but became teachers were also more likely to have scored in the top quartile (35 percent) than those who prepared to teach and became teachers (14 percent). Moreover, graduates who left teaching within 4 years were far more likely to have scored in the top quartile (27 percent) than those who continued to teach (16 percent) (*Indicator 42*).

High levels of teacher training also do not necessarily translate into similar levels of training in the subject matter that teachers teach. The Third International Mathematics and Science Study–Repeat (TIMSS-R) found that in 1999 only 41 percent of 8th-grade students in the United States were taught by a mathematics teacher who specialized in mathematics (i.e., majored in it at the undergraduate or graduate level or studied mathematics for certification). This proportion is considerably lower than the international average of 71 percent. In 8th-grade science, 47 percent of U.S. students were taught by a teacher who specialized in biology, 21 percent by a teacher who specialized in chemistry, and 13 percent by a teacher who specialized in physics. These rates for teachers who specialized in biology and chemistry are comparable to international averages, while lower for those whose background was in physics (*Indicator 43*).

SCHOOL CLIMATE AND DISCIPLINE

In recent years, policymakers, educators, parents, and students have increasingly voiced concern about school-related violence. From

1993 to 1999, some indices of violent victimization in schools remained the same, while some risk behaviors decreased. During this period, the number of students who reported being injured or threatened with a weapon on school property in the past year remained the same. However, both the percentage of high school students who carried weapons on school property within the past 30 days and the percentage who engaged in physical fights on school property within the past 12 months fell between 1993 and 1999 (*Indicator 44*).

In addition to concerns about school-related violence, overcrowded schools can have a debilitating effect on a learning environment. Overcrowded schools are a challenge to education because enrollments have increased to record levels and are not expected to decrease significantly in the future (*Indicator 2*). In 1999, 22 percent of public schools reported being overcrowded (i.e., having enrollments more than 5 percent above the number of students a school is designed to accommodate in its permanent facilities) (*Indicator 45*).

CONCLUSION

Over the past 2 decades, progress has been made in several areas in improving the quality of elementary and secondary school environments. The examples discussed above show improvements that include greater rigor in coursetaking among high school students, increased access to technology in public schools, and declines in the percentages of students carrying weapons and engaging in physical fights on school property. At the same time, these data also suggest areas for concern, such as the quality of lessons compared with other countries, the academic skills and preparation of teachers, decreasing parental satisfaction with assigned public schools, and overcrowding.



Coursetaking and Standards

Trends in English and Foreign Language Coursetaking

The percentages of high school graduates who have completed advanced academic levels of English and foreign language study have doubled from 1982 to 1998.

Given that advanced courses generally provide greater intellectual challenge and place greater demands upon students, examination of general trends in the academic level of high school coursetaking can be used to provide indications of changes in high school students' efforts to perform and achieve at higher academic levels. Changes in course-taking levels also provide a proxy measure of changes in the quality of secondary education in the country. They can only be a proxy, however, because course classifications and titles are no guarantee of content. The academic content of courses varies by state and school district, even when classified at the same level of rigor or with the same title.

Since the 1980s, when states began to make the requirements for a high school diploma more demanding, the percentage of high school graduates completing honors English and advanced foreign language courses (i.e., year 3

and higher) has increased. In 1982, only 13 percent of high school graduates had completed advanced English coursework (i.e., courses classified as "honors"); by 1998, this percentage had risen to 29 percent. Moreover, the percentage completing 75–100 percent of their English courses at the honors level tripled (from 4 to 12 percent). Over the same period, however, the percentage completing low academic English courses also increased (from 10 to 14 percent) (see supplemental table 33-1).

The percentage of high school graduates who had completed year 3 or higher of a foreign language was higher in 1998 than in 1982. In 1982, 15 percent of students completed advanced foreign language study; by 1998, this percentage had increased to 30 percent. In addition, over this period, the percentage of students completing no foreign language study decreased markedly (from 46 to 19 percent) (see supplemental table 33-2).

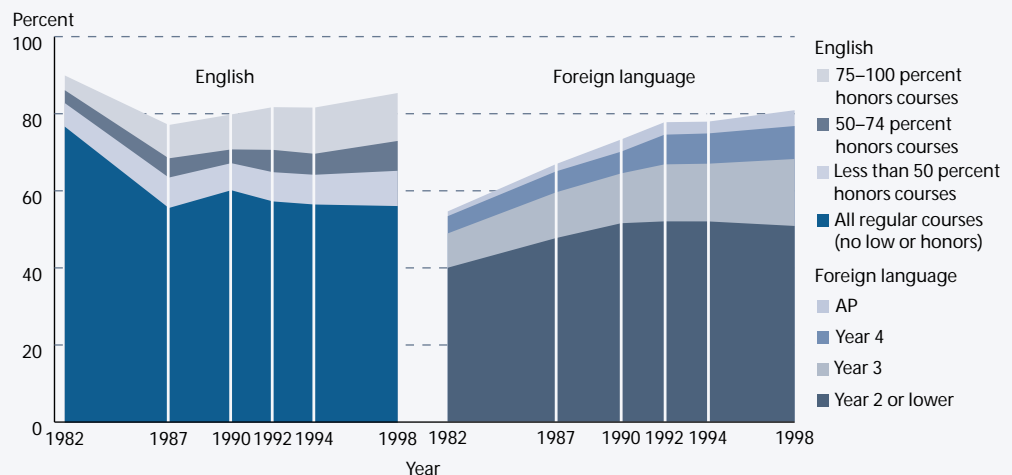
NOTE: Not displayed are the percentage of students who completed low or no English courses and the percentage who completed no foreign language.

SOURCE: U.S. Department of Education, NCES. High School and Beyond Longitudinal Study of 1980 Sophomores, "Second Follow-up" (HS&B:1980/1984); National Education Longitudinal Study of 1988 Eighth Graders, "High School Transcript Study" (NELS:1992); and 1987, 1990, 1992, 1994, and 1998 National Assessment of Education Progress (NAEP) High School Transcript Studies.



FOR MORE INFORMATION:
 Supplemental Note 6
 Supplemental Tables 33-1,
 33-2
 NCES 2001–325
 Burkam, Lee, and Smerdon 1997
 Burkam 2001

COURSE-TAKING LEVELS: Percentage distribution of high school graduates according to level of courses completed: Selected years 1982–98



Coursetaking and Standards

Coursetaking in English and Foreign Languages

Female high school graduates completed English and foreign language courses at higher rates than their peers. Private school graduates completed foreign language courses at higher rates than their peers.

While trends in coursetaking since 1982 indicate that more students are completing English and foreign language courses classified as advanced academic courses (*Indicator 33*), these trends do not reveal which students are taking the more academically challenging courses. Among 1998 high school graduates, completion rates of advanced courses varied by sex, control of school, and whether graduates pursued the Core New Basics curriculum, but they did not vary consistently by race/ethnicity.

Females were more likely than males to have completed advanced English and foreign language courses. This course-taking pattern differs from that for science and mathematics, where males and females completed advanced courses at comparable rates (*Indicator 39, The Condition of Education 2000*).

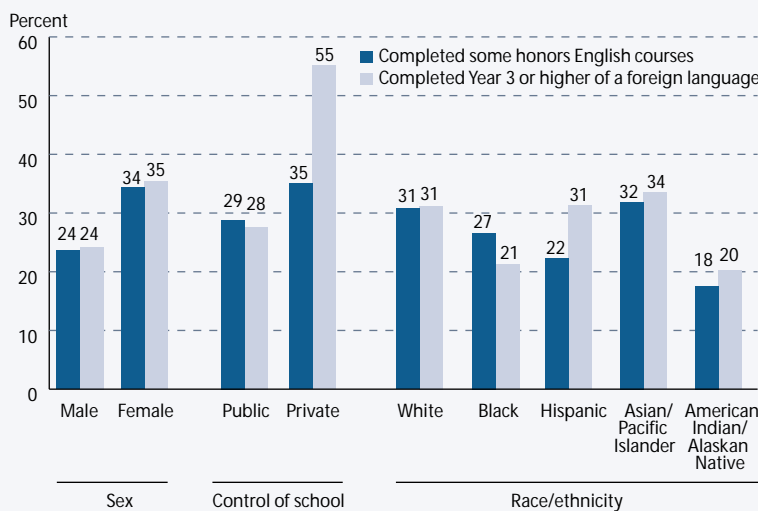
As with mathematics and science, private school graduates were more likely than public school graduates to have completed foreign language courses. They were less likely to have completed no or low academic level courses in a foreign language than their public school peers. Apparent differences in the rates

of completion of advanced English, however, were not statistically significant.

Graduates who completed the Core New Basics curriculum were more likely than those who did not to have completed advanced English and foreign language courses (as in mathematics and science). However, among those who completed this curriculum, 53 percent completed only regular English courses, and 7 percent low academic level English courses. In foreign languages, 50 percent of those who completed the core New Basics completed low academic level courses, and 11 percent no course.

Racial/ethnic course-taking patterns were less discernible. Unlike in mathematics and science, no racial/ethnic group completed advanced courses in English or a foreign language at rates higher than all other groups. However, black graduates were less likely than Asian/Pacific Islanders, Hispanics, and whites to have completed foreign language study at the advanced level. Also, Hispanic students were more likely than other groups (except Asian/Pacific Islanders) to have completed an AP course in a foreign language.

DIFFERENCES IN COURSETAKING: Percentage of 1998 high school graduates who had taken advanced academic English courses and a foreign language, by selected characteristics: 1998



NOTE: See notes to the accompanying tables (on the opposite page) on the various levels of English and foreign language courses.

SOURCE: U.S. Department of Education, NCES, 1998 National Assessment of Educational Progress (NAEP) High School Transcript Study.

FOR MORE INFORMATION:
Supplemental Notes 1, 6
NCES 2000-062, Indicator 39



¹ Indicates that student transcript records did not list any recognized English courses; however, these students may have studied some English. If students took only English as a second language (ESL) courses for credit, they would be listed in this category.

² Low academic level courses include all general English courses classified as “below grade level.” Students may have taken a general English course classified as “honors” and be included in the low academic level if the percentage of “below grade level” courses completed was greater than the percentage of “honors” courses completed.

³ Includes students who completed a general English course classified as “below grade level” if they completed a greater percentage of “honors” courses than “below grade level” courses.

NOTE: For each graduate, the percentages of completed courses classified as “below level,” “at grade level,” and “honors” were calculated. (Not all students completed 4 years of English.) After the percentage of completed courses at each level had been calculated, the percentage of graduates who fit the category requirements for each level was determined, as explained in *Supplemental Note 6*. Percentages may not add to 100.0 due to rounding.

SOURCE: U.S. Department of Education, NCES, 1998 National Assessment of Educational Progress (NAEP) High School Transcript Study.

ENGLISH COURSETAKING: Percentage distribution of high school graduates according to the type of English courses taken, by student and school characteristics: 1998

Characteristic	Highest level of primary foreign language completed*								
	Low academic level ²				Advanced academic level ³				
	No English ¹	50% or more of courses	Less than 50% of courses	Total	Regular English (no low or honors) courses	Less than 50% honors	50–74% honors	75–100% honors	Total
Total	0.9	4.0	9.7	13.7	56.1	9.1	7.7	12.4	29.3
Sex									
Male	1.2	4.9	10.9	15.8	59.4	7.8	6.1	9.8	23.6
Female	0.7	3.1	8.5	11.7	53.2	10.2	9.2	15.0	34.4
Race/ethnicity									
White	0.7	3.3	8.3	11.6	56.9	9.4	8.1	13.2	30.8
Black	1.1	4.8	12.8	17.6	54.6	7.9	7.4	11.3	26.6
Hispanic	2.2	7.3	14.9	22.2	53.3	7.9	5.8	8.6	22.3
Asian/Pacific Islander	0.9	4.6	8.3	12.9	54.3	12.6	7.4	11.9	31.9
American Indian/ Alaskan Native	0.3	5.4	12.1	17.6	64.6	6.8	5.1	5.7	17.6
Met Core New Basics?									
Yes	0.3	1.4	5.4	6.7	53.1	11.8	9.9	18.1	39.9
No	1.7	7.3	14.9	22.2	59.9	5.9	5.0	5.3	16.2
Control of school									
Public	1.0	4.4	10.2	14.6	55.7	8.6	7.5	12.7	28.8
Private	0	0	4.0	4.0	61.0	14.9	10.3	9.8	35.0

FOREIGN LANGUAGE COURSETAKING: Percentage distribution of high school graduates according to the highest level of foreign language completed, by student and school characteristics: 1998

Characteristic	Highest level of primary foreign language completed*								
	Low academic level				Advanced academic level				
	None	Year 1 or less	Year 2	Total	Year 3	Year 4	AP	Total	
Total	19.4	19.2	31.5	50.7	17.4	8.5	4.1	30.0	
Sex									
Male	24.5	20.2	31.1	51.3	15.1	6.4	2.7	24.2	
Female	14.6	18.0	32.0	50.0	19.5	10.5	5.5	35.4	
Race/ethnicity									
White	17.5	18.4	32.9	51.3	18.0	9.5	3.7	31.2	
Black	21.4	23.5	33.8	57.4	14.1	4.7	2.4	21.2	
Hispanic	24.2	20.7	23.8	44.5	17.6	6.1	7.6	31.3	
Asian/Pacific Islander	32.7	12.3	21.5	33.7	16.6	10.5	6.4	33.5	
American Indian/ Alaskan Native	23.7	31.7	24.5	56.1	14.3	5.7	0.1	20.2	
Met Core New Basics?									
Yes	10.8	11.9	38.1	50.0	23.0	11.1	5.3	39.3	
No	30.1	28.2	23.3	51.5	10.4	5.4	2.7	18.5	
Control of school									
Public	20.5	20.1	31.8	52.0	15.9	8.1	3.7	27.6	
Private	7.8	9.4	27.7	37.1	33.3	13.3	8.5	55.1	

* These figures include only students who studied French, German, Latin, or Spanish as these are the only foreign languages commonly offered in high schools for 4 years or more. Some students in each category also studied more than one foreign language.

NOTE: The distribution of graduates among the various levels of foreign language courses was determined by the level of the most academically advanced course they had completed. Graduates who had completed courses in different languages were counted according to the highest level course completed. Graduates may have completed advanced levels of courses without having taken courses at lower levels. See *Supplemental Note 6* for more details on these levels. Percentages may not add to 100.0 due to rounding.

SOURCE: U.S. Department of Education, NCES, 1998 National Assessment of Educational Progress (NAEP) High School Transcript Study.



FOR MORE INFORMATION:
Supplemental Notes 1, 6
NCES 2000–062, Indicator 39

Coursetaking and Standards

Trends in High School Occupational Coursetaking

Although overall vocational coursetaking declined between 1982 and 1998, occupationally specific coursetaking remained relatively steady.

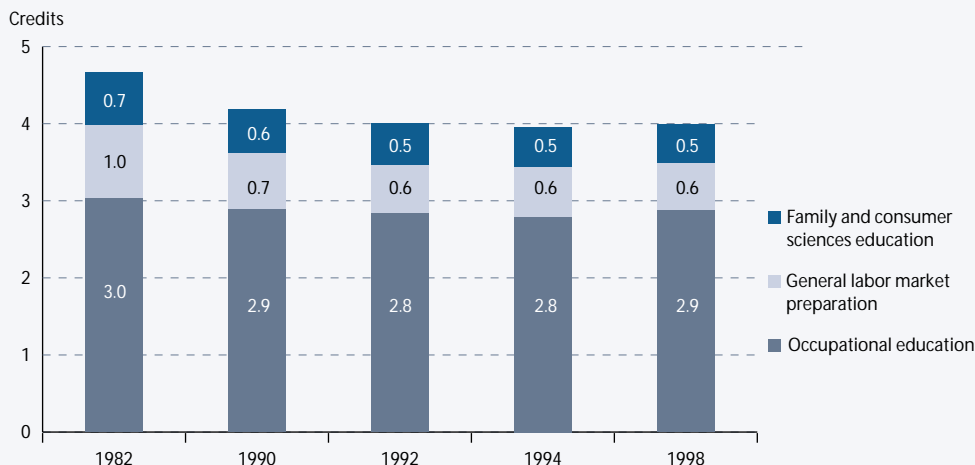
High school vocational education consists of occupational education, general labor market preparation, and family and consumer sciences education. Occupational education, which is intended to prepare students for a specific occupation or cluster of occupations, constitutes the largest share of the vocational curriculum. Although overall vocational coursetaking declined among public high school graduates between 1982 and 1998, occupational coursetaking remained relatively steady. Vocational coursetaking declined by .69 credits on average, from 4.68 total vocational credits in 1982 to 3.99 credits in 1998. In contrast, the level of occupational coursetaking remained about the same (3.03 credits in 1982 and 2.87 credits in 1998). By 1998, occupational coursetaking made up 68 percent of graduates' total vocational coursetaking, up from 59 percent in 1982 (see supplemental table 35-1).

To examine trends in occupational coursetaking, several measures of participation can be used. Two of these involve tracking the percentage of occupational "investors" (those earning 3.0 or more occupational credits) and occupational "concentrators" (those earning 3.0 or more occupational credits in a single program area, such as agriculture or business). The

percentage of public high school graduates meeting the more stringent occupational concentrator definition declined from 34 percent in 1982 to 25 percent in 1998 (see supplemental table 35-2). However, the percentage of graduates earning 3.0 or more occupational credits remained about the same (46 percent in 1982 and 44 percent in 1998). Thus, while similar percentages of graduates earned 3.0 or more occupational credits over the period studied, these occupational investors were less likely to concentrate their coursetaking in a single program area. Instead, they took a broader mix of occupational courses.

Occupational investors increased the rigor of their academic coursetaking over this period, but no more so than did other students. For example, the percentage of graduates earning 3.0 or more occupational credits who completed "advanced" coursework in mathematics increased by about 16 percentage points, from 12 percent in 1982 to 28 percent in 1998. Similarly, the percentage of graduates earning less than 3.0 occupational credits who completed "advanced" coursework in mathematics increased by about 14 percentage points, from 32 percent in 1982 to 46 percent in 1998 (see supplemental table 35-3 and *Supplemental Note 6*).

VOCATIONAL CREDITS: Average credits earned in vocational education by public high school graduates, by vocational curriculum: 1982–98



SOURCE: U.S. Department of Education, NCES, High School and Beyond Longitudinal Study of 1980 Sophomores, "First Follow-up" (HS&B:1980/1982) and High School Transcript Study; National Education Longitudinal Study of 1988 Eighth Graders, "Second Follow-up" (NELS:1988/1992) and High School Transcript Study; and 1990, 1994, and 1998 National Assessment of Educational Progress (NAEP) High School Transcript Studies.

FOR MORE INFORMATION:
 Supplemental Note 6
 Supplemental Tables 35-1,
 35-2, 35-3
 NCES 2001-019





Learning Opportunities

International Comparisons of Quality in 8th-Grade Mathematics Lessons

The quality of the mathematical content of 8th-grade mathematics lessons in the United States was rated lower than the quality of those in Germany and Japan.

The Third International Mathematics and Science Study (TIMSS) included a Videotape Classroom Study of 8th-grade mathematics, based on a sample of 231 classrooms in Germany, Japan, and the United States. This study examined teachers' goals, the organization and process of mathematics instruction, and the mathematical content of the sample lessons. In all these areas, the study found the German, Japanese, and U.S. lessons differed.

For example, the German and U.S. teachers emphasized mathematical skills as a lesson goal more often than the Japanese teachers, who were more likely to emphasize mathematical thinking (see supplemental table 36-1). Most U.S. lessons (83 percent) contained “task-controlled” tasks in which the teacher demonstrated a particular solution method to students and asked them to replicate that solution, as opposed to “solver-controlled” tasks in which the teacher encouraged students to find alternative solution paths on their own. By contrast, 48 percent of the German lessons and 17 percent of the Japanese lessons contained exclusively “task-controlled” tasks (see supplemental table 36-2).

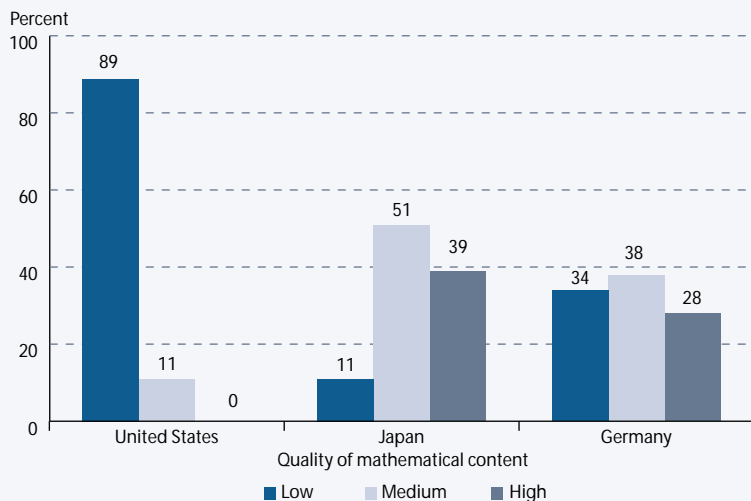
Similarly, the German and Japanese teachers often included deductive reasoning as part of their lessons, whereas the U.S. teachers did not (see supplemental table 36-3).

Differences in the overall quality of the mathematical content of the lessons were also evident: 39 percent of the Japanese lessons and 28 percent of the German lessons were rated as containing “high”-quality mathematical content, but none of the U.S. lessons were rated as such. Most of the U.S. lessons (89 percent) were rated to have “low”-quality mathematical content. These ratings, assigned by a panel of experts, were based solely on “Lesson Tables,” which graphically presented analyses of each lesson’s coherence, reasoning, level of complexity of mathematical content, connections between mathematical principles and motivations, articulation of general mathematical principles, and kinds of assigned student tasks. Prepared for 90 of the videotaped classrooms, the “Lesson Tables” masked or altered information identifying the lesson’s country of origin (e.g., monetary units) so as to eliminate possible rating bias (see *Supplemental Note 5* for more details on the rating process).

NOTE: For details on the average TIMSS scores of 8th-graders in mathematics, see *Indicator 18, The Condition of Education 2000*. Percentages may not add to 100 due to rounding.

SOURCE: U.S. Department of Education, NCES. *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), 1999.

LESSON QUALITY: Percentage distribution of 8th-grade lessons rated as having low-, medium-, and high-quality mathematical content, by country: 1994–95



FOR MORE INFORMATION:
Supplemental Note 5
Supplemental Tables 36-1,
36-2, 36-3

NCES 2000–094,
NCES 2000–062,
NCES 1999–074

Learning Opportunities

Class Size of Kindergartens

Kindergarten classrooms in private schools were more likely to have small class sizes in 1998 than were such classrooms in public schools.

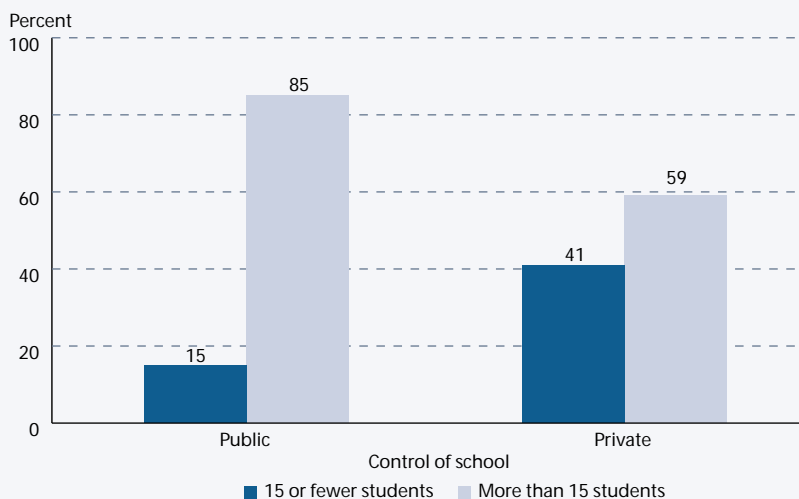
A significant reform strategy in recent years has been to reduce class size in kindergarten through the 3rd grade in order to improve student learning, especially for minority and disadvantaged students. Many studies have found that minority and disadvantaged students benefit disproportionately from small class sizes in the early grades (Achilles 1996; Finn 1998; Robinson and Wittebols 1986). The optimal class size in the primary grades, or the threshold at which gains in student achievement are realized, is still debated (Hanushek 1999). However, there is some agreement that a threshold may exist between 15 and 20 students (Mosteller 1995; Slavin 1989; Glass and Smith 1979). This indicator examines the percentage of kindergarteners in classes with 15 or fewer students.

In 1998, 20 percent of the Nation's kindergarteners were in classes with 15 or fewer students. The average class size for kindergarteners in public schools was 20,

while it was 18 for those in private schools. Kindergarteners enrolled in private schools, however, were more likely to be in a class with 15 or fewer students than their peers enrolled in public schools. Forty-one percent of private school kindergarteners had 15 or fewer students in their class, compared with 15 percent of public school kindergarteners. Despite these differences, the majority of kindergarteners in classes with 15 or fewer students were in public schools. In 1998, public schools enrolled 82 percent of 3- to 5-year-olds in kindergarten (*Table 46, Digest of Education Statistics 1999*).

Besides this difference between public and private schools, kindergarten class size in 1998 also varied by the percentage of minority students in the classroom. Kindergarten classrooms with less than 10 percent minority students were more likely to have 15 or fewer students than classrooms in which more than 75 percent of the students were minorities (see supplemental table 37-1).

CLASS SIZE: Percentage distribution of kindergarten classrooms according to control of school and class size: Fall 1998



NOTE: Percentages may not add to 100 due to rounding.

SOURCE: U.S. Department of Education, NCES, Early Childhood Longitudinal Study, "Kindergarten Class of 1998–99," Fall 1998.

FOR MORE INFORMATION:
Supplemental Table 37-1
NCES 2000–031



Achilles 1996, Finn 1998, Glass and Smith 1979, Hanushek 1999, Mosteller 1995, Robinson and Wittebols 1986, Slavin 1989



Learning Opportunities

Student/Teacher Ratios in Public Elementary and Secondary Schools

Between 1990 and 1998, student/teacher ratios declined in public elementary schools but rose slightly in public secondary schools. Differences by school size persist at both levels.

Several states have implemented policies to reduce class size as a means to improve education. To measure progress in meeting this goal, educators frequently use the ratio of students to teachers as a proxy measure for class size. (Student/teacher ratios do not provide a direct measure of class size because they are based on the amount of time in full-time equivalents that all teachers in a school spend instructing students. This includes time spent by classroom teachers; prekindergarten teachers in some elementary schools; art, music, and physical education teachers; and teachers who do not teach regular classes every period of the day.)

Between 1990 and 1998, the student/teacher ratios in elementary schools were stable in the early part of this period but then declined; student/teacher ratios in secondary schools rose and fell, ending slightly higher in 1998 than in

1990. These trends were consistent for elementary and secondary schools with small, medium, and large enrollments.

Variations in student/teacher ratios among schools with different enrollment levels were also consistent between 1990 and 1998. During this period, regular elementary schools with more than 1,000 students enrolled 3.6 more students per teacher, on average, than elementary schools with enrollments under 300. Regular secondary schools with more than 1,000 students enrolled 6.2 more students per teacher, on average, than secondary schools with enrollments under 300.

Student/teacher ratios in special education schools increased slightly but remained below those of elementary and secondary schools from 1990 to 1998 (see supplemental table 38-1).

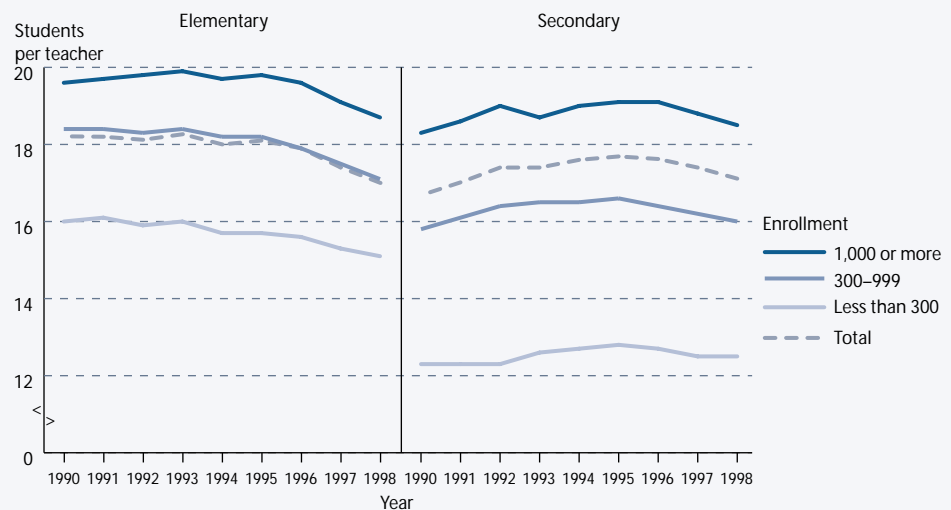
NOTE: Data from schools that did not report both student enrollment and the number of teachers employed were not included in the calculations of these student/teacher ratios. Teacher data for elementary schools include prekindergarten. The method for calculating these ratios has been revised. These ratios express the total number of students divided by the total number of full-time equivalent teachers.

SOURCE: U.S. Department of Education, NCES, Common Core of Data (CCD), various years.



FOR MORE INFORMATION:
Supplemental Table 38-1

STUDENT/TEACHER RATIOS: Regular public elementary and secondary school student/teacher ratios, by enrollment: 1990–98



Learning Opportunities

Teachers' Readiness to Use Computers and the Internet

Only one-third of teachers felt "well prepared" or "very well prepared" to use computers or the Internet for instruction in 1999.

While computers and the Internet have transformed how business and research are conducted in the United States, most public school teachers do not yet feel prepared to use these technologies. In 1999, only 10 percent of public school teachers reported feeling "very well prepared," and an additional 23 percent reported feeling "well prepared" to use computers or the Internet for instruction. The majority (53 percent) reported feeling "somewhat prepared," and 13 percent reported feeling "not at all prepared."

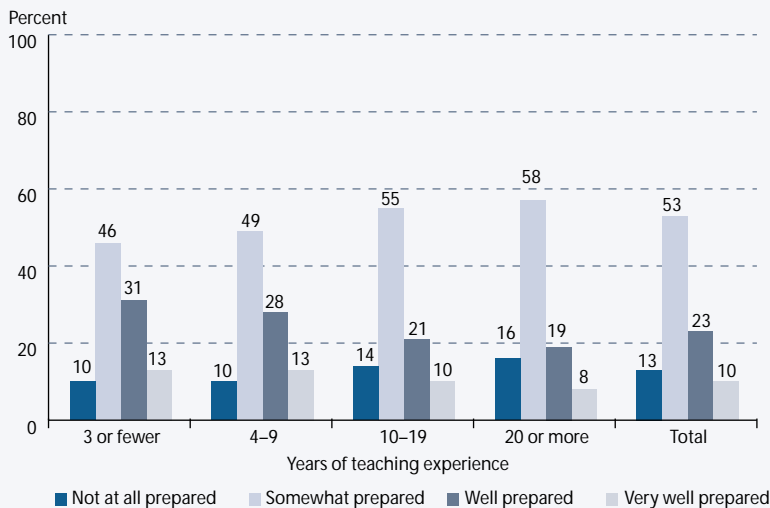
Differences in teachers' readiness to use computers and the Internet translated into large differences in how often teachers used these technologies. Teachers who reported feeling well or very well prepared were more likely than teachers who reported feeling not at all prepared to use them to create instructional materials (88 versus 50 percent), gather information for planning lessons (71 versus 28 percent), access research and best practices for teaching (52 versus 11 percent), and create multimedia presentations for their classes (55 versus 12 percent) (see supplemental table 39-1). They were also more likely than teachers who reported feeling not at all

prepared to assign students schoolwork requiring the use of a computer or the Internet (see supplemental table 39-2).

Teachers with fewer years of teaching experience were more likely to feel prepared to use computers or the Internet than their more experienced colleagues (supplemental table 39-4). Professional training in these areas was also related to feeling more prepared (see supplemental table 39-3). The percentage of teachers who reported feeling well or very well prepared to use these technologies did not vary significantly by instructional level, school poverty (as measured by the percentage of students eligible for free or reduced-price school lunch), or minority enrollment (see supplemental table 39-6).

At least 30 percent of teachers identified each of the following as a "great barrier" to using these technologies for instruction: a shortage of computers (38 percent), a lack of release time to learn how to use computers or the Internet (37 percent), and a lack of scheduled time for students to use computers in class (32 percent) (see supplemental table 39-5).

READINESS TO USE TECHNOLOGY: Percentage distribution of public school teachers according to how well prepared they felt to use computers and the Internet for classroom instruction, by number of years of teaching experience: 1999



NOTE: Less than 1 percent of all public school teachers reported no computers or the Internet were available to them anywhere in their school. These teachers were not included in the estimates presented here. Percentages may not add to 100 due to rounding.

SOURCE: U.S. Department of Education, NCES, Fast Response Survey System, "Public School Teachers' Use of Computers and the Internet," FRSS 70, 1999.

FOR MORE INFORMATION:

Supplemental Note 8
Supplemental Tables 39-1, 39-2, 39-3, 39-4, 39-5, 39-6

NCES 2000-090, NCES 2000-102





Special Programs

Inclusion of Students With Disabilities in Regular Education Classrooms

Inclusion rates for students of almost all disability types have increased over the past decade.

Since 1975, Congress has required that students with disabilities receive an education in the “least restrictive environment.” The “least restrictive environment” for a student is determined on a case-by-case basis. Data suggest that, since 1988, U.S. schools have found inclusion in the regular education classroom to be the “least restrictive environment” for increasing numbers of students with disabilities. They also suggest that progress has been made toward reaching the target, set by the U.S. Department of Education’s Office of Special Education Programs, that by 2000–01, 50 percent of children with disabilities ages 6–21 will be “served in the regular education classroom 80 percent of the day or more.”

In 1997–98 (the most recent year for which national data are available), states reported that 46 percent of students with disabilities spent 80 percent of the day or more in a regular education classroom. In 1988–89, only 31 percent of such students did so. The increase in the percentage of students with disabilities included in regular classrooms 80 percent of the day or more is

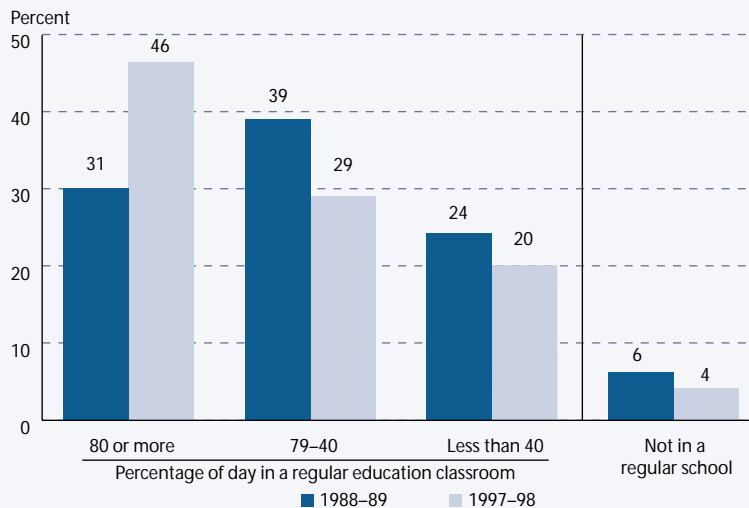
noteworthy because the number of such students has been growing faster than total school enrollments. The ratio of special education students to total K–12 enrollment in 1988–89 was 112 per 1,000 students; in 1997–98, it was 128 per 1,000 students (*Table 53, The Digest of Education Statistics 1999*).

Although the percentage of students with disabilities placed in regular classrooms for at least 80 percent of the day increased between 1988–89 and 1997–98, the size of increase varied by disability type. The largest increase occurred among students with specific learning disabilities (from 20 to 44 percent). The smallest increases occurred among students with multiple disabilities (from 7 to 10 percent) and those who are both deaf and blind (from 12 to 14 percent). The percentage of students with disabilities educated in separate facilities declined for students of all disability types (for which data exist) except for those with visual impairments (see supplemental table 40-1).

NOTE: Students counted as disabled are those students served under Part B of the Individuals with Disabilities Education Act (IDEA) in the United States and outlying areas. See *Supplemental Note 12* for a summary of data by all disability types. Percentages may not add to 100 due to rounding.

SOURCE: U.S. Department of Education, Office of Special Education and Rehabilitative Services. *22nd Annual Report to Congress on the Implementation of the Individuals with Disabilities Education Act*, 2000.

SPECIAL EDUCATION: Percentage distribution of students ages 6–21 with disabilities, by educational environment: 1988–89 and 1997–98



FOR MORE INFORMATION:

Supplemental Note 12

Supplemental Table 40-1

NCES 2000–031

School Choice

School Choice and Parental Satisfaction

A higher percentage of students in grades 3–12 were enrolled in schools selected by their parents in 1999 than in 1993. These parents were more likely to be “very satisfied” with their child’s school than parents of children attending an assigned school.

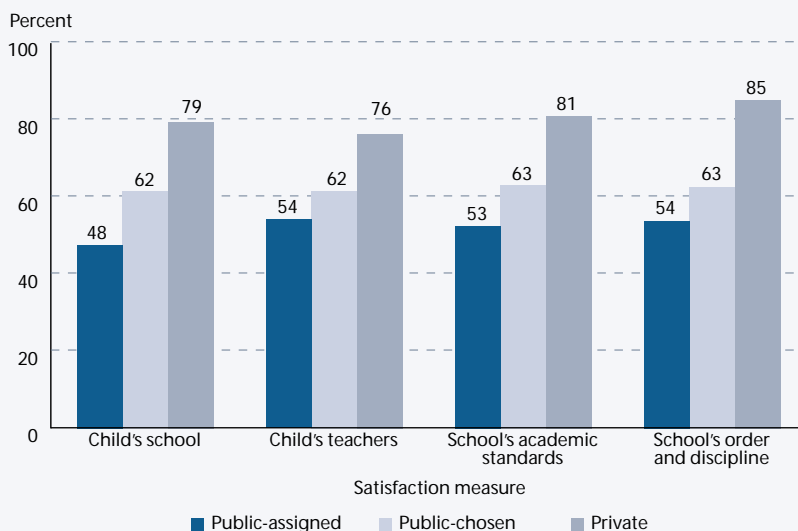
Between 1993 and 1999, the percentage of students in grades 3–12 attending an *assigned* public school dropped from 80 to 77 percent. Among students who attended *chosen* schools in 1999, more attended public schools selected by their parents than private schools. Black students were more likely to be in a chosen school than white and Hispanic students. Of the black and Hispanic children whose parents selected their schools, more attended a public school than a private school (see supplemental table 41-1).

In 1999, the percentages of students in grades 3–12 whose parents reported being “very satisfied” with their child’s school, teachers, school’s academic standards, and its order and discipline were highest among those in private schools, followed by those in chosen public schools, and finally by those in assigned public schools. At private schools, a greater percentage of children had parents who were very

satisfied with order and discipline than with the school or teachers in 1999. Although more than half of the students in assigned public schools in grades 3–12 had parents who were very satisfied with most aspects of their child’s school in both 1993 and 1999, there was a decrease between these 2 years in the percentage of children with parents who were very satisfied with the school, teachers, and academic standards (see supplemental table 41-2).

For children in assigned or chosen public schools in 1999, parents were more likely to be very satisfied with the various aspects of schools when their children were in grades 3–5 than in grades 9–12. This was not the case for parents of private school children, however: these parents were as likely to be very satisfied with their child’s school, its academic standards, and its order and discipline (but not teachers) whether their children were in grades 3–5 or 9–12.

SCHOOL SATISFACTION: Percentage of students in grades 3–12 whose parents reported being very satisfied with aspects of their child’s school, by type of choice: 1999



NOTE: Includes those who responded “very satisfied,” from a scale of “very satisfied,” “somewhat satisfied,” “somewhat dissatisfied,” and “very dissatisfied.” Ungraded students and homeschoolers were excluded from the estimates. Data have been revised from previously published figures.

SOURCE: U.S. Department of Education, NCES, National Household Education Surveys Program (NHES), 1999 (Parent Interview Survey).

FOR MORE INFORMATION:
Supplemental Notes 1, 3
Supplemental Tables 41-1, 41-2





Teachers

Qualifications of College Graduates Who Enter Teaching

Academically strong college graduates who become teachers are more likely not to have prepared for a teaching career than to have prepared and more likely to leave teaching than to remain in teaching.

Studies of teachers' academic qualifications have identified a tendency among academically weak graduates to be more inclined to become schoolteachers than their academically stronger peers (Vance and Schlechty 1982; Ballou 1996; NCES 2000–152). The entrance examination (i.e., SAT or ACT) scores of 1992–93 college graduates can serve as a useful proxy measure for academic caliber to examine the percentages of academically strong and weak graduates according to their college major, whether they prepared to teach,¹ and whether they became teachers.

Among 1992–93 college graduates who majored in education, 14 percent had SAT or ACT scores in the top quartile. This is significantly less than the percentage of all 1992–93 graduates and those majoring in the social sciences, humanities, or mathematics/computer/natural sciences who scored in the top quartile (see supplemental table 42-1). Among graduates who became teachers, 55 percent majored in

education (see supplemental table 42-2). Those who did not prepare to teach but became teachers by 1997 were much more likely to have scored in the top quartile (35 percent) than those who prepared to teach and became teachers (14 percent).

Where 1992–93 college graduates eventually taught was related to where they ranked on their college entrance examinations. Those who taught only in private schools were more likely to have scored in the top quartile than their peers who taught only in public schools. Likewise, those who taught only in secondary schools were more likely to have scored in the top quartile than their peers who taught only in elementary schools.

Among the 1992–93 college graduates who became teachers within 4 years of graduating from college, those who left teaching were more likely to have scored in the top quartile than those who remained in the profession.

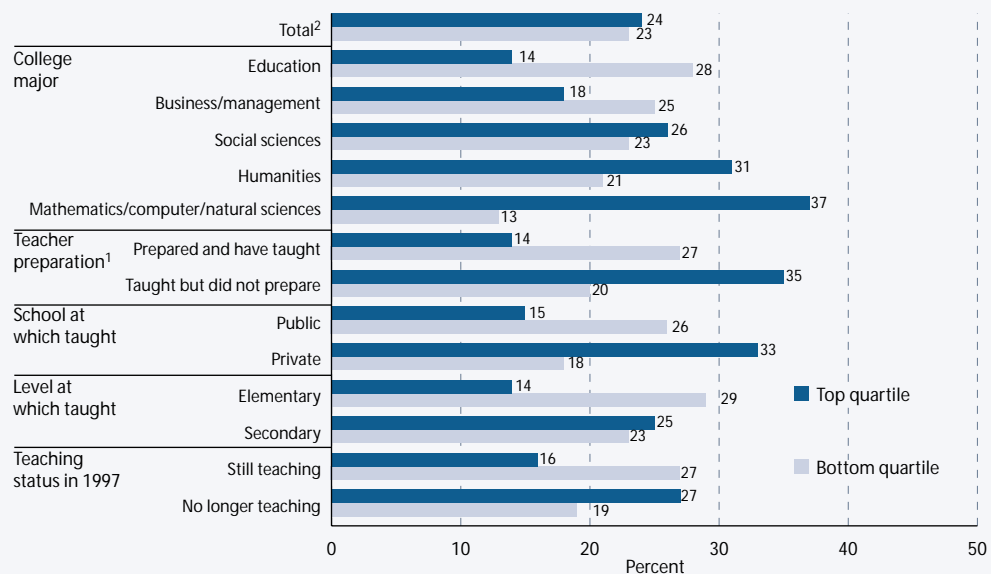
¹Graduates classified as "prepared to teach" had completed a student-teaching assignment or earned a teaching certificate.

²Top and bottom quartiles in this analysis do not equal 25 percent because SAT and ACT scores were not available for some graduates (see supplemental table 42-1).

NOTE: Excludes 1992–93 bachelor's degree recipients who had taught before receiving their bachelor's degree.

SOURCE: U.S. Department of Education, NCES, Baccalaureate and Beyond Longitudinal Study, "Second Follow-up" (B&B:1993/1997), Data Analysis System.

ACADEMIC QUALIFICATIONS: Percentage of 1992–93 college graduates in the top and bottom quartile of SAT or ACT scores, by selected characteristics: 1997



FOR MORE INFORMATION:
 Supplemental Notes 1, 7
 Supplemental Tables 42-1, 42-2
 NCES 2000–152
 Vance and Schlechty 1982
 Ballou 1996

Teachers

Teacher Preparation in 8th-Grade Mathematics and Science

U.S. 8th-graders were less likely than their international peers to be taught mathematics by a teacher who majored in mathematics.

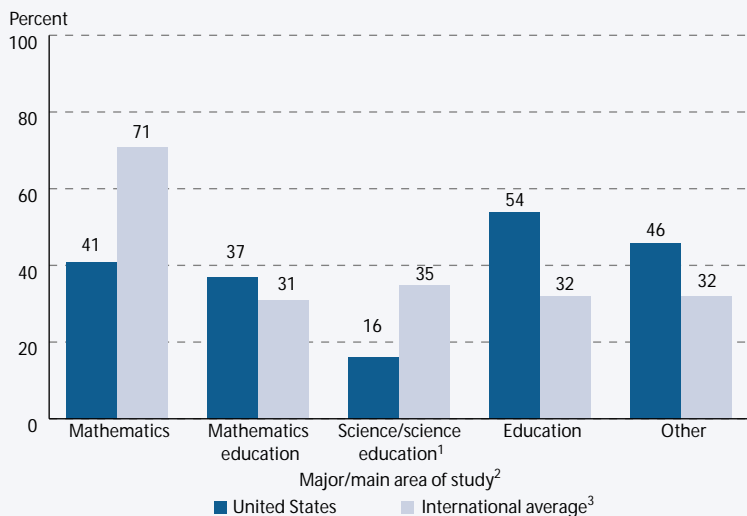
In recent years, researchers, practitioners, and policymakers have focused on the academic preparation and qualifications of teachers, and many have argued that teachers should have subject matter expertise, as well as training in teaching methods. Several studies have indicated that teacher subject matter preparation, particularly in mathematics and science, is related to student achievement, even after controlling for teacher and student background characteristics, such as race/ethnicity and socioeconomic status (Darling-Hammond 2000; Goldhaber and Brewer 1997 in NCES 97-535). In the Third International Mathematics and Science Study-Repeat (TIMSS-R), mathematics and science teachers of 8th-graders were asked about their main areas of study (i.e., their majors or the international equivalent) at the bachelor's and master's degree level.

U.S. 8th-graders were less likely than their international peers to be taught by a mathematics teacher with a bachelor's or master's degree in mathematics. In 1999, 41 percent of U.S. 8th-graders had a mathematics teacher who majored in

mathematics, a smaller percentage than the international average of 71 percent. (The international average was based on all 38 participating TIMSS-R countries.) U.S. 8th-graders were about as likely as their international peers to be taught mathematics by a teacher who majored in mathematics education (37 and 31 percent, respectively). Finally, they were more likely than their international peers to be taught mathematics by a teacher who majored in education (54 versus 32 percent).

In 1999, U.S. 8th-graders were as likely as their international peers to be taught science by a teacher with a bachelor's or master's degree major in biology, chemistry, or science education. However, they were less likely than their international peers to be taught science by a teacher who majored in physics and more likely to be taught science by a teacher who majored in education (see supplemental table 43-1). In science, the international average was based on those countries that reported that 8th-grade science was usually taught through a general/integrated science curriculum (23 countries including the United States).

INTERNATIONAL COMPARISON OF MATHEMATICS TEACHERS' MAIN AREAS OF PREPARATION: Percentage of 8th-graders taught mathematics by teachers who reported various main areas of study for their bachelor's and master's degrees: 1999



¹Includes biology, physics, chemistry, and science education.

²More than one category could be selected.

³The item response rate for this question was less than 70 percent in some nations. Countries could exclude up to 10 percent of schools or students that would be difficult to test.

NOTE: Eighth grade in most nations. The international average is the average of the national averages of the nations that reported data.

SOURCE: NCES 2001-028, based on data from Mullis et al. (2000). *TIMSS 1999 International Mathematics Report: Findings from IEAs Repeat of the Third International Mathematics and Science Study at the Eighth Grade*, Exhibit R3.1. Chestnut Hill, MA: Boston College.

FOR MORE INFORMATION:

Supplemental Note 5
Supplemental Table 43-1

NCES 2001-028

Goldhaber and Brewer 1997
(NCES 97-535)

Darling-Hammond 2000





School Climate and Discipline

School-Related Violence and Safety

The percentages of high school students engaging in physical fights and carrying weapons on school property have declined since 1993, but the percentage being threatened or injured with a weapon on school property has not changed.

Schools should be safe and secure places for students and teachers. Without a safe learning environment, teachers cannot teach and students cannot learn. A survey by the Centers for Disease Control and Prevention has collected data since 1993 on the risk behaviors of students in grades 9–12. Although some measures of violent victimization in schools have remained constant over time, other measures of youth risk behaviors that affect the safety of schools have decreased.

Between 1993 and 1999, the percentage of students who were threatened or injured with a weapon on school property remained constant. In contrast, the percentage of students who reported being in a fight on school property in the last 12 months declined from 16 percent in 1993 to 14 percent in 1999. During this same time period, the percentage of students who reported that they carried a weapon, such as a gun, knife, or club, on school property at any time in the past 30 days also decreased from 12 percent in 1993 to 7 percent in 1999.

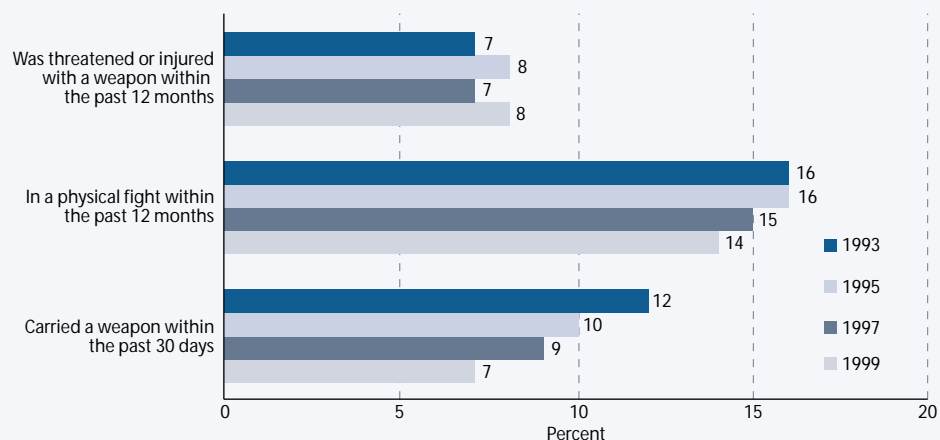
Exposure to violent and other risk behaviors varied by some student characteristics in 1999. Males were more likely than females to have engaged in a physical fight, to have been threatened or injured with a weapon, and to have carried a weapon on school property. Among several apparent racial/ethnic differences among the measures of violent or other risk behaviors at school, only one difference was statistically significant: Hispanic or Latino students were more likely than black, not Hispanic or Latino, students to report carrying a weapon on school property in the 30 days before the survey.

Students in the 9th grade were more likely to have reported either engaging in a physical fight or being threatened or injured with a weapon at school than were students in higher grades. However, they were no more likely to have reported carrying a weapon to school than those in higher grades (see supplemental table 44-1).

NOTE: The data do not meet NCES standards for response rates. For definitions of the racial/ethnic categories used in this indicator, see *Supplemental Note 1*.

SOURCE: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Health Statistics. National Health Interview Survey—Youth Risk Behavior Survey, 1993, 1995, 1997, and 1999.

SCHOOL-RELATED VIOLENCE: Percentage of high school students who reported being threatened or injured with a weapon, engaging in a physical fight, and carrying a weapon on school property: 1993, 1995, 1997, and 1999



FOR MORE INFORMATION:
Supplemental Notes 1, 8
Supplemental Table 44-1

School Climate and Discipline

Overcrowding in Schools

About half of all public schools were enrolled at less than capacity in 1999, but one in five was overcrowded. Schools with 600 or more students were more likely to be severely overcrowded than smaller schools.

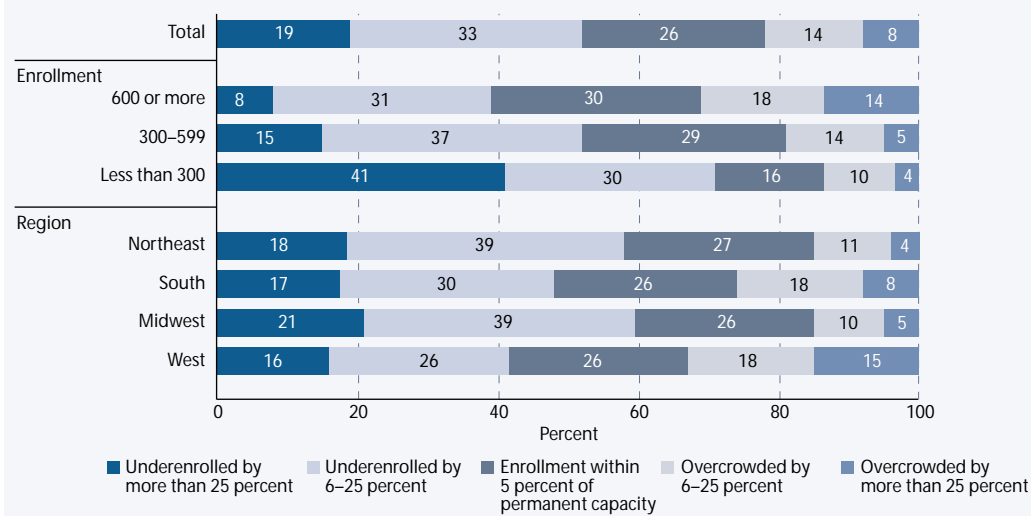
Overcrowded schools are a challenge to education because enrollments have increased to record levels and are not expected to decrease significantly in the future (*Indicator 2*). Overcrowding is a cause for concern because research suggests that gains in student achievement (especially for disadvantaged students) are greater in classes with 13–20 students than in larger classes (Krueger 1999; Finn 1998; Achilles 1996). In schools without sufficient temporary classroom space, overcrowding can increase class size (Rivera-Batiz and Marti 1995). Overcrowded schools are more likely than underenrolled schools or schools within 5 percent of their enrollment capacity to have at least one onsite building and one building feature, such as plumbing or heating, in less than adequate condition (NCES 2000–032) (see supplemental table 45-1).

In 1999, 22 percent of public schools reported being overcrowded (i.e., enrolling more than 5 percent above the number of students the school was designed to accommodate in its permanent facilities). Eight percent reported being severely overcrowded (i.e., enrolling

more than 25 percent above permanent capacity). About one-half of schools (52 percent) were underenrolled (i.e., enrolled more than 5 percent below permanent capacity).

The proportion of schools reporting severe overcrowding in 1999 differed somewhat by enrollment size, percent minority enrollment in the school, and geographic region. Schools with enrollments of 600 or more students were more likely to be severely overcrowded than schools with lower enrollments. Severe overcrowding was also more likely in schools with more than 50 percent minority enrollment than in schools with minority enrollment of 21–50 percent or less than 5 percent. Severely overcrowded schools were more common in the West than in the Northeast or Midwest, but apparent differences in the distribution of such schools were not statistically significant by locale (urban, suburban, or rural); instructional level (elementary, secondary, or combined); or the percentage of students eligible for free or reduced-price school lunch (see supplemental table 45-2).

SCHOOL ENROLLMENTS: Percentage distribution of public schools reporting that they are underenrolled, at capacity, or overcrowded, by school enrollment size and region: 1999



NOTE: Percentages may not add to 100 due to rounding.

SOURCE: U.S. Department of Education, NCES, Fast Response Survey System (FRSS), *Condition of America's Public School Facilities: 1999* (NCES 2000–032), 2000.

FOR MORE INFORMATION:

Supplemental Notes 1, 8
Supplemental Tables 45-1, 45-2

NCES 2000–032

Achilles 1996; Finn 1998; Krueger 1999; Rivera-Batiz and Marti 1995



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